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Identification of World Class Universities: Destructive Pluralism*

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ABSTRACT

The article deals with the problem of identifying world-class universities (WCU) on the basis of information provided by various ranking systems. The relevance of the problem is due to the fact that in 2022 Russia was "cut off" from the world community, including the interruption of cooperation with leading international ranking universities, so the country risks losing the opportunity to self-check its successes and failures by generally recognized criteria. In this regard, the purpose of this article is hypothesis verification that the "friendly" ranking of ARWU base can serve as an effective substitute for the "unfriendly" QS ranking base. To test the formulated hypothesis, we used the previously developed algorithm for identifying WCU using statistical data from the five Global University Rankings — Quacquarelli Symonds (QS), Times Higher Education (THE), Academic Ranking of World Universities (ARWU), Center for World University Rankings (CWUR) and National Taiwan University Ranking (NTU) — and two University Rankings by subject — QS and ARWU. Conducted calculations disproved the general hypothesis and revealed a fundamental inconsistency of results obtained on the basis of different rankings. In addition, by the example of the ARWU, a profound contradiction in the logic of compiling the GUR and the SRU was uncovered. That raises a broader question about adequacy of the concept of the WCU itself. To answer this question, we conducted a "humanitarian test" for the validity of modern WCU, which showed the presence of elementary illiteracy and lack of culture among graduates of advanced universities. Collected stylized examples allowed to establish that modern world market leaders' universities do not pass the "humanitarian test", and therefore the entire rating system cannot be considered a reliable basis for conclusions about the activities of universities. The question of replacing the term WCU with a less pretentious "product" category — practice-oriented universities — is being discussed.

Keywords: world-class universities; higher education; competitiveness; ranking

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INTRODUCTION

In 2003, in the world started a massive campaign to compile university rankings. The university's entry into the top lists of these ratings testified to its high integration into the global scientific community, great scientific and educational success and served as a positive marker for all interested persons [1, 2]. Initially, Global University Rankings (GUR) were compiled, giving a general assessment of the authority of the university, and later University Rankings by Subject (URS) were being developed, recording their achievements in specific scientific fields. Currently there are about two dozen rating products and their development companies — rankers in the world [3, 4]. The existence of a multitude of ratings showed their inconsistency [5] and raised the question of their adequacy and reliability [6, 7].

Comparing the different GUR, the author's note that understanding the methodology of ranking, universities can improve their practice and become competitive [8], however, one should keep in mind that there are practically no two identical ratings from a methodological point of view [9]. Comparative analysis of five GUR's (ARWU, QS-THE, Webometrics, Leiden, HEEACT[1]), based on an assessment of their rank comparability [10] showed great similarities between ARWU and HEEACT's ratings, while the others were very different [11]. The correlation between these two GUR was also found in researches [12, 13], whereas in [14] is a close correlation in — between Taiwanese NTU and Turkish *University Ranking by Academic Performance* (URAP). Factor analysis of ARWU, THE and QS rating products illustrated that these systems are not mutually supportive and additive [15]. In turn, the analysis the intersection of five GUR (ARWU, QS, THE, Leiden, U-Multirank[2]) showed that only 35 universities are in the top-100 of all five rankings and there are significant differences in the geographical representation of universities [16]. Similar results were in the work [17], where the author also showed the intersection of only 35 universities in the top-100 three ratings — ARWU, QS and THE. Despite the differences, analysts note that a general approach to measuring the quality of higher education is gradually emerging at the international level, based primarily on the evaluation of research performance and academic reputation [18].

Without going into details of the rating movement, we point out that the process of entering the world rankings and the associated mechanism of building world-class universities (WCU) is quite expensive and long [19, 20]. Russia joined him, having spent a fair amount of time, money and efforts to enter the top-100 chosen for this purpose three GUR — *Quacquarelli Symonds* (QS), *Times Higher Education* (THE) and *Academic Ranking of World Universities* (ARWU). The initiative was not successful: none of the Russian universities–applicants even came close to the coveted border of the top-100 and only a few universities in recent years were able to enter the top-50 of URS QS. Despite this, the failure did not discourage the Russian leadership, and domestic universities continued to focus on GUR and URS as a useful source of assessment of their success on international criteria. However, 2022 year made it impossible to follow the long-term trend. Due to Russia's special military operation in Ukraine, the country was subjected to unprecedented scale and force of international sanctions. One of

[1] ARWU — Academic Ranking of World Universities, developed by Shanghai Jiao Tong University; QS–THE (QS World University Rankings — Times Higher Education) — joint ranking of the British edition Times Higher Education (THE) with Quacquarelli Symonds (QS) until 2009, that they are separated by two independent ranking later; Webometrics — Ranking Web of Universities, published by Spanish laboratory at the Spanish National Research Council (CSIC); Leiden — ranking developed by Centre for Science and Technology Studies (CWTS) at University of Leiden; HEEACT — ranking by Higher Education Evaluation and Accreditation Council of Taiwan (HEEACT), which suspended its participation in project in 2012, and have been manufactured by National Taiwan University and became known as the ranking NTU.

[2] U-Multirank — multidimensional ranking of universities initiated and funded by the European Commission.

them became "excommunication" of Russian science from the international community. This resulted in the refusal to include Russian journals in the International Academic Databases (IAD) *Scopus* and *Web of Science*, in the suspension of the indexing journal, that have entered these databases, in a lack of access of Russian users to these databases. At the same time, the informational cooperation of Russian universities with international rankers are stopped. If in 2022 year all the listed negative effects have not yet manifested fully, it can be stated with confidence that from 2023 year the scientific isolation of Russia will become full-scale.

The accession of Russia to GUR and URS was determined by the need to create WCU in the country, which in the future could act as drivers of technological development. The scientific ostracism to which the country fell in 2022 year does not solve the problem of establishing effective scientific and educational centers. In this regard, the goal of the article is to ensure whether in the new conditions it is possible to find alternative opportunities for self-identification and self-testing of Russian universities, so as permanently not to lose contact with the world scientific community. Here, too, the more general question arises as to what the WCU should meet in the modern environment.

IDENTIFYING WORLD-CLASS UNIVERSITIES: SEARCH OF INFORMATION ALTERNATIVES

Most reputable GUR and URS are developed and compiled in countries that have joined to sanctions. However, among them there are products that belong to friendly or at least neutral States in relation to Russia. In particular, this applies to the oldest rating — ARWU, compiled in China by *Shanghai Jiao Tong University*. There is chance that this ranker does not intend to exclude Russian universities from its base. In this regard, under conditions of information isolation, Russia could focus on GUR and URS of ARWU. This hypothesis will be verified below. Given that the WCU identification experience was previously based on URS QS, this base can now be replaced on the Chinese product. The general hypothesis can be formulated as follows: the ARWU database will be an effective substitute for the QS database.

Previously, the authors proposed an operational definition of WCU that takes into account the scale of the organization's achievements and the strength of its brand: *world-class University can be considered a university that has received wide international recognition and first-class scientific results on a wide range of scientific fields* [21]. This interpretation, on the one hand, contains the criteria of Jamil Salmi, who highlighted the three main characteristics of the WCU: high concentration of talents, abundance of resources, effective management [20] and, on the other hand — allows us to go to the procedure of their identification. In this case, "wide international recognition" is approximated by the fact of the university entering the top-100 at least one of the five reputable GUR, "top-notch scientific results" — its entering in the top-50 University Rankings by Subject (URS) of a certain rating system (QS), "wide range of scientific directions" — is heuristically determined number of URS in which the university was in the top-50 (5–6).

Hereinafter to assume that the first part of the definition ("university that has received wide international recognition") is a criterion of the global success of the university, which we will refer to as "G-criterion". The second — ("with top-notch scientific results in a wide range of scientific fields") acts as a local criterion, determining the number of subject areas of successful work of university researchers and is designated as "L-criterion". Parameter "L", in addition to the actual number of scientific directions, in which the university is an international leader, also assumes a lower bound — L*, exceeding which allows us to talk about sufficient scientific diversification of the university. In the

future, we will start from understanding of WCU, on which the basic algorithm of their identification was based and which has been repeatedly tested earlier (for example, [21, 22]). Although the basic identification algorithm has since been slightly modernized, further calculations will be based on it as sufficient to understand the qualitative situation.

The essence of the proposed alternative is that, as before, the G-criterion is checked based on whether the university is in the top-100 of one of the five reputable GUR: *Quacquarelli Symonds* (QS), *Times Higher Education* (THE), *Academic Ranking of World Universities* (ARWU), *Center for World University Rankings* (CWUR) *и National Taiwan University Ranking* (NTU). If it is represented in the top-100 at least one of the specified GUR, it is a contender for the role of WCU, and the L-criterion is checked: whether university in the top-50 in at least 5 or 6 directions in the URS ARWU [L* = 5 (L* = 6) appears as the minimum "cut-off boundary" of universities]. Emphasize that the main element of the change of calculation method consists in the transition from the information base URS QS to the base URS ARWU.

The proposed castling of sources of information raises a number of related issues, not only of practical but also of theoretical importance:

- How invariant are the results based on URS QS and URS ARWU?
- Are Russian universities fully and adequately represented in the ARWU system?
- Is it possible to draw practical conclusions from the ARWU data about disadvantages of Russian universities and ways of strengthening them?

We answer these questions below.

Since in 2021 only one Russian university — Lomonosov Moscow State University — was in GUR QS and ARWU, then for the next years it is enough to use only one GUR — ARWU. But Russia was still in different rankings since in 2021, for this year we will use the expanded GUR base to identify WCU.

TRANSITION FROM QS TO ARWU: VIOLATION OF INVARIANCE

To check the formulated hypothesis, we will use a basic identification algorithm with a small adjustment: top list of potential WCU is standardized by cutting-off the "excess" part. All universities with numbers greater than "100" are discarded, as a result there is a list of the top-100, in which there are WCU.

We will use two versions of the L-criterion to compile a list WCU — L* = 5 and L* = 6. This will compare the stability of the two rating systems to the cut–off boundary. Both systems compared for 2021.

Comparisons lead to several conclusions.

First, the ARWU system is less sensitive than QS to the subject cut-off boundary. If the boundary L* = 6 for QS is sufficient to form a compact WCU top list, then for ARWU this is not too much (*Table 1*). Moreover, experimental calculations show that even with the criterion L* = 7, the list of potential WCU in ARWU is 107 units; only the transition to an even more stringent criterion L* = 8 allows to bring the top list to the standard value of 100 positions. This situation is due to the fact that the URS ARWU methodology reduces the concentration indicators of scientific directions in universities and thus leads to "smearing" of the core of leading universities. For example, according to ARWU, the maximum subject concentration has *Stanford University* — 39 positions, therefore, none university in the world reaches the mark of 40 units. However, according to QS, 8 universities reach and exceed the above level: *University of Oxford* — 40, *Stanford University* — 41, *University of Cambridge* — 41, *University of California, Berkeley* (UCB) — 41, *University of Michigan, Ann Arbor* — 40, *University of California, Los Angeles* (UCLA) — 43, *University of Toronto* — 46, *University of British Columbia* — 41. Thus, the ARWU system is characterized by an excessive dispersion of WCU by scientific directions, which produces an increased requirement for a critical boundary L*.

Table 1

Number of potential WCU with different cut-off criteria (L*) for two systems — QS and ARWU

Indicator	2021	
	QS	ARWU
Number of WCU when L* = 5	111	124
Number of WCU when L* = 6	101	118

Source: compiled by the authors.

Table 2

Number of countries with WCU with different cut-off criteria (L*) for two systems — QS and ARWU

Indicator	2021	
	QS	ARWU
Number of countries with WCU when L* = 5	21	16
Number of countries with WCU when L* = 6	21	16

Source: compiled by the authors.

Second, the ARWU system covers a smaller country geography than QS (*Table 2*). For example, QS includes Finland, New Zealand, Mexico, Brazil and Russia in addition to the countries present at ARWU. Thus, the Chinese ranker is tuned to a stricter filtering of objects, and in the field of his attention are universities from too few countries. It should be noted, however, that the discrepancy is a fundamental one, as ARWU lost five national university systems due to these methodological differences, which have been maintained for decades in other rankings. This is striking given that ARWU is losing almost a quarter of the countries that have them, against the background of wide list of potential WCU. There is also another apparent contradiction in the Chinese product — Moscow State University in GUR ARWU in 2021 is in 93rd place and in URS ARWU for the same year it did not enter the top 50 in any scientific field. Such inconsistency makes it possible to speak about deep, principled disadvantages of the ARWU rating system.

Thus, the geographical (country) invariance of the composition of WCU at the transition from URS QS to URS ARWU is violated. This fact means that using the ARWU database as an adequate alternative to QS is questionable. In this regard, a preliminary conclusion can be made that the general hypothesis regarding the use of the ARWU database as an effective replacement for QS has not been confirmed.

TRANSITION FROM QS TO ARWU: ABERRATION OF WCU GEOPOLITICAL MAP

It has been found above that for the most common parameters the invariance of WCU estimates for QS to ARWU rating systems is not performed, and the observed discrepancies are fundamental. In this connection, let us deepen the analysis and see to what extent the intraregional distribution of WCU differs between the two information sources. To do this, consider the number of WCU by the enlarged regions of the world in 2021 for a more stringent cut-off criterion L* = 6; the

Table 3

Number of WCU geopolitical centers in 2021 according to QS and ARWU

Region of the world	Ranking QS	Ranking ARWU
	Criterion L* = 6	Criterion L* = 6
USA and Canada	39	45
Europe and Russia	35	27
Asia	16	22
Others	10	6
Total	100	100

Source: compiled by the authors.

number of aggregated regions is four — North America (without Mexico), Europe (with Russia), Asia and the rest of the world. The calculations are presented in the *Table 3*, from the analysis of which at least two fundamental differences between estimates based on QS and ARWU become apparent.

First, the ARWU system, compared to QS, gives a much more monopolized picture of the world WCU market. Almost half of all WCU is concentrated in the United States and Canada. It can be said that ARWU unconditionally recognizes the headship of American universities. The Herfindahl — Hirschman Index for ARWU is slightly higher than for QS — 3 274 versus 3 102. Similarly, the dispersion of regional WCU values for ARWU is 28.6% higher than for QS — 258.0 versus 200.7.

Second, the obtained results lead to the conclusion that there is no regional congruence of QS systems to ARWU. If one gives an approximate parity between North America and Europe, with Asia more than two times behind even Europe, the other sets an indisputable priority for North America with approximate parity between Europe and Asia. Given the above, it can be argued that the ratings of QS and ARWU set a completely different hierarchy of major geopolitical centers of economic activity, which confirms the conclusion that it is impossible to use the rating platforms QS and ARWU as interchangeable.

The comparison of the main geopolitical centers of WCU confirms the earlier conclusion that the general hypothesis regarding the use of the ARWU database as an effective replacement for QS should be rejected. The appropriate question here is which of the two rating systems demonstrates results that are more accurate. It is impossible to give a satisfactory answer to this question, because today there is no reliable methods of verification of rating products for complex objects. However, in our case, it is important statement of the fact that there is no expected invariance for WCU estimates based on QS to ARWU.

TRANSITION FROM QS TO ARWU: ABERRATION OF WCU REGIONAL SEGMENT

The differences in the position of the WCU regional centers between the two rating systems are compounded by differences in their distribution across countries within regions. Consider this issue in more detail.

For the Asian region, the ARWU results are some discouraging. This system clearly underestimates Japan's potential and doubles overestimate China's potential compared to QS (*Table 4*). This is perhaps the most impressive difference between the two

Table 4

Number of WCU Asian Countries in 2021 according to QS and ARWU

Region of the world	Ranking QS	Ranking ARWU
	Criterion L* = 6	Criterion L* = 6
China	8	16
Japan	3	2
South Korea	2	2
Others	3	2

Source: compiled by the authors.

Table 5

Number of WCU European Countries in 2021 according to QS and ARWU

Region of the world	Ranking QS	Ranking ARWU
	Criterion L* = 6	Criterion L* = 6
UK	12	8
Germany	5	3
Netherlands	6	4
France	2	4
Switzerland	3	3
Sweden	2	1
Denmark	1	2
Russia	1	0
Others	8	2

Source: compiled by the authors.

ratings of the WCU. It turns out that WCU in China is almost 3 times larger than in the rest of Asia that looks not quite realistic. Such a clear sympathy of the Shanghai ranking for Chinese universities looks not objective, especially considering the origin of the developer ARWU.

Ranking of European scientific and educational potential is also very exotic represented by ARWU rating system. Therefore, compared to QS, it reduces by a third the number of WCU in the UK (*Table 5*). In addition to the general underestimation of European success, two circumstances draw attention: castling in the two ratings of the potential of Denmark and Sweden and a fundamental realignment of forces of Germany and France. So, based on QS, in Germany there are 5 WCU, and in France — 2, and according to ARWU — 3 and 4 respectively. Finally, Russia's only WCU in QS — MSU — disappears into ARWU. Moreover, while in URS QS MSU entered the top 50 in 6 scientific directions, in URS ARWU — none at all. In this connection, there is legitimate question: how did the MSU enter the top 100 of the

Table 6

Methodology of QS World University Rankings by Subject

Direction of evaluation	Comment
1. Subject ranking	51 subject area in the directions: Arts and Humanities (11), Engineering Science and Technology (7), Life Science and Medicine (9), Natural Sciences (9), Social Sciences and Management (15)
2. University candidates	The University should exceed the minimum required assessment for each subject area by indicators of "academic reputation" and "employer reputation", as well as the minimum threshold for the number of publications in this subject area
3. Indicator	
3.1. Academic reputation	Survey of 100 thous. scientists around the world, where each of them can identify up to 10 domestic and 30 international leading institutions in their opinion (no more than two directions)
3.2. Reputation among employers	Survey 50 thous. employers, where they identify up to 10 domestic and 30 international institutions producing the most demanded and qualified specialists, and indicate the disciplines they prefer to hire graduates
3.3. Number of citations per publication	Number of citations (without self-citation) per article by destination for each institution by Elsevier Scopus database. When compiling the rating of 2021 articles were taken into account for the period 2014–2018, citation — for 2014–2019
3.4. H-index	H-index academic
4. Scoring	Different weights of different indicators are used in ranking universities by subject area
4.1. Arts and humanities	Academic reputation (60–90%), reputation among employers (5–30%), research citations per paper (0–15%), H–index (0–15%)
4.2. Engineering science and technology	Academic reputation (40%), reputation among employers (30%), research citations per paper (15%), H–index (15%)
4.3. Life sciences and medicine	Academic reputation (30–40%), reputation among employers (10–20%), research citations per paper (20–30%), H–index (20–30%)
4.4. Natural sciences	Academic reputation (30–60%), reputation among employers (10–20%), research citations per paper (15–30%), H–index (15–30%)
4.5. Social sciences and management	Academic reputation (40–70%), reputation among employers (10–50%), research citations per paper (5–20%), H–index (0–20%)

Source: compiled by the authors according to the official website QS.

Table 7

Methodology of ARWU World University Rankings by Subject

Direction of evaluation	Comment
1. Subject ranking	54 directions in natural (8), biological (4), medical (6), engineering (22) and social (14) sciences
2. University candidates	Universities that have passed the WoS publication threshold set for each area
3. Indicator	
3.1. Q1	Number of articles in WoS journals with Q1 quartile in the last 5 years
3.2. Category Normalized Citation Impact (CNCI)	Ratio of citations of published articles to average citations of articles in the same category, year and type of journal publication by the institution on academic subject for the last 5 years
3.3. International cooperation (IC)	Ratio of number of publications with authors from at least two countries to total number of related publications for the institution over the past 5 years
3.4. Quality of research (Top)	Number of articles published in leading academic journals in the last 5 years. Leading journals are determined by outstanding scientists within the academic rating of ShanghaiRanking journals
3.5. International academic awards (Awards)	Total number of university staff who received significant academic awards since 1981 (32 awards in 27 areas)
4. Scoring	For each university indicator, its percentage of the institution that scored the most points is calculated, and then the square root of the percent is multiplied by the assigned weight (determined for each direction). The final score is obtained by summing up the points for each indicator, and universities are ranked in descending order

Source: compiled by the authors according to the official website ARWU.

GUR ARWU without identifying itself on any subject in the URS ARWU?

Even stranger is the performance of the Brazilian *University of Sao Paulo* (USP) and the Mexican *National Autonomous University of Mexico* (UNAM), которые в URS QS that in URS QS entered the top-50 in 13 and 12 scientific directions, respectively, and in URS ARWU — neither. The New Zealand *University of Auckland*, which is also in the top-50 in 10 scientific areas, and the URS ARWU in only — 3, has a similar but less pronounced situation. Such examples are numerous and difficult to explain.

This allows us to ultimate verdict: WCU identification results based on URS QS and ARWU demonstrate the absence of invariance; hence, the general hypothesis of the article was not confirmed.

CAUSES OF INVARIANCE VIOLATION OF QS AND ARWU ASSESSMENTS

The lack of invariance of WCU identification results based on URS QS and ARWU requires at least a brief explanation. Moreover, the recorded differences in assessments are so significant that they exclude the possibility of replacing one source of information about universities — QS — with another — ARWU.

To explain the differences that arise, refer to the *Table 6* and *7*, which present the methodology of compiling URS QS and ARWU. The comparison of the two methodologies leads to the following conclusions.

First, QS uses large-scale expert surveys that ARWU does not use at all. Surprisingly, survey results differ from bibliometric data and result in poor comparability between the two rating systems. In this sense, the ARWU product seems even more objective, especially considering that QS surveys affect not only the academic community, but also employers.

Second, the two systems use widely differing subject lists. For example, in URS QS there is a section "*Arts & Humanities*", which URS ARWU does not have. Such a reduction of the ARWU subject base is unjustified, and thus the focus is only on natural and engineering sciences. The resulting distortions in the estimates of the two systems are caused by the loss in ARWU of 11 important QS humanitarian areas, such as: archaeology, architecture/built environment, art & design, classics & ancient history, English language & literature, modern languages, performing arts, history, linguistics, philosophy, theology, divinity & religious studies. B At the same time section "*Engineering & Technology*" in URS QS is presented in 7 directions, while URS ARWU — 22. It is not surprising that this initial incompatibility of the subject lists of the two systems results in incomparable final results.

Third, the publication and citation indicators in QS are based on IAD *Scopus*, and in ARWU — on *Web of Science*. While *WoS* was originally the American system focusing on the English-speaking world (is currently extremely conservative, with new member journals being extremely difficult to promote), *Scopus* was designed as a pan-European alternative to *WoS*, in which English is recognized as a working language but not as a native (and the base itself is more democratic and open to new participants). Obviously, the lists of the best articles in the two systems will not necessarily coincide. This circumstance — American centricity of ARWU — explains the fact that URS QS for 2021 includes 508 universities, while URS ARWU — only 458.

Thus, the three methodological differences considered in compiling URS QS and ARWU exclude the invariance of the rating results and lead to fundamental differences regarding the place and role of individual countries.

VERIFICATION OF THE WCU

The established absence of invariance between the two leading rating systems — QS and ARWU — raises new questions. For example: which of these two products is more reliable? And in extended — how trustworthy the rating sources of information?

Despite the total prevalence of ratings and their impact on all aspects of life, as well as the fact that for many years there are specialists of the new profession — rankers (rating developers), there is still no scientific basis for verification of rating products. In this regard, each time this research turns into a very creative and usually unique procedure that does not involve replication on other types of rating products. In our case, the ratings of WCU based on QS and ARWU show that Russia is not only an outsider of the market of advanced universities, but also continues to degrade. But is it really?

One of the approaches to assessing the validity of WCU ratings is based, according to the authors, on the representation in their list of universities of the countries "nuclear club". This approach focuses on the *technological side* of the WCU, but we will consider an alternative approach that is more focused to their *humanitarian potential*. The two approaches — technological and human — do not exclude, but complement each other, which justifies their use.

The essence of the proposed method consists in the use of stylized examples (SE), which due to their "refinement" allow to draw general conclusions about the studied phenomenon. In this case, SEs reflect some aspect of a reputable WCU that reveals cognitive dissonance between expectations and reality.

The first SE concerns *Harvard University* and its "graduate" *William Gates*. First, the story of B. Gates, who entered Harvard in

1973, was expelled two years later, and since 07.06.2007 officially considered a Harvard graduate, because the administration of the university decided to give him a diploma (for special merits) 34 years after admission.[3] The remarkable fact is Gates' study profile at Harvard — law — is inconsistent with his subsequent field of study in computer technology.[4] In addition, Harvard University awarded B. Gates an honorary Ph.D. in Law.

B. Gates' initiative to improve the production of vegetable meat for the transition from normal quality meat to vegetable protein concentrate or ground meats looks like an antiscientific. Harvard and Stanford supported the development of this technology.[5] The actions of Harvard University are, in our view, completely out of WCU standards of conduct, which include. On the one hand, Harvard University demonstrates double standards in issuing its scientific and educational certificates (it sells diplomas) and on the other — participates in questionable, if not anti-social and anti-scientific, projects. Therefore, without denying the scientific merits of Harvard University, it can be stated that it is only with a clear stretch that the WCU: reality does not meet expectations regarding the leader of the Ivy League.

Another failed Harvard graduate is a confirmation — *Mark Zuckerberg*, who studied at the university for only two years, but, like Gates, 13 years later still received a diploma, adding to the ranks of "honorable" graduates of Harvard. This fact is not surprising, if we recall that one of the criteria for the evaluation of universities at the GUR is the presence of outstanding graduates.

The second SE concerns the current Secretary of State for Foreign, Commonwealth and Development Affairs of the United Kingdom, Liz Truss (*Elizabeth Mary "Liz" Truss*), studied philosophy, politics and economics at *the House or College of Scholars of Merton in the University of Oxford*, which she graduated with honors.[6] Despite her excellent education, the politician of such a high rank "became famous" with his frankly shocking statements demonstrating complete ignorance of the primitive foundations of history and geography. Thus, she proposed to protect the Baltic States from Russian aggression through the Black Sea; refused to recognize Russia's sovereignty over the Rostov and Voronezh regions, and announced that Ukraine — is a proud country with a long history, having survived many invasions — from Mongols to Tatars.[7] Such illiteracy of person, included in the top-40 graduates of College of Scholars of Merton, makes you think about the true value of education, which everyone used to consider "elite".

The third SE concerns with record holder on number of absurd utterances —*George W. Bush*, 43rd President of the USA. The man who earned his bachelor's degree from *Yale University* and graduated from *Harvard Business School*, during his career made so many gaffes and flubs that his gaffes gave rise to neologism — "bushism". In particular, he called Africa a country suffering from an unthinkable disease; Greeks — as "Grecians"; Australia — as "Austria"; Elizabeth II — as Elizabeth XI. During a visit to Japan, he confused "deflation" with "devaluation", thereby crashing the yen's exchange rate; he asked, where is Wales in the USA; he believed that humans and fish could coexist peacefully; increased the "triple" allocation from 50 to 195 mln dollars; he considered East Berlin and Leipzig part of Central America.[8]

The string of statements could go on, but even the examples given are enough to cast doubt on the brilliant education of one of the

[3] URL: https://lenta.ru/articles/2007/03/23/gates/

[4] URL: https://www.shkolazhizni.ru/biographies/articles/40248/

[5] URL: *https://rusorel.info/obed-dlya-rabov-muchnye-chervi-polezny-i-pitatelny/*

[6] URL: https://topwar.ru/195904-kto-uchil-dzhen-psaki-i-liz-trass-mif-zapadnogo-jelitnogo-obrazovanija.html

[7] URL: https://yamal-media.ru/narrative/glupye-ljapy-zapadnyh-politikov-o-rossii

[8] URL: https://ria.ru/20220212/kazusy-1772348568.html?in=t

leaders of the American establishment who was educated at the university, — a leader in the global education market.

Such examples, which demonstrate the lack of education of graduates leading WCU in elementary things, are not the only ones. Let us remember statements of the 44th President of the United States Barack Obama, who graduated from Columbia University and Harvard Law School, who declared 58 states in the USA. British Prime Minister Boris Johnson (*Boris Johnson*), who educated at Oxford Balliol College and continued the tradition of George W. Bush to call Africa a country. John Kerry, 68th Secretary of State, graduated from Yale University and declared American support for democratic institutions in Kyrgyzstan. The 45th President of the USA, Donald Trump, graduated the University of Pennsylvania and personally met the President of Virgin Islands of the USA.[9]

It may seem that all the above examples are isolated exceptions to the rule, which cannot serve as a serious argument to discredit the universities mentioned. But this is not so. The fact that one of the properties of SE is that they reflect not unique, but mass phenomena [23]. This means that similar examples with different variations and arrangements can be given as much as. In this case, the international recognition underlying the WCU identification is based on the publicity and openness of information about their activities — reputation in expert community and high ranking publications in open database journals. The literature has already noted the inadequacy of this approach (for example, [24, 25]), however, even if we recognize the public results of the university as an acceptable criterion for assessing its viability, then the shame and public scandals associated with "punctures" its successful alumni should be a valid argument for its failure. This counterargument reveals the above stylized examples.

Thus, the WCU, recognized as such according to modern evaluation criteria, does not guarantee the quality of education, and even less the higher level of culture of its graduates. And this fact casts doubt the need to concept of WCU in a post-industrial society.

CONCLUSION

The research leads the following important conclusions.

First, there are currently no objective criteria and reliable sources of information for determining and identifying WCU.

Second, the public recognition of some performance of universities as key to assess their viability "awakens" the law Charles Goodhart,[10] which manipulates the indicators and distorts the true picture.

Third, the current methodology and practice of ranking universities do not allow them to bring them to a single denominator, which leads not only to contradictions between the rating products of different developers, but also to the instrumental conflict between products of the same ranker (for example, GUR and URS). The multiplicity of rating centers and the diversity of their approaches to listing market participants only exacerbate the problems noted. The current state of affairs can be described as *destructive pluralism*: information is many, but it is contradictory and unreliable

In turn, based on the above, it must be noted that the concept of WCU in the modern world has become a kind of positive euphemism. In fact, the classification of a university as WCU often simply veils the aggressiveness of the management of the respective organization, its unfair methods of competition and sometimes "dirty" technology in achieving certain results. Thus, the concept can no longer act as a reliable marker for economic agents, but, on the

[9] URL: https://ria.ru/20220211/ongovorki-1772271793.html

[10] Goodhart's law sounds like this: when a measure becomes a target, it cease to be a good measure.

contrary, disorients or even frankly deceives them.

In the XXI century, some concepts and representations are hopelessly obsolete. It is not excluded that some of these included WCU, especially based on rating products. In our view, the only sensible replacement for WCU should be practice-oriented universities that actively participate in advanced technology and management initiatives. Activity is determined by the scale and significance of the contribution (developments) to these initiatives. Let us emphasize that this understanding is not, strictly speaking, identical to research, innovative and entrepreneurial universities, although it is not always contrary to them.

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The Eurasian Economic Union: Today and Tomorrow

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ABSTRACT

The Eurasian Economic Union States should strengthen their sovereignty within the EAEU through the complementary specialization of economies, cooperative ties in knowledge-intensive industries and economic sectors around the entire economic cycle. However, the Eurasian integration needs a new impetus. The period having passed since the EAEU creation imposed a necessity to qualitatively revise what has been done, to frankly state that a whole range of the Treaty's provisions was not fulfilled as well as to formulate and propose specific mechanisms for further implementation of its provisions, to outline new integration horizons, to adopt appropriate decisions and to start acting. The article provides an idea of where the Eurasian integration is currently moving. It offers an overview of the Strategic Directions for Developing the Eurasian Economic Integration until 2025, the document that embodies the transition from the shaping stage (2015–2019) to the project integration stage (2020–2025). The new stage's essence is about ensuring conditions for the specific joint economic projects at both interstate and individual economic entity level. The article mentions what has already been accomplished in this direction and what lies ahead. It reflects the integration's impact on the participating countries' economies: both existing and forecast one. Furthermore, it touches upon the issue of dedollarizing the Union countries' mutual trade, digitalization, the EAEU international cooperation as well as global economic risks and ways to overcome those through integration cooperation. In conclusion, the article proposes new principles of the integration association's work.

Keywords: EAEU; Strategy-2025; Eurasian integration; dedollarization; EAEU Member States; Greater Eurasian Partnership; globalization; economic development; digitalization

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SCIENTIFIC AND PRACTICAL FOUNDATIONS OF EURASIAN INTEGRATION

At the meeting of the Supreme Eurasian Economic Commission in Bishkek on 27 May 2022, the heads of State of the Eurasian Economic Union (EAEU), which includes the Republic of Armenia, the Republic of Belarus, the Republic of Kazakhstan, the Kyrgyz Republic and the Russian Federation, decided to approve 29 May as the Day of the Eurasian Economic. This date was chosen not by accident. On 29 May 2014, the Treaty on the Eurasian Economic Union of Belarus, Kazakhstan and Russia was signed, which was later joined by Armenia and Kyrgyzstan. Decision — is not only a tribute to the significant date of the creation of the economic union, but also the consolidation of its status and the assessment of its viability.

On the one hand, has come a long way in integration construction. Many activities are carried out by reading reports on the implementation of adopted documents and plans, the results obtained. Official representatives of the Eurasian Economic Commission and EAEU Member States regularly announce relevant achievements. Not without criticism, based on the expectation of greater efficiency, or — for existing omissions.[1]

Today's dynamically changing world requires much more flexibility and mobility, innovative approaches and ideas [1]. It is expected that

[1] Official website of the Eurasian Economic Commission. URL: https://eec.eaeunion.org/

the Eurasian Economic Union should not only form an appropriate agenda, but also somehow transform the style of its work, expand the range of activities, impress with large-scale initiatives and projects.

However, there is no active discussion of these issues [2]. And this should not be blamed on the Eurasian Economic Commission, which in its present status only implements the decisions of Member States. The Member States themselves, primarily their scientific community, which is always and everywhere the initiator of all changes, the engine of the resulting proposals, should develop the relevant request and proposal.

Most world and integration associations have the status of a free trade area or are in the process of forming a Custom Union.

Only MERCOSUR, the EU and the post-Soviet countries have achieved the highest level of integration [Free-Trade Zone, Custom Union, Common Economic Space and Eurasian Economic Union (FTZ, CU, CES and EAEU)].

Formation of the Eurasian Economic Union (EAEU) is a logical continuation of the integration process within the CU and CES. Principles of functioning of CU, CES and EAEU determine almost the whole system of measures and mechanisms for realization of goals and tasks at the stages of their creation.

The Eurasian Economic Union is based on concerted action in key economic areas — macroeconomics, competition rules, technical regulations, etc. This allows creating a common economic space, a common market of goods, balanced budget and currency policy, common approaches in the sphere of foreign policy.[2]

The minimum set of functions required for the effective functioning of the Union delegated to the supranational level within the Common Economic Space has already been effectively transferred. Supranational authority — the Eurasian Economic Commission, which replaced the Customs Union Commission in 2012 — already has the authority to take decisions on 180 functions of state regulation.

Of particular importance is the delegation of trade policy functions to the supranational authorities of the Union, including the introduction of a common customs tariff and adoption of protective measures; technical regulation and phytosanitary control; implementation of antimonopoly policy; customs and trade statistics; unification of customs and tax legislation, trade regime and trade negotiations with external partners. This contributes to the creation of an integrated and efficient of regulation of foreign trade activities on the territory of the Union [3].

At the same time, issues such as border security with neighbors, national defense, external energy relations, justice and internal affairs, social policy, labour regulation, monetary and exchange rate policy, are in exclusive authority of national authorities. In addition, the standard setting of initiatives and the implementation of norms adopted by the Eurasian Economic Commission (EEC) also remain the responsibility of national governments.

As a result, in accordance with the existing treaty and legal framework, EEC develops regulation through international agreements. This determines the nature of its work as supranational authority on the form of decisions, and interstate — on the procedures for their development and implementation.

Post-Soviet countries are particularly sensitive to the transfer of recently acquired sovereignty to the supranational level. The most important task today, therefore, is harmoniously combine elements of an intergovernmental and supranational nature.

The combination of regulatory areas devolved to the supranational level and remaining in national jurisdictions presents many complex issues that remain to be solved. In the meantime, the insufficient development of inter-State institutions leads to the process of harmonizing national interests returning to the bilateral level, which is — threat of integration. If a

[2] Economic indicators. Statistics of the Eurasian Economic Union. 2021. URL: http://www.eurasiancommission.org/ru/act/integr_i_makroec/dep_stat/econstat/Documents/I-IV_quarter_ 2021.pdf

balance is achieved between supranational executive authorities and inter-State institutions, compromises between Member States are possible for most legislative initiatives. This will address the issue of bilateral discussion of critical issues.

The EAEU Treaty, signed in 2014, is comprehensive: Member States were able to agree at once on full integration across a wide range of issues. It gave a strong impetus to the development of integration, and the proposed paradigm of cooperation proved its worth. However, the Treaty's "kinetic energy" dried up. Countries began to use tools and subsequent agreements to strengthen their economic sovereignty. There are national interests arose, recent attempts to "national lobbying" on the EEC platform, statements about "prematurity of these or other steps". Meanwhile, fears are groundless. Threats and challenges lie not in strengthening the integration component, but in the lack of competitiveness of individual economies.

Insufficient understanding of the need for accelerated modernization of the material sphere of economies on the basis the principles of complementary specialization of real sectors the economies EAEU Member States raises concern. There is an opinion about more successful integration in the financial sector of the EAEU than in industry.

Financial stabilization is important, of course, but it is not feasible in the case of macroeconomic and enterprise finance problems, as they be.

Integration into EAEU needs a new "charge". Full economic self-sufficiency of Member States is possible only within the Union — it is a fact. The sovereignty of Member States should be strengthened within the framework of the Union through complementary specialization of economies, cooperation in technology-intensive industries and the full economic cycle.

With the passing of time, since the establishment of the Eurasian Economic Union, it became clear that it was necessary to conduct a qualitative audit of the work done, and frankly to note that a number of the Treaty's positions were not implemented, and formulate and propose specific mechanisms for the further implementation of its provisions, define new integration horizons, take appropriate decisions and take action. The Commission, together with the Governments of Member States, was requested to develop Strategic Directions for the Development of Integration until 2025 (further — Strategy-2025, Strategy) [4].

In 2019, despite the deadline, the Strategy-2025 was not developed. Reasons are many. The main ones are: the unwillingness of the governments of the EAEU Member States to deepen integration more than defined by the EAEU Treaty, as well as the uncertainty of the Union's goals for the future. Of course, these issues are not far-fetched, although, except for the provisions of the EAEU Treaty, in 2018 the Heads of Member States adopted the Declaration "On the Further Development of Integration Processes within the EAEU" which, in essence, was a technical task for the development of the Strategy-2025.

The global economic crisis caused by the pandemic of new coronavirus infection has had a significant impact on the economies of all regions of the world. In 2020, the spread of the virus caused disruption of global supply chains, instability in financial markets, had a negative impact on key sectors of the economy. Measures implemented of social isolation have led to a decline in employment and consumer demand as a result of the decline in real disposable income of the population. Financial market panic and declining commodity prices resulted in significant economic losses. As a result of the widespread introduction of active quarantine measures, economies at different levels of development are experiencing a sharp recession.

Despite this, the EEC Board made serious efforts in 2020 to develop and submit to the heads of the EAEU Member States the project Strategy-2025. Pessimists told the management of the EEC Board that now the main thing — is to minimize the impact of the pandemic, not the Strategy. At the same time, the cohesion of

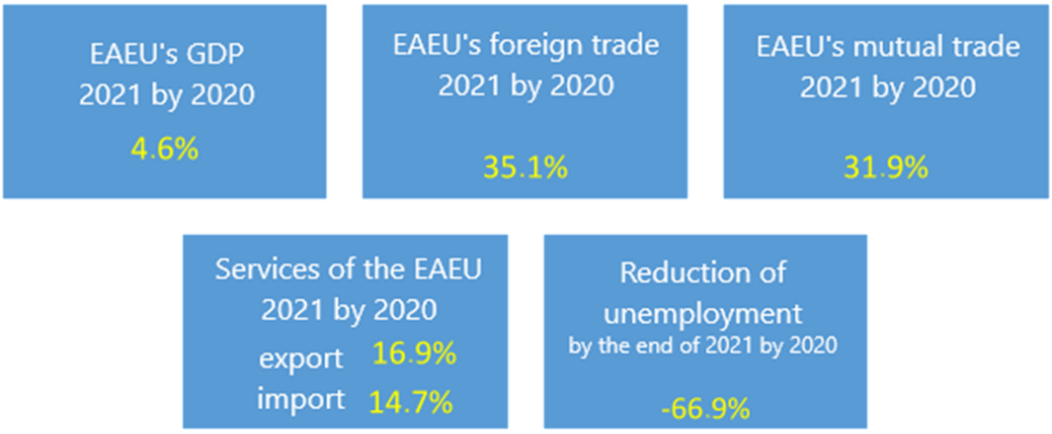

Fig. 1. **The main socio-economic indicators of the EAEU activity**

Source: compiled by the author.

the EAEU Member States in the fight against COVID-19 really showed its solvency, and the EAEU demonstrated more successful work during the pandemic than isolated actions of different countries. In December 2020, for the second time, the Strategy-2025 was approved by the Supreme Eurasian Economic Council.

STRATEGY-2025

Development of Eurasian economic integration until 2025 is focused on strategic planning in EAEU. The EAEU Treaty 2014 deals mainly with trade, and the Strategy-2025 slightly expands the horizons envisaged by it.

At the end of the first year, the pace of implementation of the Strategy is in line with the planned ones. Thanks to joint efforts, there are positive trends in most indicators: GDP, external and mutual trade, industrial production etc. (*Fig. 1*)

The results are expressed not only in the statistical but also in the practical "cut".

With regard to the creation of a common labour market, the procedure and mechanism for the export of pensions from one Member State to another has been defined, as well as the addition of years of service in Member States to determine entitlement to a pension, which affects the interests of millions of people.

Digital unified search system "Work without borders" began to operate in the current conditions, because it was in demand. Currently, the service contains more than 500 thous. jobs and more than 2 million CV.

Element-by-element formation of the common financial market — the members of the Intergovernmental Council signed an agreement on the exchange of information, which is part of credit histories within the Union.

To promote industrial development, the Eurasian Intergovernmental Council (EIC) approved the Main Directions of Industrial Cooperation until 2025, making its legal and organizational framework. Commission formed Maps of industrialization and development of the agro-industry of the EAEU. The first includes more than 180 large investment and significant projects in more than 25 industries and the second — more than 70 large investment projects in the field of AIC and provides insight into geographical location of these projects. Both resources are intended to be a tool for coordinating the actions of the EAEU countries on import substitution and avoid duplication of production.

In the adopted General Principles and Approaches to Ensuring Food Security, food security in the EAEU through produce their own food is enshrined. Production and consumption balances on the main groups of food are developed. Documents specify the fact that the food produced is sufficient for own consumption. However, there is no harmonized system for mutual trade as well as for complementary

specialization and cooperation. Appropriate program is therefore needed.

With regard to the digital agenda, work continues on the development platform of the industrial cooperation and transfer of technologies, and new projects have been launched on the technical regulatory system and transport services.

Agreement on the implementation of navigational seals in EAEU signed for unimpeded movement of goods. They provide for the tracing of goods moving through customs transit, as well as — in mutual trade (sanctions goods, alcohol, tobacco). In general, the implementation of the Agreement will minimize control measures at the internal borders of the Union, so it is necessary for early ratification by countries.

Adopted documents on equal access of all economic entities to public procurement in Member States. The volume of contracts on procurement of goods (works, services) on the territory of the EAEU in 2021 in value terms amounted to 152.8 bln USD (9.5% more than in 2020). The Republic of Belarus and the Russian Federation have the most significant trends in public procurement (33.7 and 10%, respectively).

Revised methodological framework to identify and remove barriers in the internal market of the Union.

The framework is being created for the implementation of cooperation in new areas: education, health, "green" technologies, environmental protection, and climate agenda.

The Scientific and Technical Council under the Chairman of the EEC has been established for the purpose of scientific support of integration directions, work on long-term development forecasts have been started.

Strategy-2025 — document evolutionary, and, in fact, preserves the continuity of earlier decisions taken in the EAEU, taking into account the challenges and prospects of world and Eurasian economic development, as well as contains new approaches in the formation of integration processes.

Heads of Member States in the Declaration of 2018 identified 4 macro-directions for the development of integration. Their disclosure is provided in Strategy-2025.

RELEVANCE OF STRATEGY-2025

1. The adoption of the Strategy exemplifies the transition from the stage of formation (2015–2019) to the stage of project integration (2020–2025), essence of which is to provide conditions (legal, managerial, scientific and methodological, financial) for specific joint economic projects as an inter-State and at the level of individual business entities (para. 2 Declaration, directions 6–8 of the Strategy) [5].

Examples of cooperation in EAEU already exist: the first cooperative project in the space sphere was approved, the project of the industrialization map with applications of a total cost of almost 200 bln USD was formed, development of the agro-industry development map was started, the system of accounting of production and circulation of agricultural products for monitoring food security of the EAEU is being established.

2. In order to move into a new phase of integration, it was necessary to agree on how to eliminate the disadvantages identified in the first phase. The Commission identified them well — they are mainly focused on the functioning of the internal market, ensuring the safety and quality of traded products, customs regulation, etc. The strategy proposes specific functions for which Member States have already agreed (para. 1 Declaration, directions 1–4 of the Strategy).

3. Since the signing of the Treaty, there has been an explosive growth in innovation and technology. Digital world in 2020 compared to 2014 has changed a lot. Integration should be based on modern digital solutions in all spheres. The Commission "rolled" some of them within the framework of the digital agenda of the EAEU, where there were lively discussions on the part of the issues, "weaknesses" were revealed. Direction 5 of the Strategy (correlated with para. 2 of the Declaration) proposes a balanced digital framework.

4. When working on the implementation of the Declaration and Strategy it became

apparent that the EAEU requires institutional improvement. It is necessary to eliminate the objective disadvantages (first, the absence of mechanisms for implementing Commission decisions) which prevent the full exercise of supranational competence; strengthen the right of the EAEU and support the powers of the Union bodies (Commission and Court). Steps to move in this direction are formulated in Direction 9 of the Strategy.

5. If during the formation period (2015–2019) the main task was the formation of the "framework" of the Union, then at a new stage (2020–2025) it is necessary not only to make "renovation" (give concrete projects), but also to "arrange life", i.e. to unlock the potential of integration for people, to make everyday life more comfortable.

Outlines of this work is set out in para. 3 of the Declaration and in direction 10 of the Strategy (education, health, tourism, sports).

6. The potential of the Union as an international organization was not realized in the first phase. The EAEU should formulate its agenda, for example, to promote the creation of a model of regulation of trade and economic cooperation in Eurasia beneficial to Member States and benefit economically from it. The Union needs to become a significant center of development of the modern world (para. 4 of the Declaration, Direction 11 of the Strategy).

7. Adopting the Strategy — is a balance of interests. In the new phase, it is necessary to achieve national interests and alliance goals in a complex — this is the request of Member States and an objective reality. The strategy reflects this approach. This is an indication that countries are ready to agree.

All decisions on the implementation of the Strategy will be taken in a concerted, open and by consensus among Member States.

8. Strategy — the basis for a new phase of integration. Document provides for:

- development of some 13 international treaties;
- adoption of more than 60 other normative legal acts of the EAEU;
- introduction of some 25 amendments and additions to the Treaty;
- further harmonization of national legislations of EAEU Member States.

IMPLEMENTATION OF THE PLAN STRATEGY

332 measures and mechanisms for its implementation have been approved under Strategy-2025 in 11 key areas of integration The Council of the Commission approved a detailed plan for the implementation of the Strategy, which contains 523 measures. According to the instructions of the Heads of State, approximately 75% of the activities fall on first three years of the Strategy's implementation. Out of 383 activities with deadlines, 289 are planned for 2021–2023; 140 are held annually or have an indefinite duration.

Of the 86 activities of 2021, 4 are still implementing: adoption of a mechanism for recognizing restrictions removed (para. 1.2.1), determination of the feasibility of creating a single information portal in the field of education (para. 10.2.1), optimization of general processes (para. 5.3.2), development of the concept of the territorially distributed digital platform of the EAEU (para. 5.3.4).

The Strategy provides for the adoption of 28 international treaties and agreements, more than 50 supplements and amendments to the law of the Union. Some of them have already been adopted, and the amendments provided for in the II Great Protocol, which was signed by the heads of State on 31 March 2022, are awaiting ratification.

2022 — one of the most intense in the implementation of the Strategy: 133 activities planned, 27 of which have already been implemented (*Fig. 2*).

Further implementation of the Strategy depends on the active position of the EAEU countries. The most pressing issues are: the need to accelerate the completion of the ratification of signed international treaties (of which II "Greater" protocol); timely formation and presentation of a common position in the coordination of draft

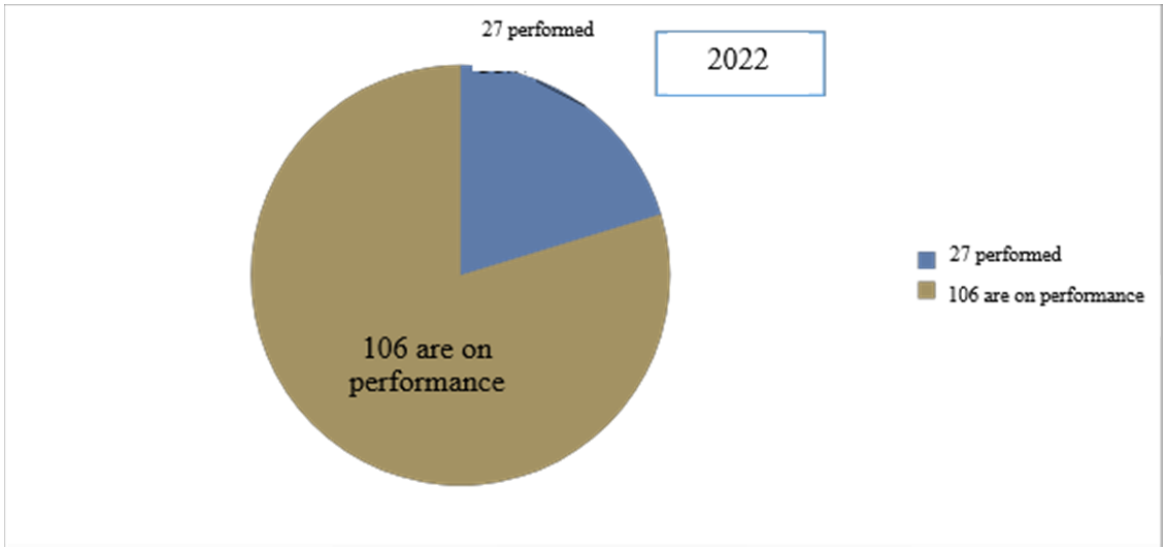

Fig. 2. **Activities planned by the Strategy-2025**

Source: compiled by the author.

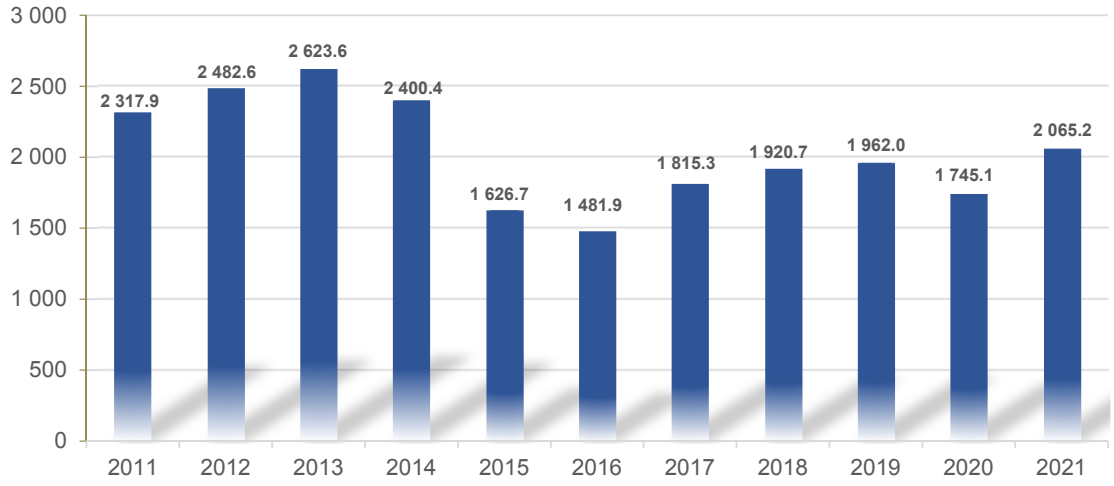

Fig. 3. **Gross domestic product (in current prices, billion US dollars)**

Source: compiled by the author.

documents; elaboration of questions regarding the presence/absence of competence of Union bodies for the implementation of the Strategy's activities; implementation of the provisions of the Strategy in the national acts of Member States, etc.

MACROECONOMIC POLICIES

In 2021, it was possible to prevent uncontrolled worsening of the economic situation, ensuring the implementation of anti-crisis programs of financial support; restore business activity, employment and trade, and show a higher rate of economic growth than in the pre–pandemic period.

In 2021, GDP amounted to 2.1 trn USD, compared to the previous year it grew by 4.6% and reached the lower limit of the interval (4.5–5.5% per year), stipulated by the main guidelines of macroeconomic policy for 2021–2022, approved by the Decision of the SEEC on 21 May 2021 year in No. 9.

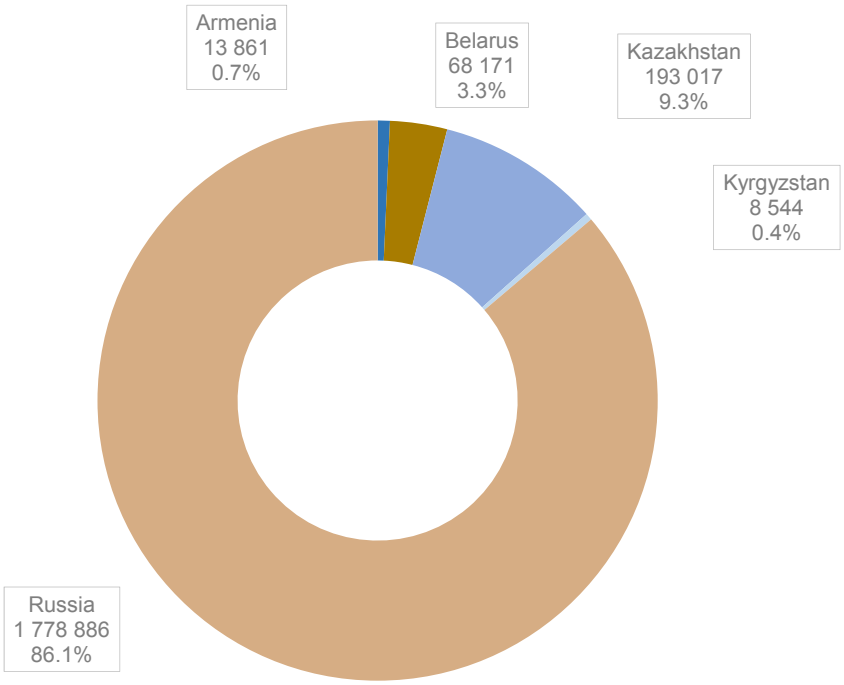

Fig. 4. **Gross domestic product by country (in current prices, USD million, % of the total GDP of the EAEU)**

Source: compiled by the author.

Recovery was observed in all sectors except agriculture. Average per capita GDP in current prices exceeded 11 thous. USD and became the maximum for last 7 years. It corresponds to the world average (latest data for 2020–10.9 thous.) (*Fig. 3*).

By 2011, the volume index of GDP of 2021 was 116%.

The EAEU GDP growth rate in the first quarter of 2022 was 103.5%. The positive growth dynamics of the economies were formed in Armenia: +8.6%, Kazakhstan: +4.4%, Kyrgyzstan: +4.5% and Russia: +3.5% (Rosstat estimates). Belarus — 0.4% decrease (*Fig. 4*).

The volume of industrial production of the EAEU in 2021 amounted to 1.4 trn USD and increased by 5.3%. At the same time, production of manufacturing industry increased by 5.1% compared to 2020 (919.3 bln USD) (*Fig. 5*).[3]

The index of industrial production of EAEU 2021 to 2011 amounted to 123.7%.

Index of industrial production of EAEU in January-April 2022 amounted to 103.7%, including the mining industry — 105.7%, manufacturing industry — 103%.

Industrial production increased in Kyrgyzstan (110.3%), Kazakhstan (104.7%), Russia (103.9%) and Armenia (102.6%); it fell in Belarus (97.5%).

Armenia registered an increase of 2.6%, which is due to the recovery of manufacturing output (+10.1%), increased production of food, textiles, metallurgy.

In Belarus, production of metallurgy, electrical equipment, motor vehicles and clothing has declined.

Kyrgyzstan became the leader in manufacturing industry growth (+18.9%), mainly due to the production of finished steel products.

Dynamics of industrial production in Kazakhstan and Russia has slowed, including

[3] The highest growth was observed in high–tech industries: pharmaceutical production (111.7%), machinery and equipment production (114.5%), motor vehicles (114.1%). As part of the implementation of food security programmes, the average per capita production of basic foods has increased significantly by 2015: meat — 1.5 times, vegetable oil — 1.4 times, butter — 1.2 times, cheese — 14%, milk — 3%.

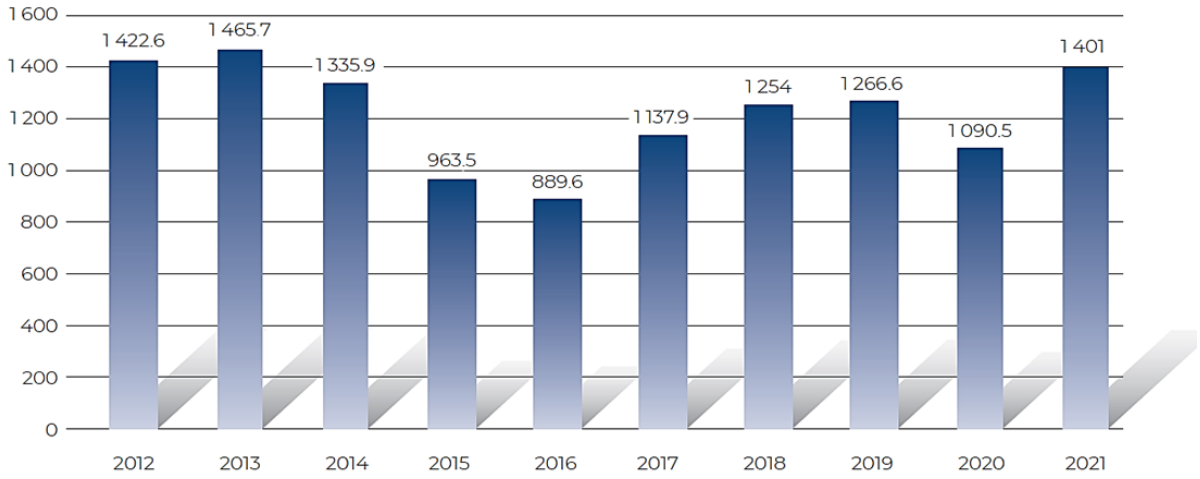

Fig. 5. **Industrial production volume (in current prices, USD billion)**

Source: compiled by the author.

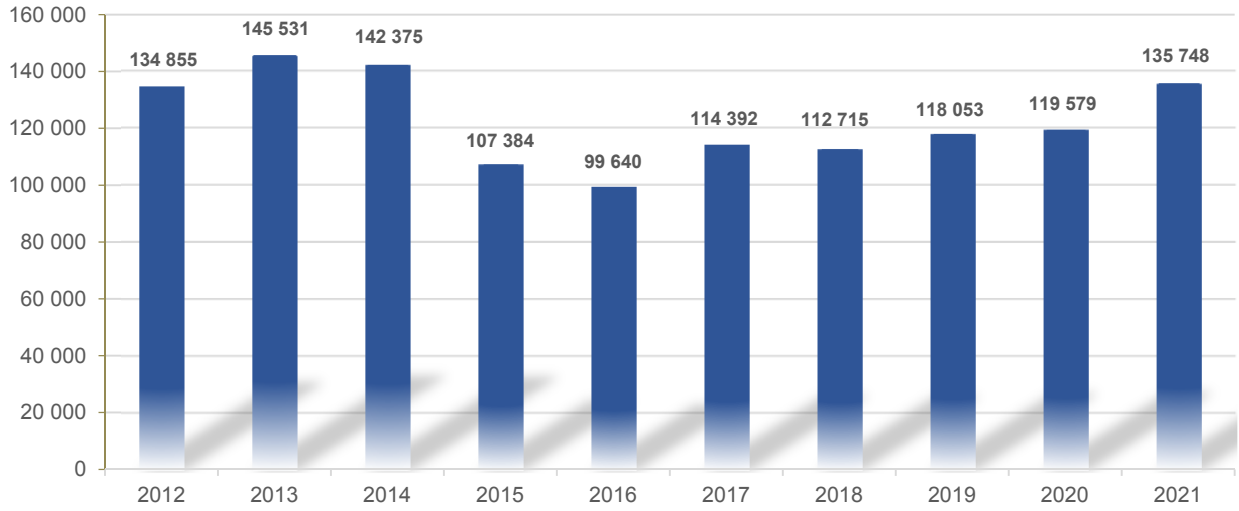

Fig. 6. **The volume of production of agricultural products of the EAEU (in current prices, million US dollars)**

Source: compiled by the author.

in the mining and manufacturing sectors. In 2021, the production of agricultural products of the EAEU amounted to 135.7 bln USD, decrease compared to 2020 by 1.4%.

Index of agricultural production of EAEU 2021 to 2011–117.8% (*Fig. 6*).

The decrease in agricultural production in 2021 is due to the decrease in the yield of main crops. Gross grain harvest in 2021 amounted to 146.8 million tons, which is 10.8% less than the previous year. Potato and vegetable production decreased by 5.9% and 1.6% respectively. The gross harvest of the main technical crops increased by 17.8% — for sugar beet and 17.9% — for sunflower seeds. Farming development was more favorable. Production of cattle and poultry by slaughter (in slaughter weight) increased by 1.2% compared to 2020, milk by 0.9%, eggs by 0.5%.[4]

Agricultural production in January–April 2022 increased by 1.9% compared to the same period last year. Growth was in Russia — 2.3%, Kyrgyzstan — 2.2% and Kazakhstan — 1.9%.

[4] Production of cattle and poultry, milk per capita in 2021 reached a maximum in 2015 (77 and 265 kg against 65 and 243 kg respectively).

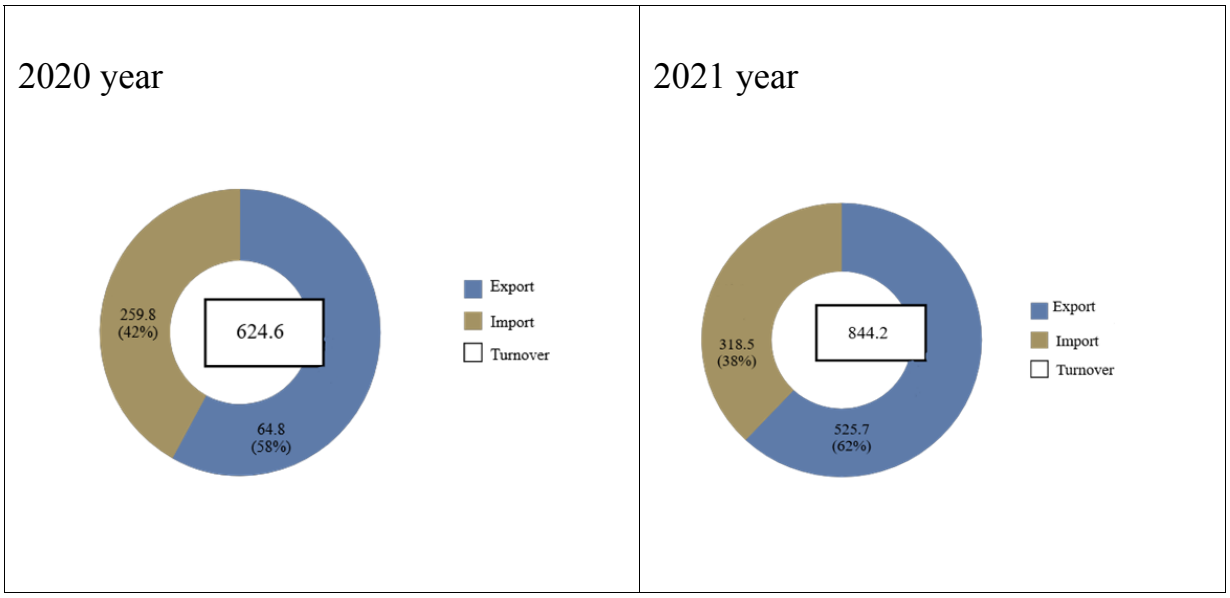

Fig. 7. **Volume of foreign trade**

Source: compiled by the author.

According to the results of 2021, the volume of foreign trade with countries outside the EAEU reached 844 bln USD, that is 35% more than in 2020 (the main contributors were: Russia, whose export growth increased by 47%, Belarus — 48% and Kazakhstan — 25.8%). Foreign trade turnover rose by 145.7% compared to 2015. The main buyers of goods exported from the EAEU were the European Union (their share accounted for 42.2% of exports) and APEC (28.3%). In the country section are leading China (15.1%) and Netherlands (9.3%). Main importers of goods to the Union market — China (27.4%) and Germany (9.8%) (*Fig. 7*).

The volume of mutual trade in 2021 reached the maximum value in the history of the EAEU and amounted to 72.6 bln USD, increasing by 31.9% compared to 2020 and by 17.8% — from 2019 (*Fig. 8*).

In 2021, the share of mutual trade in trade was 14.6%. The largest increases were in Kyrgyzstan (from 42.9 to 47.4%) and Kazakhstan (from 23.6 to 25.7%).

Mutual trade in cooperative goods in 2021 amounted to 25.7 bln USD and in comparison, with 2015 almost doubled. The share of cooperative goods in trade increased from 30% in 2015 to 35% (*Fig. 9*).

In the context of high volatility in the foreign exchange market and increasing global protectionism, the role of national currencies in the settlement of mutual trade in goods is increasing. Russian ruble retains the status of the main currency in the settlement of mutual trade (71.3%), the second most important is the dollar (17.9%). At the same time, additional opportunities for de–dollarization exist in Armenia, Kazakhstan, Kyrgyzstan, which respectively 43, 36 and 53% of mutual exports in 2021 were paid by this currency.[5]

One of the most important factors for economic growth is the growth in fixed investment, which must be at least 8–12% per year in order to achieve world average (in 2021–6.8%).[6]

The volume of mutual investments in the EAEU in 2021 quickly recovered after falling under

[5] International Monetary Fund official website. URL: https://www.imf.org/ru/Home

[6] Positive trend in sector investment in 2021: share of investment in mining decreased (from 17.2 to 16.0%) and funding for construction and modernization of manufacturing increased (from 14.3 to 14.8%). According to the results of Q1 of 2022 the growth of investments in fixed assets was recorded for all EAEU member states except Belarus. Russia (by 12.8%) and Armenia (by 6.2%) showed the highest growth. For the Union as a whole, the fixed investment index was 111.0%.

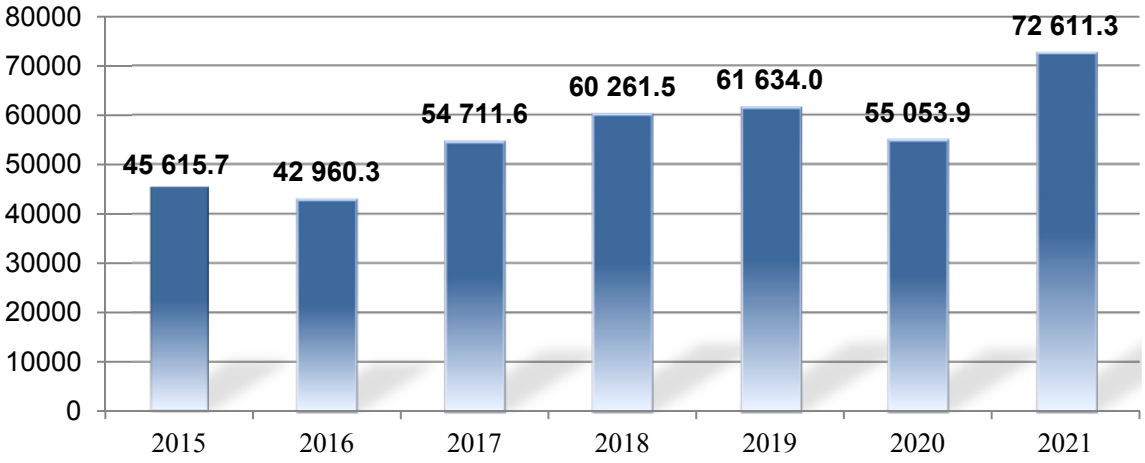

Fig. 8. **The volume of mutual trade in the EAEU from 2015 to 2021, USD million**

Source: compiled by the author.

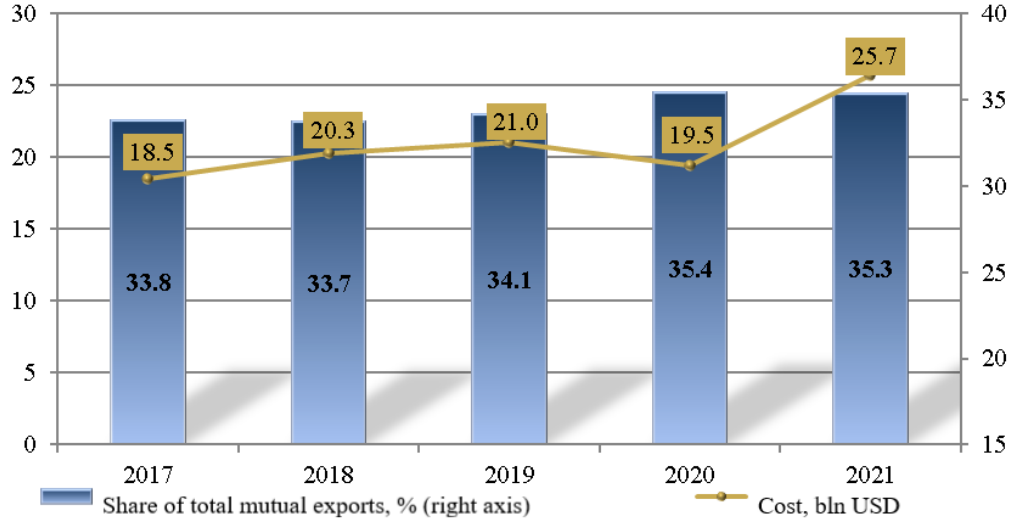

Fig. 9. **Share in the total volume of mutual exports to the EAEU**

Source: compiled by the author.

the conditions of the pandemic. It amounted to about 2 bln USD, which is 3 times higher than 2020 and 74% higher than 2019 (*Fig. 10*).

Increased household consumption in 2021 had a positive impact on the recovery of economic growth. Thus, retail trade turnover of EAEU increased in 2021 compared to 2020 by 7.1%. Growth of sales in the consumer market were in all States. Higher than in the EAEU, it is recorded in Kyrgyzstan (by 14.9%) and Russia (by 7.3%).

In the Q1 of 2022, retail sales increased by 3.4%. Higher than in the EAEU, it was in Kyrgyzstan (by 13%), Belarus (by 6.5%) and Russia (by 3.6%). At the same time, in Kazakhstan it decreased by 3.3%.

Inflation accelerated in all EU countries in 2021 and grew by 8.6% in December 2021 compared to the same period in 2020. This is the maximum value since 2015. Inflation was higher in Kyrgyzstan (11.2%) and Belarus (10%).

High inflation rate in the EAEU continues to persist this year. In April 2022, by December 2021, the consumer price index was 110.9% compared to 102.9% — in April last year. Higher than in the EAEU, it is recorded in Russia — 111.7% and

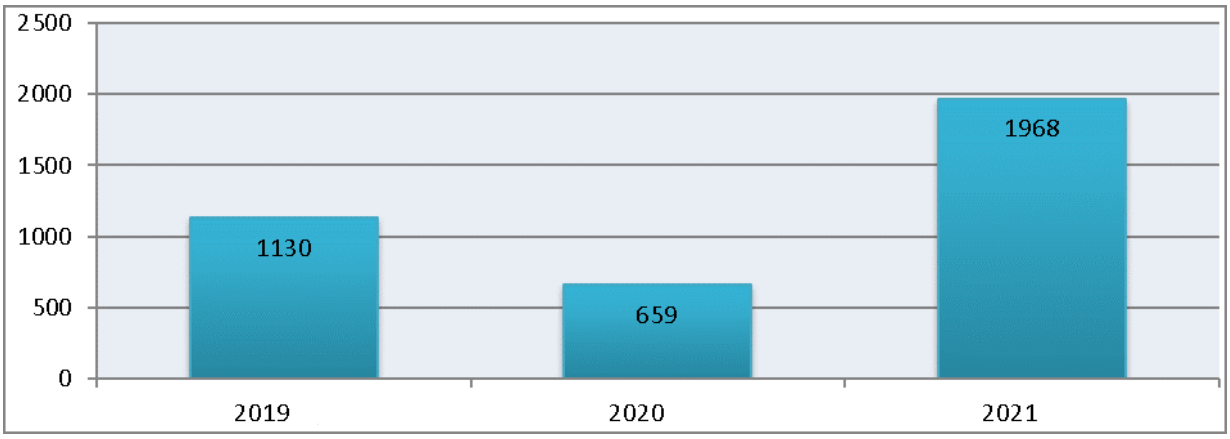

Fig. 10. **Mutual investments in the EAEU**

Source: compiled by the author.

Belarus — 111.1%. In Kazakhstan, consumer prices increased by 7.3 per cent, Kyrgyzstan — by 7.1%, Armenia— by 5.8% over the period.

In 2022 all national (central) banks of the EAEU Member States have tightened monetary policy by increasing the size of bank rates to neutralize inflationary factors. In Armenia, the rate for the beginning of June was 9.25% (+1.25 p.p. from the previous value), in Belarus — 12% (+2.75 p.p.), in Kazakhstan— 14% (+0.5 p.p.), in Kyrgyzstan — 14% (+4 p.p.), in Russia — 11% (–3 p.p.). The maximum value of rates in the EAEU was observed in Russia at the end of February (20%).

Commercial banks' interest rates on loans issued in national currency rose as central banks' rates rose. Further policy of "expensive money" can seriously affect on economic development.

Credit activity in countries high. Over the last decade (2010 to 2021) credit increased in all Member States. Armenia — 2.6 times, Belarus — 8.4 times, Kazakhstan — 3.6 times, Kyrgyzstan — 5.7 times, Russia — more than 4 times. Legal entities' deposits grew at a comparable rate: Armenia — 7.2 times, Belarus — 12.7 times, Kazakhstan — 2.7 times, Kyrgyzstan — 5.5 times, Russia — more than 4 times. Volume of deposits from 2010 to 2021 in Armenia has grown more than 5 times, in Belarus — 9 times, Kazakhstan — 6 times, Kyrgyzstan — 10 times, in Russia — almost 4 times. However, in all Member States except Belarus, deposits in national currency increased more than in foreign currency.

In the Q1 of 2022, compared to the same period of 2021, the lending of legal entities increased in all Member States, including: Armenia — 1.2 times, Belarus — 1.3 times, Kazakhstan — 1.2 times, Kyrgyzstan — 1.1 times. In Russia, the increase is minimal — less than 1%.

The favorable economic situation in 2021 contributed to employment growth. Unemployment rate (ILO methodology) at historical low — 4.8–4.9%.

The number of unemployed of EAEU continues to decrease this year. In the Q1 of 2022, the unemployment rate calculated according to ILO methodology was 4.4% (in Q1 of 2021–5.6%).

Member States adopted measures to improve the sustainability of the economies of the Eurasian Economic Union, including macroeconomic stability.

In the medium term, the main risks to the economic development of Member States relate to a number of external challenges and internal constraints. However, this opens the way for import substitution, including in payments, to an accelerated full trade under the Union in national currencies. Use of the potential of the EAEU allows to ensure internal stability of the Member-States' economies, which in the future will create conditions for annual growth of the Union's GDP by 4.5–5.5%. Development and implementation of new investment national and

union programmes and projects in knowledge-intensive and capital-intensive industries is needed.

The "self-sufficiency" program of the EAEU — is a business cooperation. Joint companies and production clusters should be more actively created, providing them with appropriate measures of state support, especially at the stage of formation and fixing in the market.

The mandate and responsibility of Eurasian Development Bank, the Eurasian Fund for Stabilization and Development, Interstate Bank should be clarified to work as development institutions. Commercial banks could also be more active in investment. Need to move to project cooperation that transforms contractual relationships into a cohesive team with long-term commitments to achieve specific business objectives by increasing the resource efficiency of each participant.

Unification of trade, industrial and financial capital within a transnational corporation will be more effective than if an independent enterprise were integrated into the process chain. In addition, production, logistics, trade risks are minimized. Only large industrial clusters can quickly introduce the latest technologies and compete in world markets. One should think not only about trade and payments in national currencies, but also about building an independent monetary system. The world is undergoing changes in international economic, political and humanitarian relations: sanctions, refusal by some countries of mega–cooperation (WTO, OECD, ILO, WHO), minimization of global challenges and threats. This trend needs to be addressed in cooperation.

Despite the obvious achievements of recent years and intensification of mutual trade, cooperation within the Union can be more active and extensive. To this end, it is necessary to strive for the use of new instruments of integration and to be quick in decision-making in order to ensure the effective growth of the economies of individual countries and the Union as a whole. Cohesion, complementarity and mutually beneficial specialization will ensure domestic market and competition in distant countries.

INTERNATIONAL ACTIVITIES

2021 has become important for the development of the Union's existing international activities in practice (improvement of cooperation mechanisms, expansion of the practice of implementing joint action plans, holding business forums, intensification of interaction with relevant international organizations).

In 2021 trade turnover with partners with whom cooperation at the level of the Union and the Commission was formalized increased by 32% and amounted to 332.1 bln USD (40.5% of the total foreign trade turnover of the EAEU), including exports of the Union grew by 38.2% (to 185.5 bln USD, 36.5% of EAEU exports), imports — by 24.9% (to 146.6 bln USD, 46.9% of Union imports).

The geography and quality of the Union's cooperation with international organizations continued to expand. The formalization of the Commission's interaction with the Shanghai Cooperation Organization (SCO), as well as the progressive development of cooperation with Association of South-East Asian (ASEAN), have led to the establishment of a new integration framework: EAEU-SCO-ASEAN. New content was given to the track of interaction between the EAEU and the CIS — the work of the Commission on developing approaches to the interface between the law of the Union and the regulatory framework of the CIS, including the elimination of contradictions between the draft regulatory legal acts came to the fore, developed within the EAEU and CIS.

In the first months of 2022 we maintained positive dynamics in industry and agro-industrial complex, in foreign trade with our friendly partners, including China and India, in mutual trade, reflected in balance of payments and consolidated budgets. The level of interest of partners to further steps of the Union for the development of Eurasian economic integration remained high.

DIGITALIZATION

Digital technology is one of the main drivers of efficiency and competitiveness. Sector "Information and communication" in 2021 provided 2.6% of total GDP in EAEU countries, and in Armenia — 3.9%, Belarus — 7.4% (of which High Technologies Park — 4.8%). World IT–market grew by 9%.

At the same time, IT provides no more than half of the industry's contribution to GDP. In Russia, according to the Higher School of Economics, this is 1%. By comparison, in the EU and China the rate is above 3%, in the USA and Japan it is even higher. Forecast for 2022 is favorable. According to consulting company Gartner, Global digital spending will be 4.4 trn USD.

Foreign trade surplus in telecommunication, computer and information (ICT) services has developed in 2021 in Armenia (340 mln USD), Belarus (2 726 mln USD) and Russia (579.5 mln USD). Negative — in Kazakhstan (281.3 mln USD) and Kyrgyzstan (5.5 mln USD). The share of ICT in services exports from EAEU Member States in 2021 amounted to 14.9%. In value terms, exports reached 11,021.8 mln USD.

In 2017, the statement of the EAEU Heads of State on the digital agenda was adopted. This was based on the assumption that digital platforms and products used by all countries would be created at the supranational level. Today we see that national systems have received sufficient development and the main issues of effective work in the Eurasian space have become: information interaction, harmonization of regulation, establishment of common formats and rules for processing different categories of information.

Among the difficulties that constrain the rate of the digital transformation of the economy in the Eurasian area are the following:

- different level of penetration of digital technologies in the economic and social spheres of the EAEU countries;
- different degree of readiness of national components to be integrated into supranational platforms in accordance with the Eurasian Integration Development Strategy;
- different approaches to IT-industry regulation in the Union countries.

Because of this, the IT-market is not efficient enough.

For example, in the Russian Federation the system of procurement of software products produced by residents of other EAEU member states remains quite complicated. And under conditions of relocation, this problem is compounded.

To sell the software to the Russian Federation, the developer needs to be included in a special registry, but there is no mechanism for this. In the Russian Federation there is a preferential amendment (20%) for domestic electronics and computer equipment, similar requirements are set for software. When concluding contracts with Belarusian, Armenian and Kazakh organizations, VAT arises, from which IT-companies in their countries are exempt.

Currently, within the framework of the Union's digital agenda, the Commission completed work on the first stage of the "Eurasian Labour Exchange" — the project "Work without borders" (the system currently registered more than 90 thous. unique users, the number of applications exceeded 400 thous.).

In order to further develop the digital agenda in the field of placement and employment, the creation of a complex of new services "Eurasian Electronic Labor Exchange" is considered. Its implementation should provide more information support to applicants and employers for online interviews, improve the analytics and monitoring subsystems and add new job search functionalities.

Work continues on the creation of the Eurasian network of industrial cooperation and technology transfer, aimed at involving small and medium enterprises in the production chains of large producers (the first stage involves connecting to the network 6 thous. of economic entities, the second — 17 thous.).

Measures adopted in the Q1 of 2022 allow to complete the planned work by the end of the year and partially catch up with the schedule established in 2019–2021. Executor of the

project — IEIF (International Eurasian Industrial Fund) is completing its work the integration component of the system, a prototype of the core component is prepared for national operators. Agreement on the use of 4 services SIIS (State Industrial Information System) in the project was reached with the Russian Federation Industrial Development Fund.

Promising is the project aimed at import substitution and maximum representation of products of the EAEU Member States in the common market by creating a system of interconnected electronic catalogues of Eurasian products. At the same time, it is advisable to use all types of trade, cooperative and logistics processes (at the first stage — for domestic exports).

Decisions of the Council of the EAEU Commission on formation of the basic digital infrastructure of ecosystem of digital transport corridors. It should provide the basis for more than 100 different services related to transport operations in the territory of the Union, as well as the possibility of integration with similar digital ecosystems of third countries.

first stage — "showcase of national digital transport corridor services", envisaging digitalization of the first 10 transport services, already in operation — the parties have access to a demonstration stand. Prototypes of services will be ready by October.

The competitive procedures for the project "Digital technical regulation in the EAEU" are completed, which is designed to create digital technical regulations and standards with the prospect of their use in automated (robotic) production systems.

The nearest plans include the transfer of procedures of state procurement into the electronic format (December 2022, Commission Council Order No. 4 from 5 April 2021). The problem is that the mutual recognition of the electronic signature has not yet been agreed.

Activities on which Eurasian Economic Commission is working can have significant integration and economic effects.

To simplify the mutual trade in goods and services, to remove barriers in the common market of the EAEU, it is expected to implement a full transition to electronic legally significant document management throughout the cycle of circulation of goods (services). In order to reduce competition between the EAEU Member States in the development of national IT-industries ("competition of jurisdictions") it was planned to: develop recommendations on the harmonization of measures to support the IT-industry in the EAEU countries, identify priority digital technologies for accelerated development of the real economy and measures to stimulate their development, complete the work on the removal of barriers for the participation of enterprises of the EAEU Member States in the public procurement in each other's territory.

Eurasian import substitution program on key positions in electronics, telecommunications equipment, software is being developed.

In cooperation with central (national) banks of the EAEU member states, the possibility of preparing a concept for the formation of a single settlement space of the EAEU is considered (in particular, taking into account the experience of the Republic of Belarus in establishing and developing a single settlement and information space — SSIS).

A unified system for monitoring threats in the sphere of cybersecurity by key objects (sectors) of the economy of the EAEU countries is formed.

The formation of a network of digital competence centers of Member States, the work of permanent expert platforms on selected issues of the digital agenda will contribute to the effectiveness of the work under the Union's digital agenda, improvement of the Union's legal framework for the development and implementation of digital initiatives. The relevant draft decisions will be submitted to the bodies in due course in the second half of 2022.

The EAEU Member States have appropriate IT-infrastructure, decisions have been taken on measures of state support. Most systematically addressed this issue in Belarus.

High-tech Park (HTP) accumulates 1064 resident companies, including 11 states (from the NAS of Belarus, Ministry of Industry, Ministry of Communications, Ministry of Labor, Ministry of Economy, National Bank). The set of decisions made allowed HTP to provide IT-services exports worth 3.2 bln USD in 2021 with a growth rate of 118%. At the same time, the share of exports in revenue was 86%, the surplus — 2.8 bln USD. Total number of employees of HTP companies is 78 thous.

All projects in the digital sphere are considered in the context of the overall objectives of Eurasian integration, planned and implemented as a set of interconnected technological activities aimed at digitalization not as a process, as achievement of specific results of the Eurasian Integration Development Strategy through digital technologies.

CONCLUSION

In the current situation, caused, on the one hand, by objective internal factors, and on the other, unfavorable external conditions, it is necessary to implement a qualitatively new approach to the further development of the Eurasian integration project. The precautionary principle must be:

• *Confidence.* It is necessary to increase the level of confidence in the EAEU, institutions and integration processes in general among national authorities, entrepreneurs and the public of Member States. For this, the EEC should establish strong partnerships with national institutions, primarily with public authorities, business communities, individual companies and enterprises, and public and academic associations.

In the context of EEC activities, substantive and purposive work is needed to improve the efficiency of internal processes and the practical relevance of decisions.

Trust is fundamental in building in EEC and integration in general is openness of decisions at both national and supranational levels. At the same time in the process of execution of decisions there should be no "gaps" between political commitment and practical implementation. Only the cohesion and unconditional trust of our countries and joint work for the benefit of the population of the Member States will lead to the successful development of the Union.

• *Self–sufficiency*. Coronavirus pandemic COVID-19 has exposed the current crisis of globalization, as well as the contradictions between the leading actors of the world economy. The growing role of national institutions and the importance of States' economic self-sufficiency became evident. In the current circumstances, large economies, especially China and the USA, have the advantage.

To compete effectively with economic giants of smaller economies, there is a need to combine and strengthen institutional collaboration. The EU is currently undergoing a strength test. The EAEU was in a similar position. It should be recognized in a timely manner that regional economic integration is necessary for the successful achievement of national goals of self-sufficiency and sovereignty (including economic and technological production). The EAEU States alone will not be able to fulfill this large–scale and strategically important task.

The Union's self-sufficiency, growing attractiveness and innovation will contribute to the development of the Member States' economies. In 2014, the founders of the Union took a forward-looking course towards integration, which we must follow rigorously and resolutely. The Commission confidently declares that it is ready to assume the role of the flagship of this process, the role assigned to it by the EAEU Treaty.

Complementarity. The transition from competition to cooperation within the Union is crucial. Economic policy should fundamentally promote the complementarity of national economies, both in the production base and in the creation of high-level industries. This is — the "key to success" of the EAEU. Competing in the same product groups is a losing tactic. Countries need to pool efforts and develop common product offers for third country markets. The Union's supporting and effective

framework should be a common infrastructure platform, including transport, fuel and energy complex.

Inviolability of the law of the Union. The Law of the Union is the foundation of the Eurasian integration project, which creates the necessary conditions and predetermines opportunities for integration work in all spheres. That is why it is necessary to pay attention to the state of the legal system, its effectiveness and tools for the practical implementation of the stated provisions.

The implementation of competences by the supranational authorities of the Union (primarily EEC) within their competence, as well as the unification of legislation in the areas of common policy, should be fully implemented, including on the basis instrument provided for in the EAEU Treaty, namely — the Union's law. There is a need to identify and effectively address, in a timely manner, the gaps in the law, which often constitute significant obstacles to the implementation of the underlying provisions, and to implement the ongoing, including conceptual, development of the law of the Union. In turn, harmonization of national legislation or the formation of common approaches to legal regulation in those areas, in accordance with the EAEU Treaty, a coherent and coordinated policy should be implemented in accordance with the tasks defined by the Member States, including the Treaty on Union.

Ensuring the functioning of the EAEU law will contribute to the comprehensive development of integration in the interests of the entire Union and its Member States.

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Modeling the Payment of Basic Income to Overcome Absolute Monetary Poverty, Support Unemployed Citizens and Families with Children

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ABSTRACT

The article is devoted to the actual problem of the introduction of universal basic income (UBI) in Russia. Taking into account the real possibilities of the Russian economy, the issues of developing models of transitional forms of UBI, the so-called "basic income (BI)" are considered for target categories of citizens. The substantiation of the possibility and expediency of modeling the effects of BI payments according to the domestic simulation model of reproduction of Russia's GDP P1–4–2 (2022–8) is carried out. The results of predictive calculations based on this model are presented. It is shown that the additional revenues of the consolidated budget of the Russian Federation not only compensate for the initial costs of implementing the BI program, but also exceed the initial costs annually. The conclusion is made about the reality of the implementation of the "BI program" in our country. The state leadership is proposed to combine the current system of targeted social support with the introduction of BI payments to the most vulnerable households and categories of Russian citizens in order to improve the level and quality of life of the Russian population and increase consumer demand.

Keywords: universal basic income (UBI); basic income (BI); models of functioning of transitional forms of BI; absolute monetary poverty; regional subsistence minimum; additional social payment (ASP); increase in payments to the unemployed; targeted assistance to families with children under 18; imitation model of reproduction of Russia's GDP type P1–4–2(2022–8); final consumption of households (FCH); consolidated budget (CB)

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INTRODUCTION

Universal basic income (UBI) is a social benefit, a regular payment of a fixed amount of money from the State to all citizens of the country, guaranteeing them a minimum level of consumption of goods, services and information regardless of the type of activity, economic and social situation.

Problems of UBI, opportunities and risks arising during its implementation are among the actively discussed in the foreign and Russian research field [1–9], and the social and economic consequences, caused by pandemic, only heightened interest in UBI and updated the discussion on the feasibility of introducing the UBI toolkit [10, 11].

In addition to the development of the UBI theoretical platform, an important area of its research is the examination of practical issues related to the implementation (in some form of completeness) of its criteria, i.e., introduction of UBI transition forms [will call them "basic income (BI)"]. BI induction testing is carried out within: a) pilot experiments or simulation modeling[1] [5, 12], the results of which demonstrate different vectors of BI influence on various parameters of living standards, employment and labor market, etc.; b) studying the opinions of different groups of the population on the implementation of BI tools [13, 14].[2]

However, the UBI concept is far from complete. Despite numerous theoretical and practical interpretations, a holistic view of the theoretical foundations of UBI, generalization of the experimental practice of introducing its transitional forms (i.e., BI) and assessment of possible consequences have not yet been worked out.

Possibilities and forms of introduction of UBI in Russia are widely discussed by the scientific community [1, 2, 4, 15]. From these discussions, it is necessary to continue the study of this problem, especially in terms of transition forms and tools for testing in Russia as a regulator to improve the level and quality of life and sustainability of society.

The authors of this study consider the necessity of testing UBI tools in Russian conditions. With their participation, a pilot testing of one of the transition forms of BI — guaranteed minimum income has already been carried out (Vologda region, 2017–2018) [16]. In addition, a survey of Russian experts (2020) on theoretical, methodological and practical aspects of UBI problems was conducted [15], as well as a survey of the target categories of the population (2021) for testing its transitional forms (BI), which showed the agreed positions of experts and the population on the readiness of our country to introduce BI and the feasibility of pilot projects.

After overcoming an acute phase of corona-crisis (2019–2020), Russia's economy has now reached a new stage of development, aimed at ensuring full economic sovereignty, in the context of intensified global confrontation with the West. According to official government projections, depending on its variants (base or conservative), Russia's GDP growth for 2022 was expected to be 2.5–3.0%, inflation — is slightly above 4%, unemployment — 4.6–4.8%, real disposable income growth — of 1.9–2.4%. However, under the new conditions of 2022, the estimates were revised to the downside (*Table 1*). Expert estimates collected by the Bank of Russia in a specialized survey in 2022 demonstrate a negative trend in macroeconomic indicators relative to the projections for 2022, which were made in late 2021. At the same time "degree" of negative expectations of experts during 2022 decreases. Official statistics for 2022 show negative trends in living standards: in

[1] URL: https://images.meinbge.de/image/upload/v1/pilot/projektmappe/Basic_Income_Pilot_Project_Magazine.pdf; BIG Coalition Namibia. URL: http://www.bignam.org/Index.html

[2] URL: citizensincome.org/wp-content/uploads/2017/11/European-Social-Survey-survey-on-Basic-Income.pdf

terms of poverty ("planned" value — 10.8%, the fact of the Q1 of 2022–14.3%) and by real disposable income (decrease in Q1–Q2 of 2022 compared to the corresponding period 2021–1.2–0.8%).

Despite the difficulties of the present period, the Russian Federation is giving priority to expanding the domestic market and improving the standard of living and quality of life of the population, including the growth of its real monetary income.

Among the measures aimed at improving the welfare of the population was the decision of the Government on extraordinary increase from 01 June 2022 of the minimum wage from 13 800 to 15 279 rub. and the subsistence minimum — from 12 654 to 13 919 rub.[3] In addition, pensions were indexed with 01 June 2022 to 10%[4] (in addition to the 8.6% indexation at the beginning of the year).

In this article it is proposed to consider actual tasks of improving the standard of living of the population of Russia (if possible, starting from 2023) by establishing BI for three target categories of households and citizens:

1) for low-income households — eliminate absolute monetary poverty [introduce an additional monthly payment up to per capita subsistence minimum (SM)];

2) for unemployed citizens registered at State Employment Centers — establishment of monthly benefit to two subsistence minimum for working population (SMwp);

3) for all children up to the age of 18 years — introduce monthly benefit on the child in the amount of the child's subsistence minimum (SMch).

Comparison of BI with "helicopter money" in Russian conditions, to put it mildly, incorrectly. The term "helicopter money" was used by M. Friedman [17] to demonstrate the absence of real effect of monetary emission in a balanced economy. Friedman presented the emission simplified — in the form of throwing money from a helicopter. If people in a balanced system of industrial relations collect the thrown money and start spending it, it will not lead to growth of real output (GDP) in the economy. Only the nominal effect of rising prices (inflation) and nominal output.

Currently, the economy in Russia is unbalanced, and the BI paid under such conditions will replace the lost income from employment, which will return to the economy in the form of additional consumer demand and will cause a multiplier effect [18, 19].[5]

THE FUNDS REQUIRED TO PAY BI TO TARGET CATEGORIES OF RUSSIANS

The funds needed to eliminate absolute monetary poverty. The most popular in the Russian Federation is modeling of BI payments to overcome absolute monetary poverty.

To construct a model demonstrating the feasibility of this task, the officially published Rosstat reporting data and the legally enshrined methodological provisions on the definition of subsistence minimum were used (SM), and data on the size and composition of the subsistence minimum in the Russian Federation. According to the latest data of Rosstat, in 2021 the level of absolute monetary poverty (further — poverty) was 11%, and 16.1 million people were below the poverty line.[6] Rosstat estimated the total deficit of monetary

[3] Putin announced an increase in pensions, the subsistence minimum and the minimum wage since 01 June 2022. Komsomolskaya pravda. URL: https://www.kp.ru/daily/27397/4592723/

[4] Putin's Decree on indexation of pensions from 01 June 2022: how many pensioners will receive now? Komsomolskaya Pravda. URL: https://www.kp.ru/daily/27397/4592705/

[5] Antipov V.I., Kolmakov I.B. Program for calculating the multiplier of target household expenditures. Certif. registr. computer program RU 2016616984, 22.06.2016. Appl. No 2016614237 dated 22.04.2016

[6] The number of people with monetary incomes below the poverty line and the cash income deficit. URL: https://rosstat.gov.ru/folder/13397

Table 1

Forecast values of macro indicators of the Russian economy for 2022

	Ministry of Economy of Russia[a]		Bank of Russia[b]		Rosstat	
	assessment in September-October 2021	assessment in May 2022	assessment in April 2022	assessment in July 2022	Q1 of 2022	Q2 of 2022
GDP, growth rate, %	3.0/2.5	–7.8/–8.8	–9.2	–6.0		
Consumer price index, annual average	4.3/4.4	16.5/16.1	22.0[c]	15.0[d]	107.6[e]	99.65[f]
Unemployment rate, %	4.6/4.8	6.7/7.0	6.9[g]	5.6[h]	4.2[i]	4.0[j]
Poverty rate, %	10.8[k]				14.3	
Real disposable income, %	2.4/1.9	–6.8/–7.4			–1.2[l]	–0.8[m]

Source: compiled by the authors on the basis of data from the Ministry of Economy of Russia, the Government of Russia, the Bank of Russia, Rosstat.

Note: [a] Data from the Ministry of Economy of Russia. Estimates in accordance with the basic and conservative versions of forecast; [b] Data of the Bank of Russia. Consensus forecast based on expert estimates; [c] December to December of the previous year; [d] December to December of the previous year; [e] March 2022, at the end of the period, as % of the previous month; [f] June 2022, at the end of the period, as % of the previous month; [g] December, without exception of seasonality; [h] December, without exception of seasonality; [i] On average per month; [j] On average per month; [k] Data from the Russian Government; [l] Compared to the corresponding period of the previous year; [m] Compared to the corresponding period of the previous year.

income of low-income Russians (the amount that they lacked to the subsistence minimum) at 633 billion rubles.[7]

In order to solve this particular problem, according to the authors, it is advisable to consider the formation of BI not as a single, equal for Russian citizens with incomes less than SM personal regular cash payment, but as differentiated regular social cash payment (ASP) to an adult member of a poor household that will raise per capita household income to the regional subsistence minimum. In other words, *BI to overcome the absolute monetary poverty (BIP) will be a guaranteed minimum per capita income of a low-income household equal to the regional subsistence minimum* defined by type of family. The implication of this is that the BIP implementation system will seek to determine the value of differential cash payments for the low-income (poor) household, making it available to households and targeting these funds to meet the most pressing needs.

The following algorithm is used to calculate differentiated cash payments to low-income households:

[7] The number of people with monetary incomes below the poverty line and the cash income deficit. URL: https://rosstat.gov.ru/folder/13397

$$BIP = SMD = \left(Nw * CBw + Nch * CBch + Np * CBp\right) * * \frac{Cei}{i} + Nw * CPw, \quad (1)$$

where: BIP — basic income for low-income families to overcome absolute monetary poverty equal to the differentiated regional subsistence minimum;

SMD — regional subsistence minimum, differentiated for households of different size and composition, taking into account consumption savings as determined by applying equivalence scales;

Nw — number of working persons living in the family;

CBw — cost of the minimum consumer basket of the working population;

Nch— number of children living in the family;

CBch — cost of the minimum consumer basket of the children;

Np — number of pensioners living in the family;

CBp — cost of the minimum consumer basket of the pensioners;

i — numerical family size (*i* = Nw + Nc + Np);

Ce*i* — coefficient of equivalency characterizing the cost savings for family *i*-numerical size;[8]

CPw — costs for compulsory payments and fees in the SM of the working population.

The algorithm for determining regular additional social payment to a family representative (ASP) has the form:

$$ASP = BIP - PCNI, \quad (2)$$

where: ASP — regular (monthly) differentiated additional social payment for representative of low-income households;

PCNI — per capita net income of a low-income family, it is a variation of the actual average per capita family income/ a citizen living alone to be recognized as poor and to receive State social assistance.[9] PCNI is defined as the amount of income from income from employment and other sources of income, including state regular social support, provided in accordance with federal and regional legislation, but without one-time cash payments and social assistance for housing and communal services. The definition of "PCNI" and its calculation were used for the first time in the Vologda pilot project (2017–2018) to find the value of a one-time additional social payment to parents in low-income families with children [16].

In conducting their own modeling, the authors used probabilistic models of population distribution at the level of average monthly average per capita monetary income (AMI), models of forecasting the parameters of these distributions and models of forecasting the subsistence minimum. The task of poverty forecasting is achieved by calculating the AMI population density integral from zero to the upper limit of the subsistence minimum. Poverty forecasting preceded by definitions: 1) subsistence minimum; 2) AMI-level population density based on forecast values of macro indicators of economic development.

The calculation of the required annual starting funds for the payment of BIP (Q) showed the following. If all people below the poverty line are targeted to pay a ASP that corresponds to a regional SM supplement to everyone below the poverty line, then absolute monetary poverty is completely resolved. Its performed

[8] The equivalence scale is represented by equivalence coefficients for consumption savings in living together, differentiated by size and family composition. Common family costs for non-food items and services were a source of consumption savings in the case of shared accommodation. For the base with the weight of "1" a family with one person of working age. Equivalence scales are widely used in international and domestic developments [16].

[9] Federal Law No.44 from 05.04.2003 "On the accounting the income and calculating the average per capita income of a family and the income of a citizen living alone to be recognized as poor and to receive State social assistance". URL: http://www.consultant.ru/document/cons_doc_LAW_41647/

calculations on the example of 2022. According to the forecasts for 2022, in general for the Russian Federation:

- estimates of the number of low-income populations will remain at 2021–16 mln person (N_{2022});
- average monthly per capita subsistence minimum — 13 919 rub. (SM_{2022});
- total monthly cash income required to allocate to each poor SM per month (OD), defined as $SM_{2022} * N_{2022}$, — 222.704 bln rub. / month;
- total annual cash income required to allocate to each poor SM per month (GD), defined as OD* 12, — 2.672488 bln rub. / year;
- actual volume of monthly cash income of the poor (FD) — 157.6 bln rub. /month;
- actual volume of annual cash income of the GFD poor is defined as the FD * 12, — 1.8912 trn rub. /year.

The annual cash income deficit (Q), defined as GD — GFD, will be 781.288 bln rub. /year.

Thus, it will take about **0.8 trillion rubles** to eliminate absolute monetary poverty in 2023.

Amount of funds required for monthly payments to the unemployed. According to Rosstat, in the second quarter of 2022, the number of unemployed according to the ILO methodology amounted to 3.0 million people, unemployment rate — 4.0%.[10] What is this mean for the state of annual maintenance of such a number of unemployed? To meet the minimum needs of the unemployed, taking into account the family burden, they need to pay basic income for unemployed people (BIUP) in the form of a benefit of at least two subsistence minimum of the working population (SMw). Annual maintenance costs of 4% will be about 1.1 trillion rub. /year.

$$3*10^6*(SM_{w2022}*2)*12 = 1.09236312\,\text{trn rub.}/\text{year} \quad (3)$$

where: SMw_{2022} — subsistence minimum of the working population, defined as SM_{2022} * 1.09, i.e. 13 919 rub. * 1.09 = 15 171.71 rub.

If the program starts in 2023 and lasts until 2035, this formally means adding the amount (3) in the first year in this period to the current cost of final of consumption households (FCH).

Amount of funds needed to support families with children under 18. It is proposed that all children, without the allocation of low-income families, be paid *from the date of birth to 18 years* of the subsistence minimum. Calculation is carried out on a direct account method. Children's subsistence minimum $SMch_{2022}$, defined as SM_{2022} * 0.97, in 2022 is 13 501 rub. /month (13 919 rub. * 0.97). According to Rosstat, the population in 2022 aged from 0 to 18 years (N_{ch}) will be 32 755.44 thous. people.[11]

The total annual amount of funds required to assistance families with children per year, as determined by formula (4), would be 5.30677434528 trn rub. /year.

$$N_{ch}*10^3*(SM_{children2022}*12). \quad (4)$$

If the basic income for children (BIC) program starts in 2023 and lasts until 2035, this formally means adding the amount (4) in the first year in this period to the current cost of final consumption households (FCH).

The maximum amount of annual expenses for solving the three tasks will be **7.179 trillion rub. /year**, i.e. 0.781 + 1.092 + 5.306.

Inflation will increase necessary costs annually. The results of the annual BI payment costs, depending on the time of the model experiment start considering inflation, are shown in *Table 2*.

[10] Socio-economic situation of Russia Moscow. January–June 2022. URL: https://rosstat.gov.ru/storage/mediabank/osn-06–2022.pdf

[11] Population by individual age groups. Rosstat. URL: https://rosstat.gov.ru/f older/12781.

Table 2

Table of annual household final consumption expenditures, adjusted

Year	Consumer Price Index	1 alternative, bln rub.	2 alternative, bln rub.	3 alternative, bln rub.
2021	1.084	–	–	–
2022	1.167	–	–	–
2023	1.053	800	2000	7000
2024	1.046	837	2092	7278
2025	1.040	870	2175	7566
2026	1.034	900	2250	7827
2027	1.030	927	2317	8062
2028	1.026	951	2379	8275
2029	1.023	974	2434	8468
2030	1.021	994	2484	8642
2031	1.018	1012	2529	8799
2032	1.016	1028	2570	8942
2033	1.014	1043	2608	9072
2034	1.013	1057	2641	9189
2035	1.012	1069	2672	9296

Source: compiled by the authors.

TASK STATEMENT AND RESULTS OF THE IMPLEMENTATION OF PREDICTIVE MODEL EXPERIMENTS OF THE IMPACT OF THE INTRODUCTION OF BI ON IMPROVING THE STANDARD OF LIVING OF THE TARGET CATEGORIES OF RUSSIANS

To calculate the forecast of the inertial development of the Russian economy (under sanctions) on the 2023–2035 interval and to obtain a reference trajectory, the current model of reproduction of the Russian GDP in the variant was used P1–4–2(2022–8), which was developed employees by IAM RAS and ICS RAS and described in detail in [18, 20].

The model P1–4–2(2022–8) allows determining in dynamics annual rates of gross domestic product (GDP/pW), final consumption of households (FCH/pWD), and final consumption of government (pYG), state consolidated budget revenue (CBR), investments in fixed capital (pIN) and real monetary incomes of the population (RMI).

It uses the conceptual framework of the international System of National Accounts (SNA). It allows simulation modeling with expert formulation of source data scenarios and obtains perturbed development trajectories. In the last modification of the model P1–4–2(2022–8), the parameters of the economy are presented as a set of some "main trends" and "interference", the sum of "trend + interference" is observed in the retrospective interval (1995–2021), and on the forecast interval (2023–2035) "interference" is absent.

Table 3

Increases in consolidated budget revenues and final consumption of the state relative to the values of the reference trajectories of inertial development

		Monetary poverty (0.8 trn rub.)	Monetary poverty and unemployed (2.0 trn rub.)	Monetary poverty, unemployed and families with children (7.0 trn rub.)
	Year	Increase in CB income	Increase in CB income	Increase in CB income
1	2023	1031	2577	9018
2	2024	1126	2815	9795
3	2025	1217	3042	10586
4	2026	1304	3259	11341
5	2027	1336	3339	11617
6	2028	1358	3396	11814
7	2029	1372	3431	11935
8	2030	1378	3445	11986
9	2031	1379	3447	11993
10	2032	1375	3439	11963
11	2033	1368	3421	11901
12	2034	1358	3396	11813
13	2035	1346	3364	11705

Source: compiled by the authors.

Experimental construction of two blocks of trajectories of indicators of the Russian economy in the 2023–2035 interval — reference trajectories of inertial development and perturbed trajectories. Their comparison determines the contribution of the measures for the allocation of funds for the "BI program" payments to the Russian economy.

The first perturbed trajectory provides an increase in final consumption of households by 0.8 trillion rubles, calculated to eliminate the absolute monetary poverty of the population of Russia.

The second perturbed trajectory provides an increase in the final consumption of households by 2.0 trillion rubles, calculated to simultaneously eliminate the monetary poverty of the population of Russia and increase the unemployment benefit to two SMw for all unemployed, registered with employment centers.

The third perturbed trajectory provides an increase in the final consumption of households by 7.0 trillion rubles, calculated simultaneously to eliminate the monetary poverty of the population of Russia, increase of unemployment benefit to two

SMw for all unemployed persons registered at the labour exchange and necessary assistance for families with children under 18, one SMch per child per month.

To make evidence and predictive estimates (for probabilistic scenarios of economic development), it is necessary:

1. Get a forecast of the inertial development of the Russian economy (under sanctions) on the 2023–2035 interval and the reference development trajectories.

2. Get forecasts of the trajectories of development of the Russian economy for the three proposed variants of managed development (under sanctions) on the interval 2023–2035.

The procedure of transformation of the source data scenario is based on the following reasoning: the amount of payment of BI in the initial year of the forecast period (for a particular scenario of the model) means a stepped increase of the item of expenditure "final consumption of households".

All forecast calculations of economic development on these models, conducted with the parameters of the BI program on the 2023–2035 interval, finally give situational topical contour estimates. Values of initial FCH increases are shown at 2022.

The hypothesis that "waves" should be tested annual increases in the consolidated budget as a result of the multiplier effect of the increase in the effective demand of the population will not only compensate for the necessary annual cost of increasing the final consumption of households, but also to give additional increments to the consolidated state budget.

To prove the feasibility of such a financial maneuver, numerical model experiments were performed, in which indicators of economic development of the Russian economy were compared between 2023 and 2035 without a program and with the conduct of 3 different BI payment programs.

The initial amount required to pay BI was to be taken from the National Welfare Fund (NFW). Of course, any intersections of the proposed options have some redundancy. Expert estimates of the probabilities of such redundancy range from 20–25%. Considered a range of activities without considering the overlap of the options. Calculations were performed while maintaining all existing social (and address, including) payments and their administration system.

It turned out that not only household final consumption, but also the final consumption of the State, investment in fixed capital and other important indicators of the Russian economy are increasing.

The values of the income growth of the consolidated budget (CB) relative to the values of the reference trajectories of inertial development in the solution of each of the three tasks of the introduction of BI are given in *Table 3* for the interval 2023–2035.

Additional CB revenue fully compensate for initial costs. That is, the functioning of the BI program in the variant under consideration, after the one-time start-up costs of the program, is provided in the future by the annual growth of CB revenue.

At the same time, all proportions of the already approved (and if necessary adjusted) budget (2023–2025) remain unchanged. Model calculations show that between 2023–2025 goods and services are sold for an amount significantly higher than the initial costs.

CALCULATION OF THE REFERENCE AND PERTURBED ECONOMIC DEVELOPMENT TRAJECTORIES AND NUMERICAL MODELLING OF THE EFFECT WITH ADDITIONAL FUNDS INTO IT FOR THE PAYMENT OF BI IN THE PERIOD 2023–2025

The specification of some of the main results of the numerical model experiments for the third variant of the BI payment

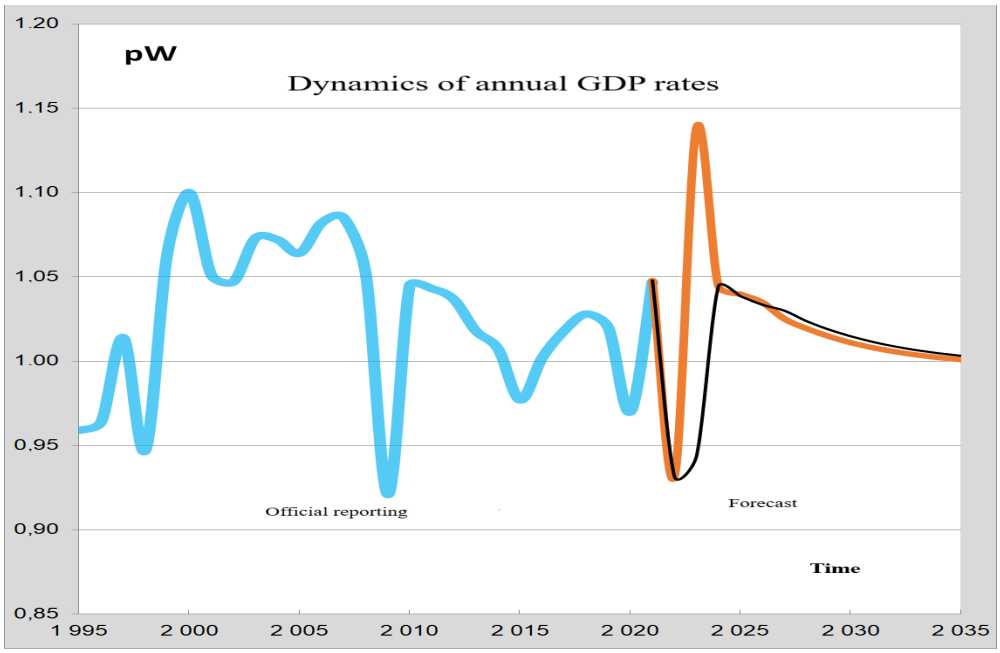

Fig. 1. **Dynamics of annual GDP rates in Russia**

Source: compiled by the authors.

Note: the reference trajectory of the forecast is black, the perturbed trajectory of the forecast (+7.0 trillion rubles of final consumption of households since 2023) is red.

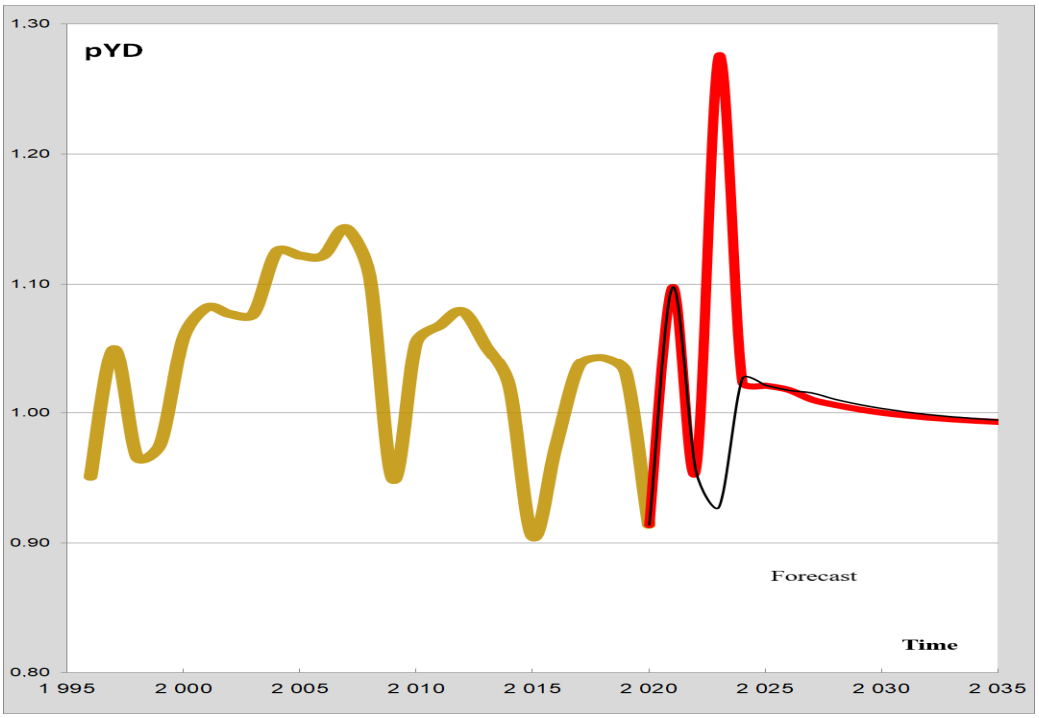

Fig. 2. **Dynamics of annual rates of final consumption of households**

Source: compiled by the authors.

Note: the reference trajectory of the forecast is black, the perturbed trajectory of the forecast (+7.0 trillion rubles from 2023) is red.

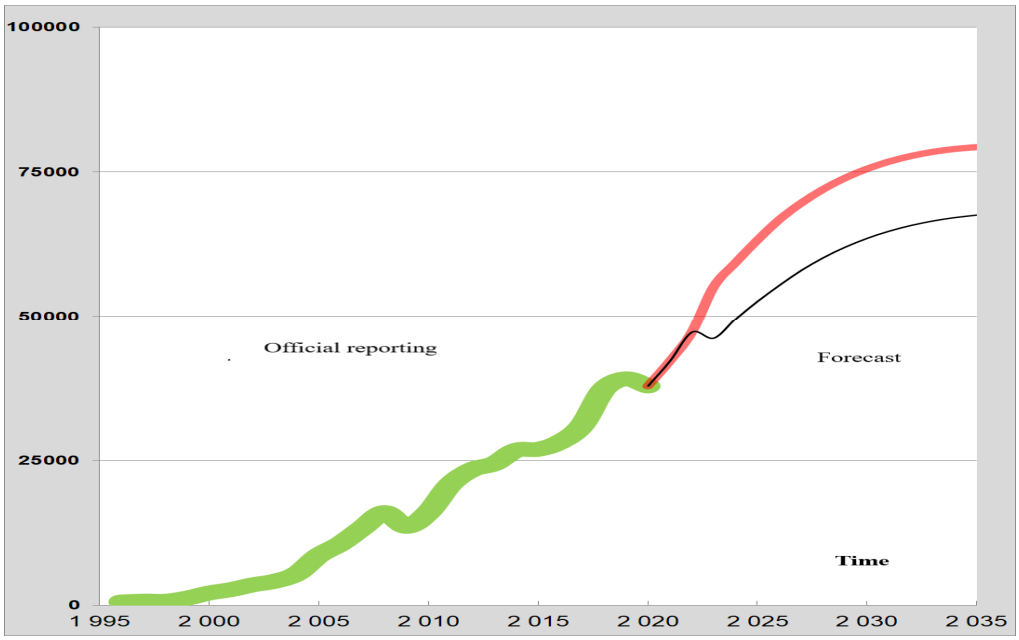

Fig. 3. **Consolidated budget revenues**

Source: compiled by the authors.

Note: the reference trajectory of the forecast is black, the perturbed trajectory of the forecast (+7.0 trillion rubles of final consumption of households since 2023) is red.

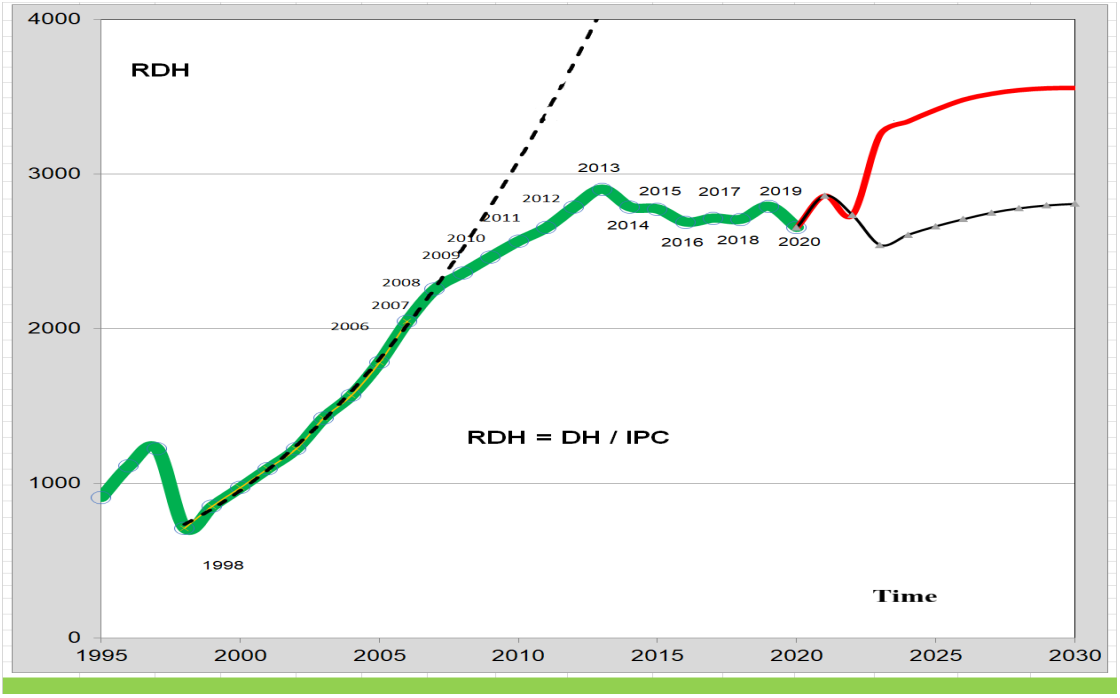

Fig. 4. **Dynamics of real monetary incomes of the population**

Source: compiled by the authors.

Note: the reference trajectory of the forecast is black, the perturbed trajectory of the forecast (+7.0 trillion rubles of final consumption of households since 2023) is red.

program (The total annual costs of the state for these measures is about 7.0 trillion rubles) for the period 2023–2025 is shown in *Fig. 1–4*. Indexation of the initial amount of BI did not provide for inflation accounting.

After the spasmodic increase of FCH in the first year of the "BI program" launch, it will work at "full capacity", i.e., goods and services will be sold at intervals 2023–2035 in excess of annual initial costs. "Wave" annual growth of the consolidated budget will compensate for the required annual costs. At the same time, all proportions of the already approved (and if necessary adjusted) budget (2021–2022) remain unchanged. To prove the feasibility of such a financial maneuver as an example, a numerical model experiment was performed, in which the economic development indicators of the Russian economy in the period 2020–2025 without a program and with the BI program were compared. It turned out that the increase in revenue from the consolidated budget exceeded the initial costs of launching the programme.

In order to assess the effect of the event, a reference trajectory was calculated — a forecast of the development of Russian economy under the inertial scenario of the initial data (the annual GDP of the reference trajectory is shown in *Fig. 1*, black), and then the "perturbed" trajectory of Russia's GDP development.

For this purpose, starting from 2023 "disturbances" were introduced into the model in the form of additional sums spent by "households" (the annual GDP rate of the perturbed trajectory is shown in *Fig. 1*, red). The difference between these trajectories — effect of the activities — showed that from 2023 the final consumption of households increased. The value of GDP (in current market prices) is also increasing, and additional revenues from the consolidated budget from 2023 fully compensate the state expenditures for the BI program. Annual GDP growth rate will increase as a result of the "BI program" (*Fig. 1*).

In the end, we are interested in graphics of the supporting and perturbations income trajectories of the consolidated budget, which are shown in *Fig. 3*. They show that the increase in revenues of the consolidated budget fully compensates the costs of the BI program. As you can see, it remains quite high throughout the forecast interval. Real incomes of the population are also increasing (*Fig. 4*).

Various payment forms (ASP, BIUP, BIC) to ensure BI could be credited to individual accounts special cards. Within the BI program for the categories of citizens covered by it, on the bank card will be placed target equivalents of money for the purchase of certain goods. The use of specialized financial instruments to stimulate consumer demand (or output) is not new in global financial practice. For example, the USA — the world's richest country — now uses ration cards, which are used by 45 million people.[12]

CONCLUSION

In this article, based on expert-simulation dynamic model, the macroeconomic implications of the proposed range of measures to introduce UBI transitional forms of payments for the solution of three interrelated tasks of improving the standard and quality of life of vulnerable categories of the population and households were analyzed. It is made a conclusion about the reality of implementation of "BI program" in our country. It is shown that the proposed BI application programs will significantly accelerate the economic and social development of Russia.

The first step (which will have a quick impact) should be to expand domestic demand by increasing real monetary

[12] URL: superbarok.livejournal.com/1798196.html.

incomes. This is what numerical experiments have confirmed. In addition, they have proven that spending on government final consumption and investment in fixed capital are both increasing. With coordinated growth in the production of consumer goods and services and the use of specialized financial instruments, all this will lead to the solution of a number of acute social problems and a new trajectory of development of the national economy, domestic demand and growth-oriented production of domestic goods and services.

We assume that implementation of the BI program will require significant preliminary preparation— determination of volumes of goods and services, logistics for raw materials and products, creation of administrative and organizational structures: accrual and payment systems for subsidies, etc. The mechanism proposed by the authors for simultaneous implementation of three interconnected parts of the program is a framework and can be adjusted. It can start with payments to one or two of the three proposed categories of population and households. The conditional start of the BI payment program from 2023 allowed to test the required quantitative parameters of the economy and show its possible economic and social impact. The time frame for the implementation of this programme depends on the readiness to implement it, which will require a whole set of reforms of the system of public administration of the economy and social sphere. This should be the result of scientific reasoning using the experience of the USSR and other countries. The authors can only assume that such measures would require:

- development of new laws and their adoption in accordance with the established procedure;
- increase the role of the RAS and its institutions in solving the problems of forecasting the economic and social development of the country, modeling inter-sectoral linkages and improving the system of public administration;
- significant adjustments to the regulations on the Ministries of Economic Development, Industry and Trade, Labour and Social Development, Finance, etc. and organization of their work;
- transfer of all methodologies and algorithms of calculations used by Rosstat to the domestic reporting and regulatory base, restoration of the annual interval of SNA-reporting publications and improvement of reporting indicators of the system of tables “Input-Output”;
- significant reduction of the Central Bank’s key interest rate to ensure long-term and cheap loans for the development of the country’s economy;
- development and application of the State Program “ration card”, within the framework of which the above categories of Russian citizens and households will be able to realize BI in purchases of domestic goods and services at government-regulated consumer prices and tariffs, as well as many other issues.

It is important to make a political decision and start real preparations for the introduction of the transitional forms of UBI, whose payment in the form of a basic income (BI) for the categories of citizens and households considered can become a new tool to improve their standard of living and quality of life and stimulating the development of the Russian economy and the social structure of Russian society in the new conditions of ensuring the full economic sovereignty of our country.

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Author's declared contribution:
V. N. Bobkov — developing the concept of the article, justification of social standards to determine the size of UBI, identifying the most vulnerable categories to UBI payments, conclusions from the results.
I. B. Kolmakov — review of the development of the problem, carrying out the economic and mathematical calculations.
V. I. Antipov — implementing predictive experiments on the impact of UBI payments on models P1–4–2(2022–8).
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The Soviet Union as the Pilot Economic Laboratory of the World

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ABSTRACT

In the economic practice of the Soviet Union, many decisions were developed that were perceived in many countries. The main experiment, the author considers the work with hundreds of thousands of top managers who do not have the property rights to their business. This article discusses methods of ensuring currency stability in the Soviet Union — sole proprietorship and personal responsibility, the formation of a personnel reserve and the so-called "nomenclature". Such Soviet developments as Dynamo and Lipetsk methods, brigade contract and Saratov system, and today are used by different countries. On this basis, it is proposed to consider the Soviet Union as an objective pilot economic laboratory of the world.

Keywords: Soviet Union; stable currency; manager stimulation; scientific organization of labor; Vologda index; nomenclature; personnel reserve; standardization of labor; Dynamo method; brigade contract; Saratov system; Lipetsk method

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INTRODUCTION

Even during the existence of the Soviet Union, some of the achievements of Soviet economic practice were more known abroad than within the country. In the new economic conditions, this unique heritage in the Homeland was almost completely forgotten, and economists who considered the Soviet system of economic management as one of the instructive, were not used.

Foreign research of the Soviet experience can be divided into three categories. The first of them is based on the Soviet Union's interpretation of exclusively as an opponent's, the second stands on socialist positions and considers the experience of building a new type of economy [1], and the third, free from ideological bias, studies Soviet methods and techniques of economic management without dividing the world into two systems or two camps [2]. The emergence of this category required a gradual transition from the integral perception of the Soviet economic system as a single phenomenon to the analysis of its individual elements. This approach is followed in the present work when interpreting the USSR as pilot economic laboratory of the world.

MOST STABLE CURRENCY

Many studies around the world focused on the mechanism of ensuring low inflation and price stability in the Soviet Union. For many, it was a paradox, a mystery: how to maintain price stability over the years?

One part of this common puzzle is: how did such a huge country manage to implement monetary reform before anyone else in the post-war world — already in 1947?

It is well known that in the majority number of States, the stability of the monetary system is ensured by a reserve currency (guaranteed yield securities, which are not means of payment). If there is little money in circulation, the reserve currency is bought by authorized state bodies, if many — sold to residents, and thus reduces the amount of money in circulation. Classic example of reserve currency — US Treasuries.

Neither in the Russian Empire, nor in the Soviet Union, and subsequently — in market Russia, it was possible to create a normal reserve currency. The reason has always been one — distrust of the state obligations. Placement of State loan bonds in the Soviet Union always went through administrative measures with party-ideological shade. Russian government securities caused the country to default in 1998.

However, during the formation of the administrative system of money circulation regulation in the Soviet Union, many techniques were invented, which in other countries are used when mistrust of the State grows.

However, the first of these — is an obvious borrowing from the practices of the USA, where the Federal Reserve System (FRS) was created in late 1913, acting as the Central Bank — consolidation of 12 Federal Reserve banks, formally private, located in the largest cities and distributed throughout the country. And at the end of 1921 the State Bank of the Russian Soviet Federative Socialist Republic (RSFSR) was created, less than two years later transformed into the Gosbank of the Soviet Union. He adopted from FRS the idea of spatial distribution of the activities of emission banks.

Just in Soviet Union issued 70 domestic bond issues, of which 65 — to 1957, i.e. about two loans per year on average. In the literature, the function of these loans is most often interpreted as attraction of funds of the population for solution of specific economic problems, and in time of war — for needs of front. But there is no doubt that this original reserve currency was regulated of money circulation. The main difference from foreign practice — actually forced placement of securities. Coercion was carried out through ideology, propaganda and directly — as obligatory purchase of bonds for some categories of citizens.

Another element of the Soviet system of currency stabilization was the separation of cash and non-cash circulation. Non-cash circulation was allowed to use only legal entities. Citizens — cash only. The recurrence of this separate payment system is still remained. In some (lightweight) form, this division is present in all countries of the world.

In addition, there was a division of credit money into "long" and "short". This required separating long-term credit banks from (LCB) commercial credit banks. They provided loans for long periods and at significantly lower interest rates. But to those who wanted to enrich themselves did not make "short" money from "long", it was necessary to have a well-functioning system of unavoidable severe penalties, and therefore, hard power in general. In the area of credit, this division improved during the reforms of 1928 and 1931.

The unique invention of the Soviet currency stabilization system was the regular compilation of the all-Union and regional balance sheets of monetary incomes and expenditures of the population. Such balance sheets allowed estimating the amount of cash in circulation and deciding whether to increase or reduce it. The balance sheet function was also to prevent the population from accumulating cash, which contributed to long-term currency stability.

Along with all the above, another element of stabilization of the ruble was the use of numerous "rationalization" techniques, which came from both the center and the places.

Here is an example. At some point, the old standard for cash registers is cancelled and replaced by a new one that is known to be more stringent. Suppose, wall fittings should not be 14 mm thick as before, but 18 mm. The Order may even be regional, but more often — common to the country. On this basis, all cash intended for the remuneration from the fund of the enterprise is withdrawn to the bank — until the fund will meet the new requirements. This reduced the amount of money in circulation. It was not possible to find information about borrowing of one kind or other methods of ensuring stability of the Soviet currency in any countries, but, undoubtedly, the whole system can be considered as a large experiment.

From 1937 to 1950, the Soviet ruble was pegged to the dollar. In February 1950, the Central Statistical Board of the USSR received an urgent assignment from I.V. Stalin to calculate the purchasing power of the ruble. Statisticians got 14 rubles per dollar (at the rate before the 1947 reform — 53 rubles). Stalin was not satisfied with this, and he ordered the ruble to be transferred to a permanent gold base, which was made by the Decree of the Council of Ministers of the USSR of 28.02.1950, the gold content of the ruble was set at 0.222168 grams of solid gold, and the sales price of a gram of gold — in 4.45 rubles. This unsuccessful experiment, which eventually ended with the death of the leader, only confirms once again that the USSR was an experimental economic base for peace. If one pays attention to the Soviet experiments they could not be repeated.

MEASURE OF TOP-MANAGERS CONTROLS

A country without private ownership of the means of production has given the world a huge number of managers who have no right to what they manage. This experience has proved invaluable for large companies [3]. However, in the early 1940s, there was a tradition to consider this problem in a purely theoretical context, as the one for the whole world [4], and since then this approach has been the predominant.

But it is possible and a completely different interpretation of this phenomenon — as a kind of experimental situation that precedes the mass distribution of hired managers around the world, the transition from the dominance of family business to the "revolution of managers".

At different times in the Soviet Union there were different systems of incentives for

managers. First there was a "reward for the execution of the plan". There was something romantic about it — the plan seemed to be comprehensive, taking into account all the circumstances of the enterprise. Subsequently, extensive literature emerged on the major defect of this method — the pursuit of unfettered plans.

The next stage was promotion "from the achieved". Director of the State enterprise were assessed on the basis of how different their performance during the period of operation was from the previous period. This approach is most often applied in foreign practice of stimulating top managers, despite the known disadvantages. The development of this method in the information age is the maintenance of a dossier for each top manager, which highlights not only his latest achievements, but also all previous. The focus on a one promotion "from the achievements" is replaced by the fixation of the constant success of the manager, but also "from the achievements".

NOMENCLATURE, STAFF RESERVE

All the largest companies in the world today hold competitions and tests for applicants. Quite often, the aim of such procedures is not to find staff for specific jobs, but to create a personnel reserve for the short and long term.

This approach originated in the Soviet Union, where there was the concept of "nomenclature". The main function of the nomenclature — is the formation of a personnel reserve for key positions in the Soviet system of management and economy, as well as — contingent of managers who can be entrusted with the management of production, editorial staff of a major newspaper or a serious position in the bodies of the party, State authorities.

Ordinary Soviet citizens treated the nomenclature ironically and often negatively. In publications and TV programs during the Soviet Union this idea was often ridiculed on the examples of how the directors of the sauna translated to the management of the philharmonic, etc. Yet now, decades later, we see that this was a compelled and inherently effective necessity not only in the critical conditions of post-revolutionary Soviet Russia. Time has shown that the idea of personnel reserve is a lot of useful.

Today, the system of training reserve of civil servants operates in the US and many countries in Europe. In the business the company "British Petroleum" is an indisputable model of formation of personnel reserve (internal nomenclature). Each division of the company has its own nomenclature, for each of its members is developed an individual development program, implemented under the control and with the help of direct managers, etc.

The first, not burdened with the initial theoretical background research nomenclature appeared in the late 1970s, and serious works — only in the 1990s [5]. Today, both empirical and theoretical research on this subject is conducted mainly abroad. The work of G.L. Tul'chinskii is interesting from the Russian publications of recent years, which showed on the example of the post-Soviet nomenclature that belonging to it can become a de-motivating factor that does not require constant maintenance of a high level of professionalism [6].

UNITY OF COMMAND

In a number of foreign researches, it was noted that the rights of the director of a Soviet enterprise were much broader than those of the top manager of a European or American firm [7]. The owner State had less control over its activities than the shareholders of a private foreign company. "Despite formal centralization, the director of the enterprise in Russia (Soviet Union) seems to have been more successful in building his own empire than his counterpart in a giant American corporation" [8]. In foreign practice, the top manager may not have ownership rights (or he was a minority), but in this case, the control over him was only strengthened.

Another thing — "red" director. The less financially connected he was with the company, the more trust he used. The principle of the Soviet system of administration was personal responsibility, and it could not be property, since none of the managers possessed such property as could compensate his possible managerial error.

In general, according to foreign researchers, personal relations are 90% determined success for the Soviet (and then Russian) manager [9]. They were often even formalized within the management structure.

Thus, at each Soviet enterprise at the top level of management two "triples" were formed — a kind of analogue of the board of directors, common for foreign practice [10]. The members of the first "triples" focused on production and economic activities,— the director, chief engineer and chief accountant — had to have personal trust in each other, since none of them had property interests in the business. Even more cohesive was the second "triples" focused on work with personnel: director, secretary of the party committee and chairman of the committee of the trade union (sometimes the secretary of the committee of the Communist Youth League).

With the destruction of the Soviet control system, the departure of one character from the second "triples" and a sharp increase in the burden on the chief accountant disturbed the balance of two "triples" and seemed a natural division of their functions.

VOLOGDA INDEX

This inflation rate, introduced in Soviet Russia in 1922, was better known abroad. Even today, only a few (mostly foreign) professionals are familiar with it.

As you know, the goal of building communism — is to create a society where the principle is respected: "From each according to abilities, each according to needs". In part, this principle is still being observed, considering needs as the basis for determining the minimum wage.

For example, in Moscow, a contract between the workers and the owner of the Trekhgornaya manufactory in September 1917 established such standards for the calculation of their wages: for a month was the bread of brown and white — 34 kg, sugar — 1.6 kg, tea — 140 g, cabbage — 7.2 kg, potatoes — 16.5 kg, pasta and cereal — 3.6 kg each, lean oil — 900 g, cows — 450 g, 680 g cheese and 1.8 kg of salt, and 15 eggs and 66 cucumbers. The Working Committee requested that 270 g of meat per day be included in the norm, but the question remained open, i.e. was not approved by vote [11]. In addition to clothing and underwear (for the year: blouse, trousers, two shirts, 2.25 towels, 1 bedsheet, 2.5 pillowcases, two pairs of socks, foot wraps and lingerie; for two years: 2 pairs of boots, 6 pairs of strapsof, cap and mittens; three years: warm jacket and trousers; four years: coat and hat, etc.), provision was made for baths, washing, haircutting and shaving, shoe cleaning and other cultural and educational purposes. Even costs of "updating the dishes" and "updating the home situation" and unexpected expenses were included in the calculation.

Labor productivity did not match wages. The October Revolution did not change the situation. In the decade following it, the gap between productivity and wages widened. In 1922–1923 wages in the metal, printing and paper industries doubled, 2.4 times in leather, 2.2 times in textiles, 1.8 times in food, 1.6 times in chemicals [12]. According to some researches, this was due exclusively to inflation [13].

In these circumstances, at the request of the Vologda trade union of dairy industry, an index was introduced in 1923, by which wages should be increased (indexed) based on the inflation rate. In the world science and practice he got as "Vologda Index", at the place of his origin.

The basket for the calculation of the minimum wage included only foodstuffs whose composition varied from one part of the country. It is important that for each item the price was

considered as if the employee had bought half of the product in the state store at fixed (controlled) prices, and half — in the market, at commercial prices that could be 4–5 times higher [14].

Vologda Index is the beginning of a wide range of indicators by which wages are indexed in the world economic practice. The relevance of such an updated indicator is felt in Russia and at present. And globally, it would be wise to use the idea of this index for average purchases in different retail chains that currently have different price ranges.

It should be noted that in the idea of paying not for the work done, but to ensure acceptable living conditions, there is something fundamentally Soviet. It is this principle that has been introduced in all economies of the world.

REGULATION AND SCIENTIFIC ORGANIZATION OF LABOUR

In the Soviet time until the late 1980s the abbreviation SOL — scientific organization of labor — was popular. It was a set of interrelated activities that improved the production process. According to some sources, the term SOL appeared in 1960 [15]. But some elements and approaches existed even during the period of military communism, many Soviet figures, including V.I. Lenin and L.D. Trotsky, were impressed by Taylorism. The latter, in particular, attempted to introduce SOL into the work of labour armies, citing Kelly, a visiting engineer from the United States, as a consultant [16].

The key to SOL was regulation of labor, more theoretically and practically worked in the USSR than anywhere else. Two methods of normalization were used: experimental-statistical and analytical (and in practice constantly tried to replace the first by the second). There was no element-by-element analysis of transactions in the statistical pilot method, it was based on actual past time and labour for similar work.

In the analytical method, each production operation is decomposed on the elements, the duration of each of them is established depending on external factors, it is determined which factors need to be changed in order to reduce their time. Finally, the optimal composition of the elements of each operation and the totality is designed. The standards obtained for each operation were considered scientifically.

There was a cost-limiting variant of the analytical method of normalization, the so-called chronometer method, when next to the employee stood the controlling manager and fixed the duration of each operation. It is not common in practice because of its high cost and extensive use of hardware production, where the duration of operations is determined by equipment and process standards. More often than not, SOL applied an analytical calculation method — without chronometer, based on approved intersectoral, sectoral or local regulations. Labor standards were to be updated with regular planned reduction of labor intensity.

Abroad this direction was considered "ultra-Taylorism" and was associated with the name A.K. Gastev, who headed the Central Institute of Labor (CIL) in 1920–1930, which, in my opinion, is not true. Much closer to the works of A.K. Gastev [17] the concept of E. Mayo's social leadership with his so-called Hawthorne experiments and the approaches of Henry Ford, with which A.K. Gastev was in correspondence.

For CIL, the country's economy was a single production structure. It was created a training center "Installation", which had the status of a joint-stock company, which trained instructors on scientific organization of labor, surveyors, accountants and specialists of the Department of technical control, as well as highly qualified workers, with SOL skills. During its existence more than half a million people were trained in 200 professions, including 20 thous. SOL instructors. Training programmes were conducted over several months. Such training institutes now exist in many leading companies in the world.

Another classic of SOL — P. M. Kerzhentsev — took a different view on many issues than A. K. Gastev. For example, he explicitly emphasized that, in addition to increasing productivity, it is necessary to increase labour intensity, considering (based on research) that the intensification of labour is not necessarily related to the deterioration of the worker's physical condition.

Thanks to P. M. Kerzhentsev, the world's science and practice have received three directions in the organization of work, which are successfully developing and in our time. The first of them is now called "ergonomics" — the science of the rational movements of the human body during work. Unfortunately, P. M. Kerzhentsev's contribution to this science, which largely determined its future development, is hardly mentioned in modern textbooks.

The second was to save working time and to plan each employee's routine — from manager to worker [18]. After decades it became called time-management and returned to our country as a foreign experience.

The third direction was the mass involvement of workers at all levels to the scientific organization of labor. Kerzhentsev organized the mass public organization "Time League", actually the first public movement aimed at improving the organization of work [19]. Activities of League members were voluntary and unpaid. All this happened long before the appearance of Japanese "quality circles".

Other prominent SOL theorists and researchers include O. A. Yermansky, E. F. Rozmirovich, N. A. Vitke and others whose works have been carefully studied by their contemporaries in many countries of the world.

DYNAMO METHOD

Productivity growth in the Soviet Union was interpreted solely as a reduction in labour intensity of production, so there was a process of constant increase in output standards and regular reassessment of jobs. It is noteworthy that, contrary to declarations, the plans to raise production standards were poorly linked to new machinery, technology, production or labour organization. The schedule for the replacement and revision of standards was agreed with the trade union, approved by the director of the enterprise and included in the collective agreement until the beginning of the following year.

In addition to the established practice, public regulatory bureaus, which included the most experienced workers, were established in enterprises in the late 1970s. The stormy discussions in the bureau identified those standards that workers felt could be shortened. This increase in productivity was mainly due to increased labour pressure on existing equipment.

The so-called "Dynamo method" became a natural continuation of this practice. In summary, the idea was that the individual worker has committed itself to increasing the productivity of their work. In response, he was given a salary increase immediately after this official promise.

The fate of the method in the world was bizarre. In 2007 the method DYNAMO++ was developed by Swedish engineers. In its framework, the stimulation of workers on the assembly line was carried out by the optimal redistribution of functions between man and automatics [20], but it was the idea of the Dynamo method. The worker must accept a new division of functions between him and the conveyor and, in fact — a future increase in productivity [21].

BRIGADE CONTRACT (SHCHEKINO METHOD)

In the 1970s in the Soviet Union, as a pioneer of the new method of stimulation, the Hero of Socialist Labor Nikolay Zlobin, the foreman of management "Zelenogradstroy" became famous. The method was subsequently named Shchekino — after the city of Shchekino, where it originally appeared, but is also known as

Zlobinsky, by name of the initiator, or as a "brigade contract". According to this method, instead of the usual orders, the brigade received a task plan for the whole year, which specified all types of work, deadlines for their implementation, the salary fund and the total amount of rewards.

The team committed to high-quality and on-time work, and the administration guaranteed the delivery of materials and equipment on schedule. Current salary payments were treated as an advance payment and full payment was made on the basis of final results. Under this approach, workers performed tasks with higher productivity and lower cost. The method was not effective because the administration often failed to meet its commitments [22].

Shchekino method was studied in detail abroad by Sovietologists [23] and management specialists [24]. But the practical implementation of the method had been considerably in Asia than in Europe or North America. The reasons for this may in common elements of community mentality.

SARATOV SYSTEM

Little known to us now Saratov system was popular in the country and the world more than half a century ago and is introduced abroad so far. It appeared at the Saratov Aviation Plant in 1955 and was fully called "the system of defect-free manufacture and its delivery to the Technical Control Department and the customer from the first presentation". Often it was replaced by the abbreviation defect-free product manufacturing (DPM), which was then understood by most manufacturers.

There was a new director at the factory, and in his first order for the aircraft factory there were only two items:

1) technical control department will stop the acceptance of the quantities of products after the first defect is found and return the whole quantities of products to the bearer;

2) workers who sell on first presentation pay an award of 50% of the basic salary.

This radical version subsequently did not catch on. Any employee was given the opportunity to obtain their own quality seal and sell the manufactured products in a lighter and more widely distributed version or details in Technical Control Department (TCD) or to the customer "from the first presentation". Employees with a personal stamp were paid 5 to 10% of salary or partial (annual) earnings to the regular premium.

The production organization system of defect-free manufacturing was distributed to industrial enterprises, and in 1979 industry standard OST 1 41725–78 was adopted, which is still in force in the Russian Federation (last updated 1 January 2018).[1]

Abroad Saratov system is better known under the name "zero-defect" (ZD). It began to be studied during the Soviet Union. For example, the American Society for quality control noted that the Saratov system is widely distributed for all countries the eastern bloc.[2] True, its origins go to the practice of the Czechoslovak shoe company Bata, introduced before World War II.

Saratov system had clones: L'viv, Yaroslavl, Krasnodar and Gorky. L'viv system of defect-free labor was developed and implemented at the L'viv Telegraph Equipment Plant in 1961.[3] Yaroslavl version called NORM appeared in 1964 at the Yaroslavl engine plant. Employees guaranteed that the engine produced will work as planned. The method is still used in the country of his birth [25]. Later Krasnodar version (1980) introduced in the Saratov system plans to improve the quality of products.

[1] OST 1 41725–78 Industry Quality Management System. Production quality management system at industrial serial enterprise, association. Organization of the production and delivery of products without defects by TCD and the customer from the first presentation. Basic provisions.

[2] Annual Technical Conference Transactions (1978). Vol. 32. Pp. 218–219. American Society for Quality Control.

[3] L'viv version was covered in the journal "Standards and Quality" in 1976 r. The English translation of the journal is available at the University of California (Berkeley) library, available electronically from August 2008 on the university website.

In the Gorky region in 1958 the system CANARSPI was created (quality, reliability, resource with the first products), oriented primarily for constructors and designers. It was developed by Chief Engineer of Gorky Aircraft Plant "Sokol" T.F. Seifi at the launch and serial production of aircraft MiG-19 and MiG-21. It has extended the quality management system to the design and production process to produce reliable aircraft from the first prototypes. Their developers made a commitment to eliminate or minimize the correction of defects in serial production, for which they increased their salary.

Seven years after its introduction in 1962, similar systems were introduced in the East and West Germany, Poland, the USA, Japan and other countries. In each of them they acquired their specific forms, but their origins were at the Saratov Aviation Plant.

LIPETSK METHOD

So called the method of organizing production in construction. It was that the mason should not have been distracted by the ancillary activities: prepare the mortar, applied to the wall and leveling, lifting bricks from the floor, etc. He had to stand in front of the installation site and wait for two utility parts to put bricks in each hand.

The method was not widely used in the Soviet Union, but in the United States it was introduced as the Lipetsk method. More widely known not the method itself, but Lipetsk masonry, which became effective using this method of work management. With it there are three spoon rows without bandage, and the space between the bricks of the outer and inner rows is filled with mortar and broken brick. Next comes one row of rows. Such masonry simplifies the mason's work and loads the utility parts with a bolt.

There was a Lipetsk masonry in Lipetsk in the 1960s, at the beginning of the mass construction "khrushchev" of silicate brick without plaster. It did not require the three-quarters bricks needed for the bandage. One of the reasons for its emergence was the beginning of the use in the construction of silicate brick, which is difficult to crack exactly. For the same reasons, it most likely spread outside the Soviet Union, mainly in Eastern Europe.

CONCLUSION

The above innovations were integrated into the Soviet economic system. The opposition between the two systems always had a strong ideological component, which did not allow research into their similarities.

Time had to pass to separate them as special elements of economic mechanisms in a calm atmosphere of abated ideological struggle. In my opinion, this time has come.

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Human Potential Reproduction in the Context of New Challenges

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ABSTRACT

Subject. The article considers the evolution of human development theory under the auspices of the United Nations Development Programme (UNDP), and the factors influencing human potential reproduction.
Purposes. To compare the concepts of "human potential" and "human capital", existing tools for their assessment. Analysis of the specific features of Russia's human potential development and possibilities of its increase.
Methodology. In the article are used methods of quantitative analysis and cross-country comparisons, a systematic approach in the study of components of human potential.
Results. The author compared the content of the terms "human potential" and "human capital", which have many common meaningful elements, therefore they can be used in practice as synonyms. The analysis of human development dynamics in Russia highlighted the weaknesses and strengths of this process using the UNDP Human Development Index, Human Capital Index from the World Bank, and Global Human Capital Index from the World Economic Forum (WEF). Russia's lagging behind developed countries in some human development components requires an active demographic policy, modernization of health care and education, pensions and social assistance, development of cultural, formation of an efficient labor market and an innovation ecosystem.
Prospects. To improve the efficiency of measures aimed at the active reproduction of human potential it is necessary to continue improving the tools for estimating its components, which should be better aligned with the modern requirements of a rapidly changing technological structure of the economy.
Keywords: human potential; human development; human capital; educational process; motivation for innovation; labour potential; cost of human life

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INTRODUCTION

At the end of the last century, Human Potential (HP) was recognized by the world community as the main factor in the formation of an innovative economy, the driving force of sustainable development and human progress. In Russia, at the state level, it has been declared the main strategic resource of innovative growth based on new technologies.

Within the current economic paradigm, the development of HP is one of the main conditions for increasing the competitiveness of the national economy.

The representation about the main role of economic growth as a measure of progress, which prevailed in the practice of social production until the second half of the 1980s, moved into the background (is still alive), where research under the human development approach is widely accepted. It was based on the understanding that economic growth, measured by the volume of material goods and services, is not an end in itself, but simply a means to improve the quality of life of people.

As a result, the United Nations Development Programme (UNDP) experts working on human development theory published their first report "Human Potential Development Report" (HPDR) in 1990. It presents the Human Potential Development Index (HPDI), which has since been calculated annually at the regional, national and international levels.

It is a composite, average of the standard of living and quality of life of a person in a country or region, which measures their achievements in the three main sub-indices:

- Life Expectancy Index: health and longevity as measured by average life expectancy at birth;
- Education Index: access to education, as measured by the average expected duration of education for school-age children and the average duration of education for adults;
- Gross National Income Index: decent standard of living, measured by gross national income (GNI) per capita in U.S. dollars by purchasing power parity (PPP).

Since 2003 it is called "Human Development Index" (HDI), and the report — "Human Development Report" (HDR) without the word "potential", which did not correspond to the content of HDI indicators. In some countries, however, the index continued to be referred to as the Human Potential Development Index by inertia and the human development theory — as the concept of human development, although their content is not identical.

Three new indicators were introduced in 2010, in addition to the HDI composite indicator, which is based on country average statistics and does not take into account internal inequalities: Inequality-Adjusted Human Development Index (IHDI), Gender Inequality Index (GII) and Multidimensional Poverty Index (MPI).

Since 2020, UNDP experts taking into account the planetary load and social costs associated with carbon emissions and natural resources (HPDI) calculate HDI. It corrects the standard HDI to carbon dioxide emissions and per capita resource consumption for each country.[1]

The UNDP Human Development Index does not cover all the diversity of HP components that cannot be quantified more or less accurately.

HUMAN POTENTIAL AND CAPITAL: SIMILARITIES AND DIFFERENCES

The content of the term "human potential" has been discussed since the 80s of the last centuries, but its generally accepted definition has not yet been found. Russian and foreign authors give a variety of interpretations of human potential, which is largely due to the complexity of the concept.

Amartya Sen, Nobel laureate in economics in 1998, whose work is the basis of the first

[1] UNDP Report "Indices and Indicators of Human Development: Updated Statistics 2018".URL: https://hdr.undp.org/sites/default/files/2018_human_development_statistical_update_ru.pdf

UNDP Human Development Report in 1990, identified HP countries as "sum total of the physical and spiritual forces of its inhabitants, which can be used to achieve individual and social goals — both instrumental, connected with the provision of the necessary living conditions, and existential, Including the expansion of human potency and self-realization" [1].

Most Russian scientific publications consider HP as a set of biological-physical, intellectual, spiritual and sociocultural properties, abilities and resources of an individual, social group, region or country. They are already formed or forming but have not yet been implemented in practical activities, and depending on different conditions and factors, may remain latent resources [2–8].

Within the framework of different approaches to the study of the HP (philosophical, economic, socio-economic, sociological, cultural, political, psychological, resource, activity, etc.), its structural elements are distinguished, most of which are not yet quantifiable.

N.M. Rimashevskaya identifies three main groups of structural components of HP:

- physical, mental and social health;
- professional and educational resources and intellectual potential;
- cultural and moral values, spirituality and socio-cultural activity of citizens [9].

Among the components of HP, intellectual, creative, communicative, value and activity potential are most often specified, which is connected with the transition to an innovative economy that requires people to new skills [10].

The concept of human potential is based on the development of the theory of human capital, which began a few hundred years ago, much earlier the appearance of the term "human potential". HC has been continuously transformed by new demands of technological progress.

The term "human capital" was first used by Jacob Mincer in 1958 in his article "Investment in human capital and personal income distribution" [11].

The HC received international recognition in modern interpretation in 1960, when Theodore Schultz, a Nobel laureate in economics in 1979, defined its main characteristics: it is the totality of the most valuable human qualities inherent in the individual, as well as an additional source of income, which is created through the knowledge, skills, abilities of the person. While, education — is the most important factor for economic growth and at the same time — a source of future satisfaction and (or) earnings. Additional investment in education is needed to improve the quality of the labour force, which is a factor of production that generates a surplus product. Education capital — is human capital because it is inseparable from the human [12].

Nobel laureate in economics in 1992 Harry Becker, developing the ideas of his colleague, argued that HC (knowledge, skills, motivation, etc.) is formed by investing in people, among which he highlighted education, professional experience, health, geographical mobility, search for information [13].

These investments, measured in monetary terms, contribute to the development of human labour, intellectual and cultural potential.

In the XXI century, the Organization for Economic Cooperation and Development (OECD) and Economic Commission for Europe define human capital almost equally as inherent in individuals' quality of knowledge, competencies, qualifications, skills, etc., which are important for economic activity and contribute to personal and public welfare.[2]

The World Bank Group has been implementing its new Human Capital Development Project (HCDP) since 2017 to compensate for the lack of policy incentives and provide incentives to invest

[2] OECD Review Report "Measuring Human Capital: Leading Initiatives and Future Challenges". URL: https://unece.org/fileadmin/DAM/stats/ documents/ece/ces/2013/5_R_.pdf

in HC. As part of the project in 2018, the first version "Human Capital Index" (HCI) was calculated.

This index consists of several components: survival probability of children under five years of age, expected duration of studies for children, unified exam scores as an indicator of learning quality, survival of adults (proportion of 15-year-olds today who will live to 60) and percentage of children without developmental delays.

This indicator measures the productivity of the next generation of employees from 0 to 100% and means that the productivity of a person born in a year of HCI measurement, when he/her grows, it will be as a percentage of the benchmark for decent nutrition, full-time education and good health. Globally, a child born in 2020 can expect to achieve 56% of the productivity that it could achieve when it grows.

At the same time, the components of the index are represented as productivity contributions relative to the situation of full school level and health. In this case, the HCI does not take into account the quality of higher and additional education during life, the level of development of social skills, competencies, etc.

However, HCI analysis shows that in countries with the lowest levels of human capital investment at the moment, the productivity of the next generation of workers will be one third or even half lower, what could be if people were perfectly healthy and received a quality education.

The HC structure distinguishes its different types: biomedical, labour, organizational-entrepreneurial, intellectual, cultural and moral capital, etc.

It is necessary to note some terminological differences in Russian and foreign scientific works. On the one hand, experts of the Analytical Centre under the Government of the Russian Federation regularly prepare reports on human development in Russia, similar to the reports of the United Nations Development Programme, on the other hand, a number of domestic researchers, including ISEPP RAS, consider that the Russian term "human potential" is substantially more precise than the term "human development" used by the UNDP [14].

Human potential, which has a latent character, is realized not only in the socio-economic sphere, so in Russia it is studied in an extended interpretation by various sciences about the person. Receive income — is only one of the needs of a person who, in some cases, constructs a more complex system of life priorities.

Comparing the concepts of "human potential" and "human capital" is detected a number of differences and contradictions.

For example, proponents of human capital theory argue that investment in education — is the most important factor for economic growth, and human researchers respond by saying that education — is potential, which, for various reasons, may become capital, although more so for individuals than for regions or countries. The question remains a tricky one.

"The paradigm of human potential differs from the paradigm of human capital by the priority of humanistic approaches over utilitarian pragmatic attitudes and increased sensitivity to cultural-historical, sociocultural, cultural and psychological factors in the development of educational modernization programmes and strategies" [15].

Concepts of "human development", "human potential" and "human capital" have common content elements, but differ in formation, structure and application. They are united by the recognition of human development as the main goal and means of social progress.

Investment in the development of HC contributes to the accumulation of HP, so when discussing investment in human development, the author uses the concepts of "human potential" and "human capital" as synonyms.

FEATURES OF HP DEVELOPMENT IN RUSSIA

The human potential of Russia is characterized by extremely different assessments of part of its individual components. The need to build human capital is officially recognized by the Russian government in the developed and approved "Concept long-term social-economic development of the Russian Federation up to 2020" in 2008. As one of the answers to the long-term systemic challenges of the Russian economy "Concept-2020" implies overcoming the existing negative trends in human potential development, which are characterized by:

- population decline and level of employment in the economy;
- growing competition with European and Asian markets for qualified personnel;
- poor quality and low accessibility of social services in health and education.
- Human potential development involves two types of systemic transformation:
- increasing the competitiveness of human resources, labour and social sectors of the economy;
- improving the quality of people's social environment and living conditions.

They cover medium- and long-term objectives, priorities and main directions of population policy, policies of modernization of health and education, development of pension and social assistance, development of culture, creation of efficient labour and housing markets.[3]

Note that in the text "Concept-2020" the terms "human potential" and "human capital" are used as synonyms.

According to experts, the average level of implementation of measures laid down in "Concept-2020" was only 29.5%. The percentage of fully implemented measures was only 6.8%, mostly improving organizational innovations, technical solutions, but not reforms and fundamental changes that meet real challenges.

At the same time, experts recorded a high level of imitation of reforms, formal implementation of measures and instructions. According to their estimates that few measures have been implemented without attempting to distort their principles. However, there is progress as "Strategy-2010" is only 39%.[4]

Adopted on the basis of "Concept-2020" in December 2011 "Strategy-2020" also had no success: none of its macroeconomic indicators has not been fulfilled, due to the 2008–2009 crisis, demographic situation and other negative factors. There were also problems of forecasting, which at that time was largely declarative, contained a set of good intentions and general recommendations that were not closely related.

After the introduction of sanctions against Russia and the start of the COVID-19 pandemic, the HP investment goals and targets were postponed to 2024 and then to 2030.

"Saving the people of Russia and human potential development" is at the forefront of the updated national strategic priorities "National Security Strategy of the Russian Federation" in 2021, ensuring and protecting the national interests of the Russian Federation.[5]

In "Economic security strategies of the Russian Federation until 2030", adopted in 2017, the decline in the quality and availability of education, medical care and, as a consequence,— the quality of human potential is included among the main challenges and threats to Russia's economic security.[6]

According to the results of the intercountry comparison published in the 30th anniversary Human Development Report 2020 UNDP, Russia ranks 52nd out of 189 countries with

[3] Concept long-term social-economic development of the Russian Federation for the period up to 2020. URL: http://static.government.ru/media/files/aaooFKSheDLiM99HEcyrygytfmGzrnAX.pdf.

[4] URL: http://2035.media/2017/09/27/strategy2020-part1

[5] URL: http://2035.media/2017/09/27/strategy2020-part1

[6] URL: http://static.kremlin.ru/media/acts/files/0001201705150001.pdf

0.824 after Montenegro, Romania, the Republic of Palau and Kazakhstan. In this report, states are ranked according to the Human Development Index (HDI) calculated on the basis of 2019 statistics.[7]

Such a strong position in the HDI world ranking Russia is solely due to the high level of education of the population, but significantly lags behind the European states on two other indicators: life expectancy and per capita income. For example, life expectancy at birth in Russia is 72.6 years, with an average of 79.6 years in a group of countries with very high levels of human development.

For a quarter of a century, the level of human development in Russia has grown significantly: in 1995 according to HPDI, the country was on the 114th place out of 174 countries with 0.701, in 2006 — already on the 73rd (0.752). After 2009, the growth rate declined slightly, as in many other countries of the world, but HDI in Russia continued to rise until the COVID-19 pandemic.

According to preliminary estimates, UNDP, the 2020 HDI drop is equivalent to seven years of progress, as COVID-19 struck a triple blow to health, education, and income, causing a decline in human development worldwide.[8]

According to the Human Capital Index-2020 (HCI) of the World Bank, Russia ranked 41st out of 174 with a score of 68% against a world average of 56%. The index was calculated using data from March 2020, so it reflects the impact of the COVID-19 pandemic on the HC level. In 2018, Russia ranked 34th with 73%.[9]

Nevertheless, the Russian Federation is among the 10 countries in the world that have achieved the best human capital development indicators in the last 10 years: our country's HCI value increased from 60% to 68% between 2010 and 2020.

The global average "Global Human Capital Index" by World Economic Forum (WEF) in 2017 was 62%, Russia scored 72.2% and took the 16th place out of 130, that the average is lower than North America, but higher than Western Europe (including the UK, Ireland, and France), and Japan, South Korea, and Israel.[10]

The World Bank estimates that human capital in Russia accounts for the largest share of the country's total wealth — 46%; While this share is much lower than the OECD average (70%). Next are produced capital (33%), natural capital (20%) and net foreign assets (1%).

Between 2000 and 2017, HC per capita increased rapidly and by 80% in Russia. Russia is surpassed the OECD and commodity-exporting countries in HC growth per capita. However, the average annual growth rate of HC declined from 4.7% in 2000–2010 to 1.8% in 2010–2017. If Russia's average human capital growth rate of 2000–2017 is maintained (3.5%), it would take about 50 years to catch up with the OECD countries; with a lower growth rate (1.8%), Russia could catch up in almost 100 years. Despite significant growth in HC, its per capita wealth in Russia is one fifth of the OECD average.[11]

The above cross-country human capital development indices have their restrictions and disadvantages. For example, they provide mostly quantitative macro-indicators of countries and regions and do not address the meso- and micro-level, as well as qualitative parameters. At the same time, the annual international rankings of HP and HC allow to analyze the state and dynamics of human development, as well as the quality of social policy in each individual country.

[7] URL: https://hdr.undp.org/sites/default/files/hdr_2019_overview_-_russian.pdf

[8] URL: https://ac.gov.ru/news/page/padenie-indeksa-celoveceskogo-razvitia-v-2020-godu-ekvivalentno-semi-godam-progressa-27118

[9] URL: https://openknowledge.worldbank.org/bitstream/handle/10986/34518/211643RU.pdf?sequence=5

[10] URL: https://www.weforum.org/reports/the-global-human-capital-report-2017

[11] URL: https://www.vsemirnyjbank.org/ru/country/russia/publication/how-wealthy-is-russia

POSSIBLE HP INCREMENT PATHS

The high importance of human potential for the emergence of a sustainable innovation economy based on knowledge- intensive and high-technology industries that increase the competitiveness of the country is widely recognized.

UNDP experts defined general directions of HP development and proposed ways to optimize the relationship between economic growth and human development:

- increased investment in education, health, training, promotion of human capabilities and participation in production and distribution;
- more equitable distribution of income and wealth, providing a material basis for human potential development;
- balancing social expenditures, fully strengthening the economic base of the social sphere;
- expand the possibility people to exercise their political, social and economic choices, with special attention to groups (particularly women) whose opportunities are limited for various reasons.[12]

The main obstacle to HP reproduction — is the low motivation of governments and different groups to invest in HP accumulation and quality improvement. World Bank in "World Development Report 2019" documented an absence of political incentives as one of the reasons why governments do not invest in human capital: "Because investment in human capital may not have economic returns for years, politicians usually try to find faster ways to improve their reputation... The bureaucracy responsible for implementing human capital formation policies is often not able or motivated to do so effectively".

When governments are ready to invest in HP, they prefer to invest in politically visible components of HC, such as building schools and hospitals, and much less in — its intangible aspects, Improving the quality and qualifications of teachers and health workers.

The World Bank group (WB) has been implementing the "Human Capital Development Project" (HCDP) since 2017 to compensate for the lack of political incentives and create incentives for investments in HC. In particular, WB experts consider that accurate measurement of HCI, such as education and health outcomes, raises awareness of the need to develop human capital at the local, national and global levels. Such measurements provide the basis for research and analysis to develop policy measures that improve the quality of HC.[13]

Many decision makers recognize the importance of human development in words, but are not ready to invest in it. The reluctance to increase social spending on HC policies is often justified by the fact that it constrains economic growth, but studies from a number of successful countries suggest otherwise. Even when Governments and voters are aware of the importance of the multidimensional issue of human development, they may disagree on priorities for addressing it.

In one article it is almost impossible to reveal the content of all directions of human potential reproduction. Therefore, the main attention of the author is focused on the problems of innovative, educational and labor components of HP.

The current goals of innovation and digital development include the creation of new and modernization of existing technologies, the introduction of original management systems and business models that forming the sustainable economy of the future. In our country, the process is steadily but is uneven in different value chains.

On the one hand, Russia lags far behind the world's advanced countries in the creation of new technologies and investments, especially venture capital. Demand for innovation remains low, although the country has a broad infrastructure for innovative development. In

[12] URL: http://hdr.undp.org/

[13] URL: https://www.vsemirnyjbank.org/ru/publication/wdr2019

the next 14th issue of the Global Innovation Index (GII), published on 20 September 2021, Russia's innovative ecosystem ranked 45th among 132 countries, rising two positions relative to 2020 due to increased performance in all areas of science, innovation and creativity.

On the other hand, in the rating of GII 2021, Russia ranks higher, for example, among the top 20 countries in the quality of the entire higher education system, ranked 16th in the number of patent applications for inventions, although the level of introduction of scientific developments and inventions remains very low.[14]

Also, Russia creates favorable conditions and infrastructure for the development of new technologies, especially information and communication (IC), such as the Internet and mobile communication. In the rating of quality and availability of the Internet Russia takes the 9th place out of 131, the level of availability of mobile Internet — the 2nd place among the 50 countries with the largest GDP. With this cheaper than in Russia, the Internet is costs only in India.[15]

The gap between low innovation performance and high innovation potential is due to weak demand for innovation from corporations and entrepreneurs, which in Russia, as in some other countries, are either afraid of risk or are not provided with resources for the long-term return on venture investment (VI).

In addition, in the Russian economy, poor-quality competitive environment significantly reduces the motivation of enterprises, stimulating innovation and introduction of innovation. In such circumstances, competition is not for the consumer, but for access to state resources and limiting this access to competitors [16].

In 2021, the Russian venture capital market grew almost 3.5 times — from 24.9 to 85.2 billion rubles.[16]

The emergence of breakthrough technologies and innovations can be accelerated by effective management of human capital, development of new skills and competencies of personnel of different qualifications.

World Bank experts consider that three types of skills are increasingly important in labour markets: cognitive (e.g., complex problem solving), social behavioral (e.g., teamwork) and those that predetermine adaptability (e.g., logical thinking and self-confidence).[17]

In Strategies for innovative development of the Russian Federation until 2020 noted that " one of the main tasks of innovative development is to create conditions for the formation of the following competences of innovation activity among citizens: ability and readiness for continuing education, continuous improvement, retraining and self-study, professional mobility, the desire for new; ability to think critically; ability and willingness to reasonable risk, creativity and enterprise, ability to work independently, readiness to work in a team and highly competitive environment; proficiency in foreign languages, involving the ability to communicate freely in everyday life, business and professions. The formation of such competences implies the adaptation for these goals of more than just individual socio-economic policies <...>, but also the public environment as a whole, creating conditions for the freedom of creativity and self-expression, encouraging and rewarding people with

[14] World Intellectual Property Organization (WIPO). "Global Innovation Index (GII) 2021". URL: https://www.globalinnovationindex.org/gii-2021-report

[15] RBC. Russia entered the top ten rating of internet quality and availability. URL: https://trends.rbc.ru/trends/social/cmrm/613eea0f9a7947a3178b11b

[16] RBC. URL: https://trends.rbc.ru/trends/innovation/61c039b19a7947635587c04d.

[17] World Bank. 2019. World Development Report 2019 "Changing the nature of work". Washington, D.C.: World Bank. DOI: 10.1596/978–1–4648–1328–3. License: Creative Commons Attribution CC BY 3.0 IGO URL: https://www.vsemirnyjbank.org/ru/publication/wdr2019.

relevant competencies and achieving success".[18]

Formation of such qualities of human potential requires modification of all forms and technologies of educational processes at different stages of human life with mutually beneficial partnership of the state, science, production and society.

Existing inconsistencies between the education system and labour market needs leave some graduates who are forced to work outside the profession or relearn. This reduces the motivation of youth for education.

System of higher education and vocational training requires a better balance of labour supply and demand to meet the needs of the economy, as well as better coordination and practical interaction between different levels of education. In particular, the existing mechanism of targeted training with employers needs to be improved.

Forced mass and accelerated introduction of digital technologies and distance learning in 2020, despite all the shortcomings and costs, significantly increased the access of pupils and students to various information resources, that offers unprecedented opportunities for self-development with appropriate motivation.

The problem today is that in Russia, only 3% of all innovative start-ups are born in universities, while in the world this figure is 25%. Therefore, during the strategic initiative "Platform of University Technological Entrepreneurship" it is planned to create at least 30 thousand university start-ups and 150 thousand jobs.[19]

The structure of the educational process increases the number and the content of practical classes, focuses on the participation of students in innovative entrepreneurial activities through the implementation of real innovative projects within start-ups or small innovative enterprises (SIE). The success of such initiatives depends to a large extent on the demand from investors for innovative projects.

The main problem is that human capital degrades if it is not needed in the market of highly skilled labor, entrepreneurial or creative activities.

Hence the need to form the requirements to develop high-quality (high-productivity and high-paid) labour resources for the innovative economy. But it is necessary to significantly improve the interaction of the education system and the labour market. In particular, it is necessary to address the employment and adaptation of graduates of universities, colleges and technical colleges, to reduce the outflow of scientists and qualified specialists.

Excessive bureaucratization of the socio-economic sphere severely limits the creative abilities and development of HP and HC. Consumer society values spread in Russia also do not contribute to the formation of a creative personality, motivation for innovation and acquisition of knowledge, competencies and skills of investment activities. In contrast, it is necessary to create a system of social lifts for the most capable and talented people, which will show society their success stories as a social benchmark for choosing a life strategy and role model.

This will not compensate for the low demand for highly skilled labour, but will increase the number of people targeted for innovation and thereby increase human potential, as well as human capital, if talents, competencies and skills of motivated innovators are successfully implemented in the socio-economic sphere.

Russian researchers of HC rarely pay attention to such an important characteristic as the cost of human life, perhaps on moral grounds, because human life is priceless. On the contrary, however, the abandonment of the topic in developing countries devalues human life, which is reflected in the very low compensation for the families of people who

[18] Strategy of innovative development of the Russian Federation until 2020 (approved by the Decree of the Government of the Russian Federation No. 2227 from 08.12.2011). URL: http://government.ru/docs/9282/

[19] URL: https://tass.ru/ekonomika/12603543.

have died as a result of accidents, disasters or industrial accidents, in the workplace or other emergency situations.

Experts of the Financial University under the Government of the Russian Federation, using one of the existing methods, calculated the cost of human life in Russia, taking into account the moral damage in early 2018, which rose to 46.9 million rubles (825 thous. USD at the rate of that time) from 39.3 million rubles in 2015.

By comparison, in the United States, different methodologies estimate the human cost of living in the range of 7 to 37 million USD. In 2016, the U. S. Department of Transportation set the cost of living at 9.6 million USD, while in Bangladesh it was only 5.2 thous. USD [17].

At the same time, in Russia compensation for victims and their families in cases of industrial accidents, transport, etc. is several times lower than the scientific assessment of the cost of human life, moral damage is rarely taken into account.

This does not contribute to an understanding of the value of human life, leads to insufficient funding of safety measures at work and at home, as well as education and health, which inhibits the development of HC and active innovation of the state and business.

CONCLUSION

Reproduction of human potential determines the nature of the future development of the country and serves as a qualitative characteristic of the social policy of the state.

Annual publication of HP and HC quality benchmarking contributes to a better understanding of human development, to some extent influences the political motivation to invest in the social sphere, especially in education, health, science, culture, etc.

Many decision makers are aware of the importance of investing in HP and recognize the importance of human development in strategic concepts at the national and regional levels, but are not prepared to invest in it, since the benefits of these costs will accrue mainly to the younger generation. From a practical point of view, the substantive proximity of the multi-component terms "human potential" and "human capital" reduces the value of many Russian studies to find differences between them and allows them to be used as synonyms. For example, investments in education and health actually increase both HP and HC.

Human capital is degraded if it is not needed in the highly skilled, entrepreneurial or creative labour market, so the interaction between the education system and the labour market should be significantly improved.

Russian higher and secondary specialized education lags behind in the creation and regular updating of the content of the educational process and the introduction of skills and competencies required by the innovative economy. On the contrary, education should be ahead of production requirements, i.e. provide graduates with knowledge of the most advanced technologies and innovations that have not yet been widely applied. In this way, educational institutions will create a zone of near-term development of high-tech production, encourage employers to create high-productivity jobs.

To develop innovative potential, it is necessary to stimulate the interest and motivation of young people to innovate, to improve the culture of creativity and innovation in corporate governance and society at large. Societal orientations of innovation can spread when society is presented with an attractive and understandable image, a desired future.

The minimum cost of living concept introduced at the legislative level for Russians, which is used in cases of compensation for families of people, could really stimulate the development of HC in Russia, Persons who died as a result of accidents, disasters or industrial accidents, in the workplace or in other emergencies. Minimum cost of living estimates can be calculated for different industries and cases of loss of life and damage

to health in all spheres of life, but should be several times higher than the current amounts in the practice of the state and business.

Further research may focus on improving HP and HC performance. In addition, the efforts of scientists and experts can be linked to the examination of sectoral requirements for human quality, as well as the impact of demographic and migration factors at the country and regional levels.

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Assessment of the Significance of the Level and Quality of Life of the Population in Russia

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ABSTRACT

It is necessary to identify the national features of development in Russia to establish appropriate methods, in view of the different approaches to the analysis and modelling of the standard of living and quality of life of the population in various countries and international integration associations. This article analyzes the practical aspects of the most significant areas of interaction and development groups of indicators of standard of living and quality of life in the Russian Federation. The study used a systematic approach and statistical methods. The groups of indicators of quality of life summarized by the author were compiled on the basis of normative legal acts and expert documents: material well-being, healthcare, education, environment, self-perception, power. The content analysis was conducted of open-source commentaries on the issue of representation of a "better life" to determine key problems and propensities. The most and least pronounced groups of preferences among the population are identified. Differences in the opinions of Russians on the importance of groups of indicators depending on gender, age and in connection with the pandemic are demonstrated. The author has come to conclusion about necessity to take into account such variables, it is substantiated the need to make changes to the current standards for the transition to new models of the standard of living and quality of life.

Keywords: quality of life; standard of living; citizens' preferences; aspects of living; quality of life; groups of indicators; content analysis

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INTRODUCTION

The end of 2021 was a very important period for the population of the CIS countries: the states adopted a unified standard that provides standards of quality of life. Despite the recommendatory nature of the 33 standards, the document mentions the budgeting of the areas under consideration.[1] At the same time, there were news about plans to introduce a unified quality of life standard at the national level in Russia, as every year the question was raised that they should be fixed by regulations [1].

However, do not forget that modern methodologies do not have an established benchmark of the number of indicators, as well as the areas of life that require monitoring or assessment. Different methods dictate the rules. For example, in the same CIS database security indicators are used in the analysis of living standards, but in the index of the Analytical Centre of the Russian Federation they are not.

The study of issues is necessary for the inclusion of indicators in standards of living and is not a new area of research. Features of the formation of preferences in the population are analysed with age, regional, professional, educational and other aspects.

In a number of works universal application of integrated approaches in the assessment of the level and quality of life of the population, efficiency of methods on the basis of objective indicators is highlighted [2]. Other works is written that it is impossible to make progress in the country in assessing the level and quality of life with only quantitative or economic indicators [3, 4], a symbiotic relationship between objective and subjective factors [5]. Researchers consider the influence of different areas of life on subjective well-being [6]; the importance of safety [7], scientific and technological progress [8]; the dependence of ecology on economic development [9]; and emphasize the need for accounting and objective, and subjective indicators [10, 11].

Based on an analysis of existing methodologies, many authors have worked to identify key groups of indicators of the standard of living and quality of life of the population, highlighting sometimes unique aspects: social environment [4], human genes [12], cognitive, emotional, rational expectations [13], social capital [14], socio-economic status [15].

The study proved the importance and effectiveness of using such methods in assessing the dependence of quality of life on medicine based on data from Germany [16], confirm insignificance the weight coefficients for analysis of life satisfaction [17], provide the method of assessment of the quality and standard of living of the population with weights of each indicator and possibility of easy replacement of variables on the example of Greek municipalities [18], demonstrate INVAR[2] based methodologies and their capabilities [19], assess weights by interviewing and applying hierarchy analysis [20].

This article analyzes how the preferences of the population of Russia are formed when assessing the level and quality of life, taking into account the prevailing mentality.

MATERIALS AND METHODS

In order to analyze the stated problem and achieve the goal of the study, the article studies normative-legal acts,[3] hat determine

[1] Decision on quality of life standards: approved by the Economic Council of the Commonwealth of Independent States on 02.12.2021. Moscow. Unified register of legal acts and other documents of the Commonwealth of Independent States. URL: https://www.un.org/ru/universal-declaration-human-rights/index.html (accessed on 28.01.2022).

[2] The method consists of 10 sequential steps where the optimization of the criteria and the selection of the best alternative.

[3] GOST R ISO 37120–2015. Sustainable Community Development. Indicators of urban services and quality of life. M.: Standartinform; 2015. 70 p.; Human development index in Russia: regional differences: analytical note. Analytical Center under the Government of the Russian Federation, 2021. URL: https://ac.gov.ru/uploads/2-Publications/analitika/2022/ICR_2021_long.pdf (accessed on 01.02.2022).

the method of assessment of the standard of life and quality of life of the population in Russia, and necessary indicators for this purpose .[4]

On the basis of the online survey of the population of Russia, conducted by the OECD within the project "Better Life Index", data on preferences and ranking of 11 main aspects of life by the degree of importance were used .[5] During the research for 2011–2022 years, 3400 people were interviewed.

RESULTS

The study of the standard of living and quality of life of the population shows that these concepts are becoming deeper and cover more and more indicators. There are traditional directions of analysis developed by the UN, which includes: "material well-being", "issues of economic inequality and meet of basic needs" (food, housing, security), and also education and health, living and working conditions, recreation and entertainment. Then we added "subjective assessments", "financial data", "environmental aspects", "attitude to free time", "innovative activity", etc.

Thus, the following main groups of indicators (structural elements and aspects of the standard and quality of life of the population) were formed to analyse comments from the open database:

1. Material well-being (earnings, monetary success, fair remuneration, economic inequality, housing, working conditions).

2. Healthcare (health and life expectancy, health system and institutions, quality of services).

3. Education (quality of education, number of students and ready to go to university, financial literacy).

4. Environment (sense of safety for your life, environmental issues, rights and liberties).

5. Well-being (life satisfaction, availability and quality of social connections, leisure, values, the relationship between free time and work).

6. Authority (quality of public goods provided, infrastructure, corruption, control, innovation and science, stability).

About 680 user comments from 3400 were analysed through content analysis. They did not affect the main results and were not reported and therefore require review.

In the analysis of emotional reports, it was identified that 80 comments (12%) made a negative assessment of the state of living and the quality of life of the population. And only 4 comments (0.5%) can be attributed to positive: "Enough money", "I am not afraid", "Everything is fine", "I am not complaining". The rest were neutral.

The most popular problem is financial status (30% of complaints): "lack of funds for needs", "desire to earn more", "unfair amount of income". In second place — "respect for human rights and freedoms" (18%), "security" (18%), as well as "prevalence of ethical values" (18%). There were complaints about "small number of civil rights", "the place of citizens in the priority of power", "inequality", "adequate laws". Among the values met: "mutual respect", "public consciousness", "society without aggression". And the vast majority (more than 90%) of respondents who noted the importance of moral values and security — young people, for whom the priority of these problems is significantly higher.

Half as often people worry about infrastructure, freedom, work-vacation balance, corruption, environment. Indirect or direct dissatisfaction with power is more common: excessive control and interference with life.

Neglected is the field of science and innovation (one answer), and it is this that contributes to creating conditions for improving the quality of life of the population.

To analyze preferences, refer to the comments and see the answers to the

[4] International definition and measurement of levels of living: an interim guide. New York: UN; 1961. 18 p.

[5] OECD Better Life Index. BLI Data Services v2. URL: https://www.oecdbetterlifeindex.org/bli/ (accessed on 28.01.2022).

question: "What is a better life for you?" Non-representative responses deleted (120) — sarcasm, uncertain options, for example: "living with cats", "...happily", "...beautiful", "to live in a country that likes" etc. If we group the variants of answers, we see that for Russians the most important thing is "material well-being", "safety" (basic need) and "respect for rights and liberties" — efficiency of legislative and law enforcement systems (*Table 1*).

As before, we refer to the following values: "equality", "respect", "strong family ties". Freedom can be considered both as "value" and as "respect for rights" in the group of indicators "security". Depending on the point of view of value we can refer to the group "well-being" or to the group "power", and "purity of the city and products" (ecology) can be attributed to the groups of indicators — "healthcare", "environment" and "power". Let's assume that these answers refer simultaneously to several groups of indicators, then we will get that the most important group — are "environment", "well-being" and "material well-being" (*Fig. 1*). This is followed by "power" and "healthcare". In last place — "education".

Finally, on to the structure of the responses to the question on the ranking of the 11 aspects of level of the standard of living and quality of life on a scale of 0 to 5 proposed by OECD. User responses for the period 2011–2022 are presented. The following aspects:

(a) housing conditions;
(b) income;
(c) work;
(d) quality of social communication;
(e) education;
(f) ecology;
(g) civil rights;
(h) health;
(i) satisfaction;
(j) safety;
(k) work-leisure balance.

Of the 3400 responses, those that gave an equal assessment of relevance for different aspects of life were removed (270 options). It turns out that for 7–8% of Russians are important or, on the contrary, not all aspects of life are equally important. Male respondents 60% more than female.

Also excluded were the options where more than 6 aspects were given zero significance estimates and the remaining part — the same or the estimates consist of two numbers (460 options). It is assumed that respondents decided not to distribute all aspects of quality of life correctly, but simply, without thinking, gave an express analysis of the most and least preferred: "important" or "not important". Mode and median aspects of life in these

Table 1

Distribution of comments on the priority of life activities of users from Russia by group over the past 20 years

Field of life	Number of replies
Welfare, housing	156
Respect for the rights	119
Safety	113
Healthcare	96
Carrier, work	92
Family, values	91
Satisfaction, happiness	78
Ecology, climate	67
Infrastructure, progress	63
Stability	52
Education	45
Self-realization, rest, leisure	43
Harmony in everything	39
Liberty	30

Source: calculated by the author based on the OECD. URL: https://www.oecdbetterlifeindex.org/bli/.

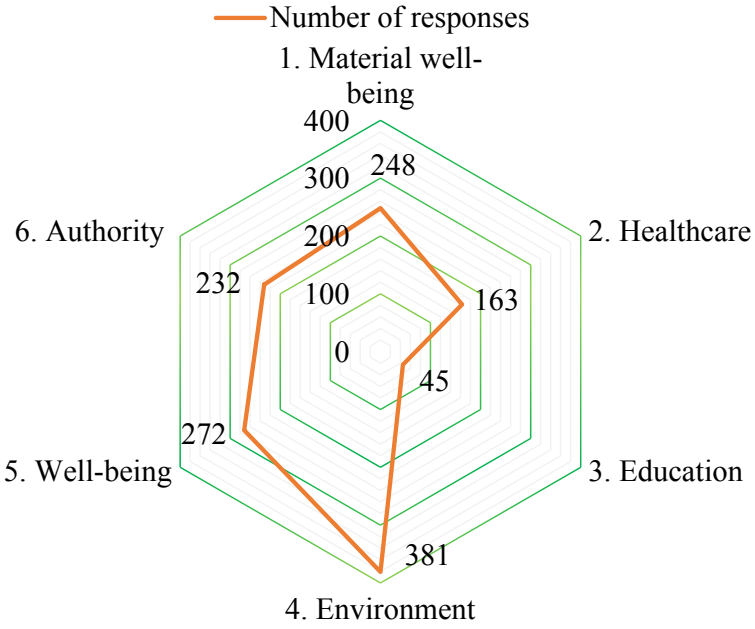

Fig. 1. **The structure of the most important groups of indicators of standard of living and quality of life for the Russian population, number of responses**

Source: calculated by the author based on the OECD. URL: https://www.oecdbetterlifeindex.org/bli/.

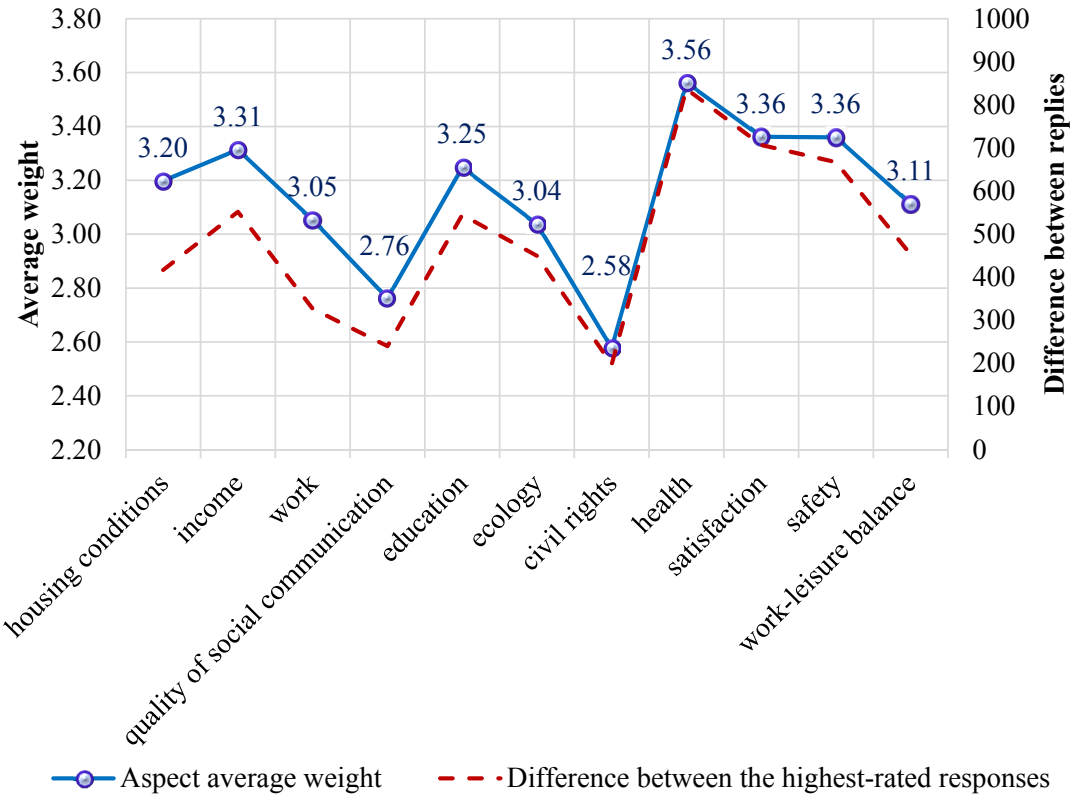

Fig. 2. **The importance of standard of living and quality of life aspects for Russians on the "Better Life Index" scale, average score**

Source: calculated by the author based on the OECD. URL: https://www.oecdbetterlifeindex.org/bli/.

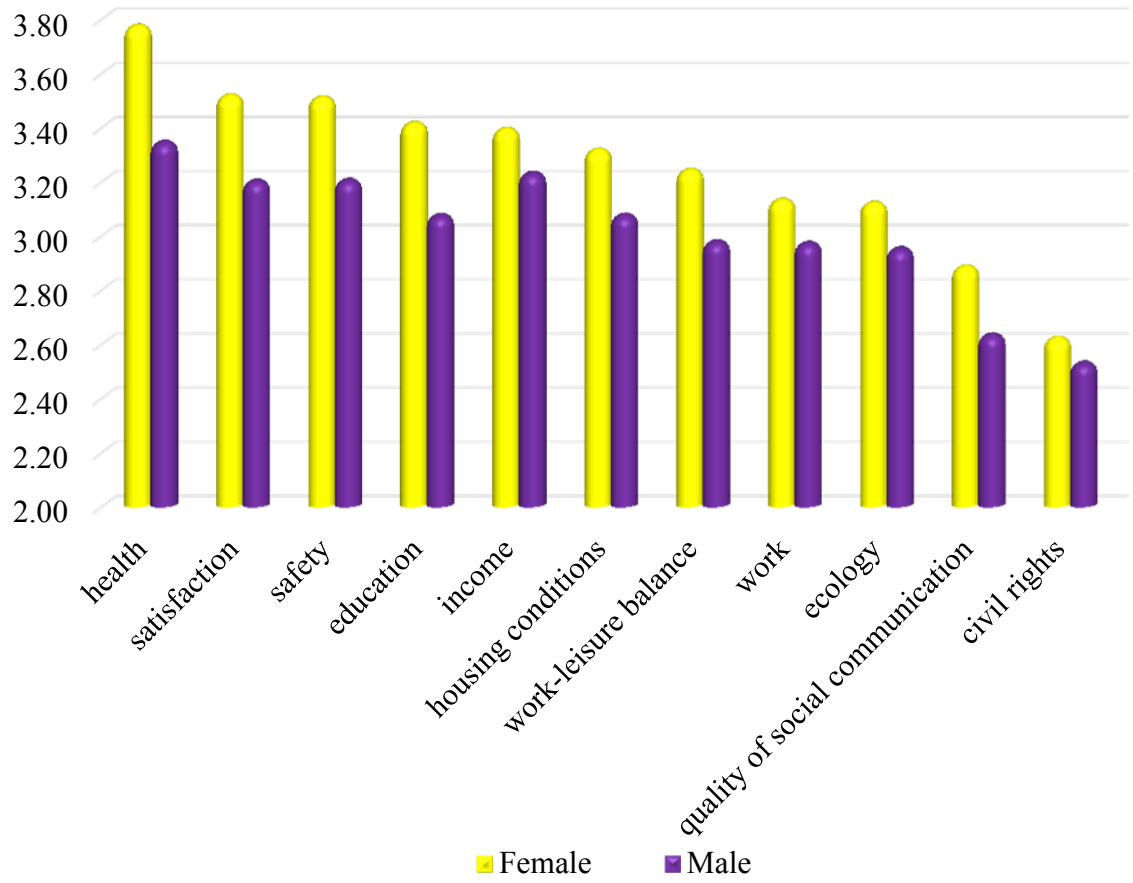

Fig. 3. **Distribution of average indicators of the importance of aspects of the standard of living and quality of life in Russia, by sex, average score**

Source: calculated by the author based on the OECD. URL: https://www.oecdbetterlifeindex.org/bli/.

responses coincide and are 1. The most popular — "housing conditions and income", then goes "work", "security" and "education" with balance between "work" and "rest". The least important are "quality of social relations" and "participation in democratic processes". That is, everything is consistent with the data of *Table 1*, besides the education, which in this calculation is more important than satisfaction, ecology.

The remaining responses were analyzed in terms of averages in order to establish the significance of aspects of the standard and quality of life for Russia on average (*Fig. 2*). Equally divided by sex: 50% each. The most important were: "health", "life satisfaction" and "safety". Less important: "civil rights" as an aspect of measuring trust in government according to OECD methodology and "quality of social relations".

The obtained values contradict the results of content analysis: "respect for the rights" (civil rights) was the second indicator by weight, and "family and values" (quality of social relations) were more important than "ecology", "education", "satisfaction". The first mismatch can be explained by the fact that the content analysis spoke not only about the trust in the Government, but also about the respect of all rights and freedoms, the effectiveness of the legislative system, and in the OECD methodologies into civil rights assessment includes such indicators as "transparency of power" and "voter activity". They do not reflect respect for the rights of citizens or the country's legislative system,

Table 2

Average values of certain aspects of the standard of living and quality of life in Russia, by sex

		Civil rights	Health	Satisfaction	Safety
Male	Mode	1	5	3	3
	Median	2	3	3	3
Female	Mode	3	5	5	5
	Median	3	4	4	4

Source: calculated by the author based on the OECD. URL: https://www.oecdbetterlifeindex.org/bli/.

Table 3

Average values in assessing preferences for aspects of standard of living and quality of life in Russia depending on age

Aspect	Average values change	Mode change	Median change	Is there a trend?
a	0.13	1	0	No
b	–0.55	0	0	Yes, marginally negative
c	–0.17	0	0	Yes, marginally negative
d	–0.41	0	–1	Yes, negative
e	0.07	2	0.5	No
f	–0.22	2	0	No
g	–0.28	–2	–1	Yes, marginally negative
h	–0.10	0	0	No
i	–0.35	–2	–1	Yes, negative
j	–0.53	–2	–0.5	No
k	–0.47	0	0	Yes, marginally negative

Note: (a) — housing conditions; (b) — income; (c) — work; (d) — quality of social communications; (e) — education; (f) — ecology; (g) — civil rights; (h) — health; (i) — satisfaction; (j) — safety; (k) — work-leisure balance.

Source: calculated by the author based on the OECD. URL: https://www.oecdbetterlifeindex.org/bli/.

but rather characterize civic activity. As the data show, civic activity in Russia is low (lower than the world average).[6] Similarly, the "quality of social relations" is measured by the number of people who have support for their relatives, rather than the development of ethical values in society.

It is further analyzed to what extent the scores differ according to the gender of the respondent (*Fig. 3*). It turned out that women on average rated the importance

[6] International IDEA. Voter Turnout Database. URL: https://www.idea.int/data-tools/data/voter-turnout (accessed on 01.02.2022).

of each aspect for their lives 8% higher. "Education" and "health" are evaluated as the most significant: 3.42 versus 3.08 (average importance for women and men by education, respectively) and 3.78 versus 3.35 (average importance for women and men by health, respectively). Having placed in descending order of importance these aspects, we see that "incomes" in men are in 2nd place after "health", while in women it is on 5th, after "health", "satisfaction", "safety" and "education". For men, in addition to income, it is "security", "satisfaction" and "housing conditions" that are important.

If we calculate the mode and the median for the values, we will get that the first 6 aspects and the latter have the same estimate of 3. For the remaining aspects of the assessment are changing (*Table 2*). Mode and median take into account individual differences in aspects. So, women have higher demand for decent "level of civil rights" (civic activity), "life satisfaction" and "security".

The impact of age on preferences for groups of indicators of living standards and quality of life was also analysed (*Table 3*). Aspects that are less important with age — "quality of social communication" and "life satisfaction". The analysis also found that in the pre-retirement and retirement age, the importance of education increases spasmodically and the importance of safety decreases. However, these conclusions are preliminary and require correction due to a small sample of data (80% of respondents are young).

There was a slight change in preferences during the pandemic: aspects such as "health" and "housing conditions" have become more important for people (average increase of 3%). Estimates of income, education and civil rights increased by 5–7%. The monetary issue overtook "satisfaction" and "safety", taking second place after "health". The primacy "health" failed to overtake any of the directions. This explains the small percentage increase in importance of this aspect (less than 1%): most already put "health" in the forefront. It is assumed that the coverage of people with such opinions in the country has only slightly increased.

DISCUSSION

The study concluded that there are different assessments of relevance for the various aspects and areas addressed in the methodologies for assessing the quality and standard of living of the population and have their own assessments of relevance. Percentage of people indifferent to the ranking and distribution of the presented indicators, small but not so small that forget the existence of such citizens. Despite the different criteria of relevance of people, the main problems are not always directly related to the areas that are most important to them: the most complaints and negative emotions on content-analysis were related to the group of indicators "income", although "health", "satisfaction" and "safety" on average are higher among the population of Russia.

Very few people are interested in the area of innovation, infrastructure and science, although this is necessary to improve the standard and quality of life of the population. There is a tendency to demand the development of society in terms of education of morality and ethical consciousness ("value"). Complaints often arise from discrimination, lack of respect for rights and freedoms, injustice, stereotyped thinking, lack of mutual respect.

The study showed that women in Russia give better ratings to all aspects of the population's standard of living and quality of life. The most important groups of indicators for them are "health" and "satisfaction". Taking into account individual differences and averages, it can be said that it is thanks to women in Russia that the importance of security and civil rights is significantly increased. In addition, as individuals mature, there are clear trends towards a downward trend in the quality of social interaction and life satisfaction.

CONCLUSION

Thus, in Russia, citizens have formed individual preferences in the choice of the fundamental spheres of living standards and quality of life. At the present stage, when assessing them, depending on age, gender, situation (pandemics, crises), it is necessary to take into account weights. As preferences may change, models and methodologies for assessing living standards and quality of life are expected to take these variables into account. Public entities and their facilitators need to investigate and consider these changes in order optimal assess quality of life and standard of living.

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Debt Policy in Modern Conditions of the World Economy Development

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ABSTRACT

The purpose of this article is to identify the main subjects of the debt economy of Russia and the USA. The scientific novelty of this study lies in the disclosure of the mechanism of activity of the US Federal Reserve System (FRS) as a subject of the debt economy, the main holder of public debt and the guarantor of dollar financing. The article considers measures of federal budget support, defines the conditions of growth of federal debt of the United States, the influence of the financial policy of the FRS on the state of public debt. The author's position on strengthening the role of the FRS in management of economic processes is substantiated.

Keywords: debt policy; Federal Reserve; federal budget deficit; treasury bonds; corporate debt

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INTRODUCTION

The development of international debt market (IDM) as a part of the international financial market is determined, first of all, by the main direction of development of the international financial market itself. In a stable situation the volume of operations on IDM will increase, in a crisis — on IDM it is possible to stagnate, in a worsening of crisis — to reduce the volume of operations on IDM emission segment.

The structure of the IDM emission segment is usually dominated by borrowers from developed countries (80–90%), in the coming years, the main borrowers will probably be Asia-Pacific region (for example, China). At the same time, Japan, Canada, Brazil, Switzerland and South Korea are characterized by an increase in the volume of IDM operations, and they can objectively compete with traditional leaders (the UK, the USA, France, Germany, Netherlands).

Russia's economic development depends not only on the use of its own resources to achieve its goals, but also on an effective debt financing mechanism. But domestic debt financing markets are not always able to meet participants' needs in terms of quantity, cost, and deadline for provision of cash resources. The international debt capital market is considered as an alternative source of funding.

Developed countries is doing well in providing budget balance [1]. Their strong legislative framework protects the national economy and citizens. However, despite the established legal framework in most developed countries, world experience shows that in practice budget balance (which is a strategic goal of fiscal policy) is very difficult to ensure. Budget deficits are present all over the world [2].

RUSSIAN DEBT POLICY

According to the results of 2021, the Russian budget was executed with a surplus of 515 bln rubles.[1] The growth of the economy objectively led to an increase in revenues to 25.3 trn rubles. Federal budget expenditure

[1] URL: https://bujet.ru/article/445109.php

growth of 1.9 trn rubles, compared to 2020. Total budget expenditure was 20.6 trn rubles.

GDP growth in 2020 was 4.7%, indicating a more dynamic recovery of the Russian economy than in other countries.

In 2021, there was an increase in investment, increased employment, implemented anti-crisis social measures to support private entrepreneurship. Labor market situation has returned to the pre-Covid level of 2019.

According to statistics, the state debt of Russia on 1April 2022 amounted to 4804890 mln rubles (57143.2 mln dollars). The strategy for managing the external and internal state debt of Russia is adopted within the framework of certain goals and objectives of development of the country and regions, taking into account the total budget deficit and necessary borrowing volumes, as well as the limits of state debt as part of the established policy of government borrowing (*Table 1*).

The primary measure of state debt is the total debt burden on the economy — the ratio of state debt to GDP. Russia's position in the sphere of debt policy can be characterized as strong, based on stabilization of state debt service expenditures in the period 2018–2019. In these years, securities (about 75%) predominated in the structure of state debt as part of government obligations expressed in national currency (rubles). As of 1 January 2019, Russia's state external debt was heavily external bond debt.

FISCAL POLICY AS THE BASIS OF THE USA STATE DEBT GROWTH

Federal budget deficit and the need to finance it is a serious problem for the USA economy. The reason for this was the economic crisis caused by the COVID-19 pandemic, which required significant funds (*Table 2*).

As you can see from the *Table 2*, in 2016–2019 the budget deficit grew relatively slowly. Fiscal year 2020, budget deficit increased sharply (more than three times) — to 3.132 trn USD, compared to 2019 (0.984 bln dollars), by the implementation of measures to support the national economy in conditions of the pandemic. In 2021, there was a slight reduction in the budget deficit to 2.775 trn USD due to significant growth (18%) in federal revenue. The imbalance in the US budget is primarily due to high public spending, which rose by 53% in 2021, compared to 2019, to a record 6.822 trn dollars. The US Government has allocated significant funds to provide financial support to people and businesses in the form of incentive payments and emergency loans to small businesses. Budget deficit in fiscal year 2020 reached 15.0% of GDP, in 2021–12.1% against 4.6% in 2019. In fiscal year 2021, federal spending accounted for almost 30% of the country's GDP, significantly exceeding incomes (17.6%), suggesting a relatively moderate impact of budget revenues on the USA economy. In previous years, the gap between the indicators was much smaller, as shown by *Table 3*.

As budget deficits grow and USA state debt rises, the cost of repayment increases by 92 bln USD from 2007 to 2020 (21%), is 8% of total budget expenditure, compared to 15.8% in 2007.[2] Low state debt service costs, with constant growth, can be attributed to massive USD injections of FRS into money circulation, while maintaining a relatively low key interest rate, which constrains the growth of state debt repayments. With the key interest rate rising in 2022 (at the end of June 2022–1.5–1.75%) can be expected further increases in state debt servicing can be expected. On 16 March, FRS (for the first time since December 2018) raised the key interest rate by 0.25 p.p, to 0.25–0.5%, in response to the serious consequences for the country's economy due to coronavirus pandemic; 4 May — on 0.5 p.p., to 0.75–1%, is intended to offset inflation; 15 June — on 0.75 p.p., to 1.5–1.75% annual. Such a sharp increase in key interest rate is

[2] URL: https://www.whitehouse.gov/wp-content/uploads/2021/05/hist03z2_fy22.xlsx

Table 1

Russian budget parameters for 2021–2022

Indicators/year	2020	2021	2022
Volume of GDP (billion rubles)	112 863	120 364	128 508
Inflation rate (%)	3	4	4
Projected total federal budget revenue (million rubles)	20 379 371	21 246 524	22 058 263
of which: projected total additional oil and gas revenues (million rubles)	2 332 924	2 234 556	2 035 670
Total amount of expenses of the federal budget (million rubles)	19 503 319	20 634 020	21 763 304
Upper limit of the state internal debt (million rubles)	12 981 289	14 643 689	16 619 254
Upper limit of the state external debt: bln USD; bln euros	64.4 56.4	67.6 57.8	68.9 57.4
Federal budget surplus (million rubles)	876 051	619 504	294 959

Source: URL: http://www.consultant.ru/document/cons_doc_LAW_339305/ 6e24082b0e 98e57a0 d005f9c20016b1393e16380/

Table 2

Expenditures and revenues of the U.S. Federal Budget (2016–2021), trn USD

Financial year	Federal budget expenditures	Federal budget revenues	Federal budget deficit
2016	3.853	3.268	–0.585
2017	3.982	3.316	–0.665
2018	4.109	3.330	–0.779
2019	4.447	3.462	–0.984
2020	6.551	3.419	–3.132
2021	6.822	4.047	–2.775

Source: URL: https://fred.stlouisfed.org/series/FYFSD; https://fred.stlouisfed.org/series/FYONET; https://fred.stlouisfed.org/series/FYFR

Table 3

Expenditures and revenues of the U.S. Federal Budget (2015–2021), % of GDP

Years	Federal budget expenditures	Federal budget revenues	Budget deficit
2015	20.242	17.819	–2.423
2016	20.553	17.434	–3.119
2017	20.374	16.969	–3.405
2018	19.935	16.155	–3.780
2019	20.746	16.154	–4.593
2020	31.358	16.368	–14.989
2021	29.667	17.599	–12.068

Source: URL: https://fred.stlouisfed.org/series/FYONGDA188S.

due to the persistence of high inflation in the USA, which reached 8.6% — in May 2022, amid improved economic activity and relatively low unemployment in the country.[3] High inflation is the result of supply and demand imbalances, high energy and food prices, Covid restrictions in China, leading to disruption of supply chain. According to current projections, the key FRS interest rate could reach about 3.5% by the end of 2022.[4] In this case, public debt service costs could rise to 20–25% of total budget expenditures, which would have a negative effect on the federal budget. FRS lowers US GDP growth forecast by 2022 to 1.7% from the previously indicated 2.8%.[5]

As shown in *Table 4*, U.S. state debt tends to constant growth. Between 2007 and 2020, it almost tripled from 9.4 trn USD (64.4% of GDP) to 27.7 trn USD (129.9% of GDP). By the end of 2021 it had reached 29.6 trn dollars, by the end Q1 of 2022–30.4 trn USD. Feature of the USA is nominating state debt in national currency. The USA borrows in dollars and also repays in dollars. As long as the dollar remains the world's key currency, the USA can borrow large amounts indefinitely. If necessary, FRS may issue additional emission of dollars to buy back the debt [3].

Bonds used, issued by the U.S. Treasury Department, to finance state debt. Trade allows the US government to raise additional funds to support government spending in conditions of rising budget deficits [4]. Investors ensure the safety of reserve funds and form a dollar "airbag".

SUBJECTS OF THE USA DEBT ECONOMY

The U.S. state debt consists of two parts: public debt and intragovernmental debt. Public debt accounts for about 80% of federal debt, while intragovernmental debt accounts for — 20%. The holders of the latter are state institutions (government pension funds, social insurance funds) that invest the free cash in treasury bonds, which is reflected in an account with the U.S. Treasury Department [5].

Public debt is represented by government securities traded on the open market. The main holders are represented in *Table 5*.

The main holders of public state debt are foreign investors. Their share from 2008 to

[3] Here's What You Need to Know About America's Super-Hot Inflation. URL: https://www.nytimes.com/2022/06/11/business/economy/inflation-us-prices.html

[4] US FRS raised the rate to 1.5–1.75% per annum. What is waiting for the markets. URL: https://quote.rbc.ru/news/article/62a88e519a7947d51e6838ed

[5] US FRS raised base interest rate. URL: https://ria.ru/20220615/stavka-1795603621.html

Table 4

U.S. public debt (2007–2022)

Year	The share of state debt to US GDP, %	State debt in trn USD
2007	64.4	9.438
2008	77.3	11.127
2009	86.8	12.773
2010	93.4	14.270
2011	97.4	15.607
2012	101.2	16.771
2013	102.9	17.601
2014	100.8	18.152
2015	104.3	19.265
2016	103.2	19.846
2017	104.4	21.090
2018	104.3	22.028
2019	107.7	23.224
2020	129.9	27.747
2021	123.4	29.617
Q1 of 2022	124.6	30.400

Source: URL: https://fred.stlouisfed.org/series/GFDEGDQ188S

2015 exceeded 40%. Since 2016, the share of foreign investors has been steadily decreasing, as can be seen from *Table 4*. In 2021, it was 30%, indicating a weakening of foreign investors' interest in buying U.S. debt.

With rising borrowing and, at the same time, a weakening of the influence of foreign lenders, domestic investors take a leading position: investment and pension funds, insurance companies, commercial banks, whose assets grew by 635 bln dollars for 2021.[6]

Their combined share of public state debt reached 37% in 2021.In 2022, a number of financial institutions, including investment and pension funds, banks, insurance companies, and other holders of state debt, may suffer serious losses due to an increase in the key FRS interest rate.

In 2021, the share is in the hands of individuals' debt obligations of sovereign debt declined to 2% from 7% in 2020 and 10% in 2019, which is caused by a reduction in the volume of bond purchases by individuals directly, through cash funds.

The largest sovereign debt holder after foreign investors is the U.S. FRS. The majority of the FRS funds, whose share is around 67–69%, is aimed at financing the U.S. state debt

FRS dollars are mainly invested in Treasury bonds, the purchases of which were significantly increased in 2020–2021. FRS accounted for 24% of sovereign debt in 2021, against 13% in 2019 and 6% in 2008. The increase in FRS share was due to the acquisition of huge volumes of treasury papers to support

[6] US Treasury Securities Statistics. URL: https://www.sifma.org/wp-content/uploads/2021/02/US-Treasury-Securities-Statistics-SIFMA.xlsx

Table 5

The main holder of U.S. public debt, %

Data	Individuals	Investment funds	Banks	Insurance companies	FRS	State government	Foreign investors	Pension funds	Others
2007	0	7	2	2	12	11	40	22	3
2008	4	11	5	2	6	8	43	19	2
2009	9	9	3	3	9	7	42	17	2
2010	10	8	4	2	10	6	43	16	2
2011	8	8	4	3	14	5	42	15	2
2012	8	8	4	2	15	5	42	14	1
2013	6	8	3	2	17	5	43	15	1
2014	5	8	4	2	19	4	42	14	1
2015	7	9	4	2	18	4	41	14	1
2016	7	11	4	2	17	5	38	15	1
2017	7	12	4	2	16	5	38	14	2
2018	9	12	5	2	13	4	36	16	1
2019	10	13	5	2	13	4	35	15	2
2020	7	16	5	2	22	4	29	13	2
2021	2	15	7	2	24	6	30	13	1
Q1 of 2022	3	14	7	1	23	6	30	14	2

Source: URL: https://www.sifma.org/wp-content/uploads/2021/02/US-Treasury-Securities-Statistics-SIFMA.xlsx

the country's economy during the pandemic. By buying Treasury bonds, the Federal Reserve is intervening in resolving the problem of state debt. Federal debt is monetized by inflating the FRS balance sheet. As of 15June 2022, FRS has assets on its balance sheet, accounting for about 24% of public debt and 19% of total federal debt (*Fig. 1*).[7]

[7] Assets: Securities Held Outright: U.S. Treasury Securities: Wednesday Level, Millions of U.S. Dollars, Weekly, Not Seasonally Adjusted. URL: https://fred.stlouisfed.org/series/WSHOTSL; Outstanding U.S. debt on a daily basis. URL: https://fiscaldata.treasury.gov/datasets/debt-to-the-penny/debt-to-the-penny

The function of FRS is to regulate the volume of money supply. Through trading in debt securities in the open market, FRS influences on the money supply. It is possible to determine the extent of the increase in money supply after the purchase of securities, when analyzing the balance of the federal reserve, the assets of which reflect the volumes of debt securities. Since September 2019, debt volumes have been growing constantly [6].

While as of 29 January 2020 the amount of debt on the balance sheet of FRS was

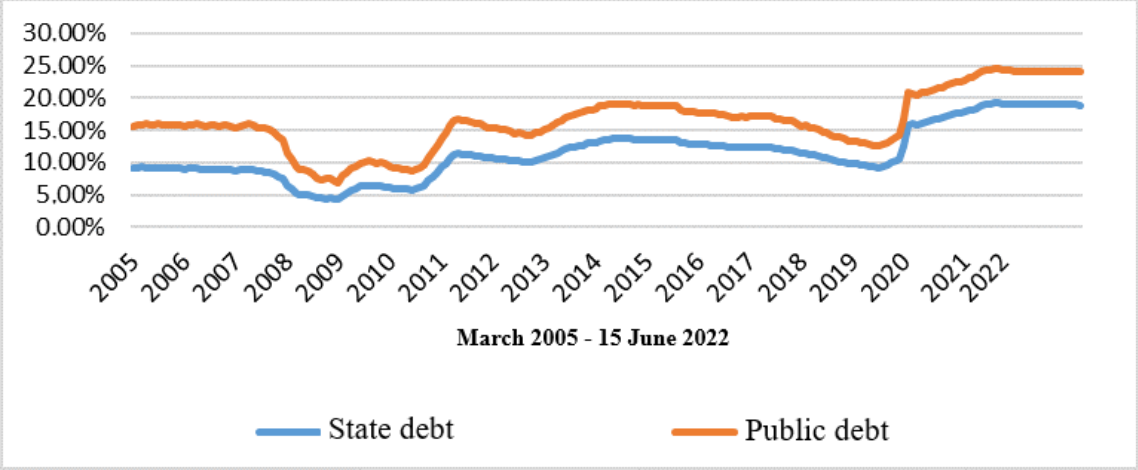

Fig. 1. **The share of U.S. Treasury securities on FRS balance as a percentage of national and public debt, %**

Source: URL: https://fred.stlouisfed.org/series/WSHOTSL; https://fiscaldata.treasury.gov/datasets/debt-to-the-penny/debt-to-the-penny

2.409 trn dollars, as of 25 May 2022–5.769 trn USD.[8] Over the last decades, 2019–2022 is the highest increase in assets on FRS balance sheet. In April 2022, FRS assets reached a record level of 8.9 trn USD, or 36% of the country's GDP.[9] Since 1 June 2022, the financial regulator monthly reduces the balance by 47.5 bln dollars, implementing treasury bonds by 30 bln dollars, and mortgage securities — by 17.5 bln USD. Since September 2022, the monthly balance reduction of 95 bln USD, which is twice the level established since June.[10] Asset repurchase ceased as early as March 2022.

Government securities held by FRS become a factor influencing money supply. Source of changes in money supply — Treasury deposit in FRS. Treasury holds non-bank funds directly in FRS account. Treasury expenses are charged to FRS. 75% of FRS accounts are held by the US Treasury. This liquidity is frozen. It does not circulate in the financial system. Thus, not all dollars issued by FRS fall directly into the financial system.

If the Treasury deposit on the FRS balance increases, the money supply decreases, and vice versa. The inverse relationship between deposit size and money supply is evident (*Fig. 2*).

While treasury bonds have been growing steadily since the beginning of 2020, the deposit, having increased by mid-2020, it gradually declined, having decreased to 141 billion dollars at the end of November 2021, compared to 1792 billion dollars at the end of July 2020. From January 2021, the Treasury's deposit increased to 957 billion dollars at the end of April 2022. However, it decreased in May and June (*Table 6*).

THE ROLE OF FRS IN NEUTRALIZING THE CRISIS IN THE U.S. ECONOMY

The Federal Reserve's support of debt markets involves the purchase of not only treasury, but also corporate, municipal debt and even so-called "garbage" that have no real value, in order to neutralize the crisis in the economy. Purchase of treasury bonds and mortgage securities is virtually unrestricted. As a result, the Federal Reserve held one third of total U.S. mortgage bonds. From the beginning of 2020 to 8 April 2021, the volume of mortgage

[8] Factors Affecting Reserve Balances (H.4.1) for Feb 18, 2021. URL: https://www.federalreserve.gov/datadownload/Download.aspx?rel=H41&series=58e3a3737f0257bd2c349939c2346207&filetype=spreadsheetml&label=include&layout=seriesrow&from=01/01/2020&to=12/31/2020

[9] FRS may begin to reduce its balance sheet assets by $ 95 bln per month in May. URL: http://www.finmarket.ru/database/news/5694531

[10] The US Federal Reserve raised the rate to 0.75–1% per annum. What is important for investors is to know. URL: https://quote.rbc.ru/news/article/627274159a794718c1de5368

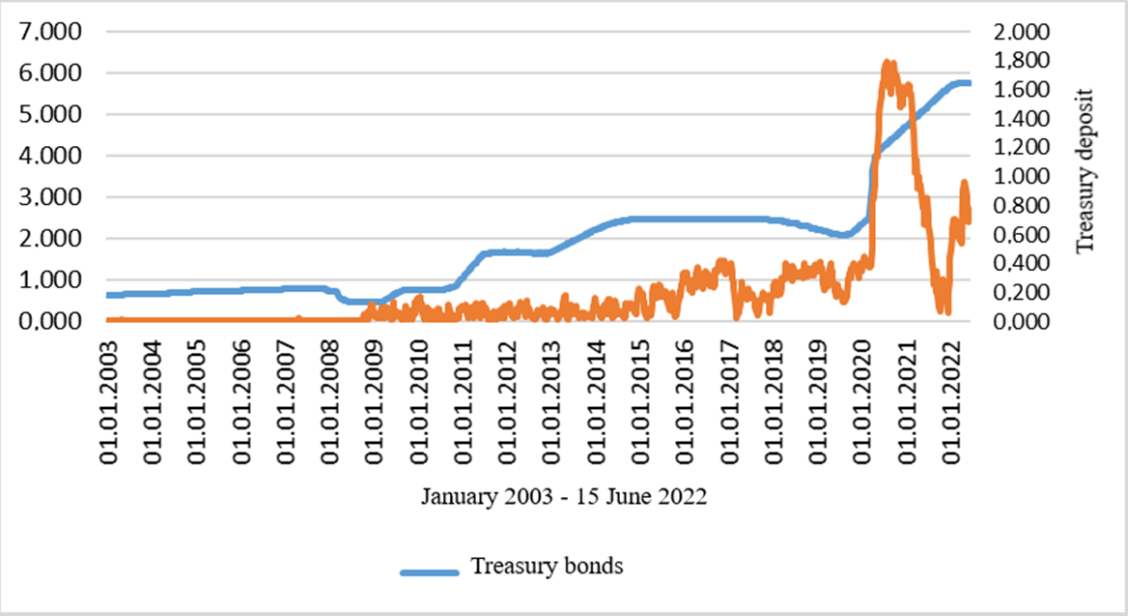

Fig. 2. **Items on the FRS balance, trn USD**

Source: URL: https://www.federalreserve.gov/datadownload/Download.aspx?rel=H41&series=58e3a3737f0257bd2c349939c2346207&filetype=spreadsheetml&label=include&layout=seriesrow&from=01/01/2020&to=12/31/2020

bonds in assets of FRS increased by more than 55% — from 1.4 to 2.2 trn USD.[11] The volume of mortgage bonds grew over 15 months, the average monthly growth was over 3.5%. FRS actively purchased mortgage securities to mitigate the effects of the pandemic on American householders.

In June 2020, FRS began buying corporate bonds issued by American companies to support the national business for the first time. Financial regulator's decision was driven by the oil market collapse and investors' intention to implement corporate bonds. Acting on the debt market as a buyer of corporate bonds, the Federal Reserve was based on the interests of market entities seeking to transfer their assets into cash.

FRS support makes the corporate bond market more attractive. In the first five months of 2020, the issuance of investment corporate bonds reached 500 bln, compared to 200 bln USD for the same period of 2019. This growth was driven by the desire to maximize liquidity. Investment companies, having started issuing bonds, significantly reduced bank borrowing. Banks could not satisfy demand of companies for US dollar liquidity. FRS has taken on the responsibility of meeting the demand for loans using its own balance sheet. By buying corporate bonds, the Federal Reserve System allowed companies to sell more bonds. As part of the company support program, FRS has acted as a lender of last resort to the corporate sector. In essence, Federal Reserve passed to the purchase of corporate debt, which contributed to the maintenance of liquidity and the functioning of the bond market during the crisis. By buying corporate bonds, the Federal Reserve System allowed companies to sell more bonds and at the same time has taken on some risks, such as credit risk of companies that are often unable to repay debts.

By buying up corporate debt, FRS is actually increasing its impact on the real economy. FRS monopoly excludes competition with other entities to finance the U.S. debt model. Thus, FRS remains the main beneficiary of U.S. state debt.

[11] Assets: Securities Held Outright: Mortgage-Backed Securities: Wednesday Level, Millions of U.S. Dollars, Weekly, Not Seasonally Adjusted. URL: https://fred.stlouisfed.org/series/WSHOMCB

Table 6

Items on the FRS balance at end of month, trn USD

Data	Treasury bonds	Treasury deposit
29.01.2020	2.409	0.451
26.02.2020	2.474	0.388
25.03.2020	2.978	0.385
29.04.2020	3.971	1.076
27.05.2020	4.110	1.327
24.06.2020	4.197	1.587
29.07.2020	4.294	1.792
26.08.2020	4.359	1.607
30.09.2020	4.445	1.782
28.10.2020	4.527	1.653
25.11.2020	4.607	1.484
30.12.2020	4.689	1.614
27.01.2021	4.766	1.613
24.02.2021	4.845	1.440
31.03.2021	4.942	1.122
28.04.2021	5.015	0.932
26.05.2021	5.087	0.779
30.06.2021	5.183	0.852
28.07.2021	5.264	0.537
25.08.2021	5.346	0.258
29.09.2021	5.431	0.174
27.10.2021	5.513	0.236
24.11.2021	5.579	0.141
29.12.2021	5.652	0.284
26.01.2022	5.716	0.640
23.02.2022	5.742	0.675
30.03.2022	5.760	0.557
27.04.2022	5.764	0.957
25.05.2022	5.769	0.802
15.06.2022	5.763	0.770

Source: URL: https://www.federalreserve.gov/datadownload/Download.aspx?rel= H41&series=58e3a3737f0257bd2c349939c2346207&filetype=spreadsheetml&label=include&layout=seriesrow&from=01/01/2020&to=12/31/2020

During the crisis caused by the COVID-19 pandemic, FRS, in order to support equity assets, raised the issue of possible purchases not only of business debt, but also of stocks, as both U.S. and foreign investors tried to free themselves from them. FRS management consider that this issue would become relevant in the circumstances when it would be unrealistic to keep stocks from falling without partial "nationalization" of the stock market by the Federal Reserve, although American laws prohibit the expansion of FRS assets through such transactions. The current U.S. Secretary of the Treasury, J. Yellen, spoke for an opportunity to amend U.S. legislation in April 2020 [7]. This includes lifting the ban on the acquisition of shares in companies by the Federal Reserve. Several representatives of American business consider it appropriate to allow FRS to buy back not only bonds, but also shares. In this case, all purchased will be transferred to the FRS balance sheet, which will allow the financial regulator to further strengthen its position. Such a scenario is possible given the volatility of the US financial system caused by increase in state debt.

CONCLUSION

Experience of FRS may represent interests for the Central Bank of the Russian Federation and other financial organizations in the development of monetary policy, as well as for financial regulators of other EAEU Member States.

The pandemic strengthened the influence of the federal reserve, gave foreign partners the opportunity to borrow money in dollars on the security of government debt. Fixed assets of FRS provide Central Banks in the EU, UK, Canada, Japan.

As the world's guarantor of dollar financing, FRS pursues a policy of dollarization of the world economy and consolidation of the key role of the dollar in the global financial system [8].

Developing countries suffer from federal reserve monetary policy owing to weak national currencies and high levels of external debt.

Therefore, the position of Russia and other BRICS countries aimed at de-dollarization of the world economy is understandable.

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The Potential of Mutual Trade Between China and Russia in the Field of High-Tech Manufacturing Products

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ABSTRACT

The article investigated the dynamics of mutual trade between China and Russia in the field of high-tech products. Analyzed the scale, structure and trends of mutual trade on high-tech products between China and Russia. Determined the main groups of goods in the field of high-tech products. Calculated and assessed the possibilities of cooperation between China and Russia in this area, using the Trade Complementarity Index. It is shown that China and Russia are ideal partners in the field of trade in high-tech products. The main problems of trade development in this area are revealed: from the point of view of Russia, it has a low level of diversification of methods for obtaining transitional technologies, and for China — a weakness in independent development of new technology.

Keywords: high-tech products; mutual trade; China; Russia; Trade Complementarity Index; export potential; technologies; innovations; research and development (R&D)

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INTRODUCTION

The level of development of high-tech industries is the main indicator of the efficiency of innovative economic activity and international competitiveness around the world. As a significant stimulus to international trade, high-technology manufactures have the following characteristics:

- high technology intensity;
- high value added;
- low power consumption;
- low emission of hazardous waste.

The term "high technology" originated in the United States. In the book "Technologies and International Trade", published by the US Academy of Sciences in 1971, it was stated that high technologies are developed and used to gain a competitive advantage and gain in the economy [1]. In the opinion of T.V. Konochkina, "high-tech products — it is a product manufactured by enterprises in knowledge-intensive industries, produced using the newest techniques and technologies, with the participation of highly qualified, specially trained personnel, embodying modern scientific achievements, best practices and high socio-economic performance" [2].

APPROACHES TO THE CLASSIFICATION OF HIGH-TECH PRODUCTS

Three approaches to classifying high-tech products are mainly used in world practice: patent, industry and product.

In order to harmonize international patents, within the framework of the tripartite agreement among the EU, the USA and Japan, their patent offices have been invited to group patents into different categories, among which the high-tech group. Many correlation tables had to be developed to implement this approach.

As for the industry approach, the ISIC (International Standard Industrial Classification of All Economic Activities), classifier is based on the ratio of research and development (R&D) to value added and output.

OECD has divided all industries into four categories: high-tech, medium-tech and high-level, medium-tech and low-level and low-tech.[1] Based on this approach, within the Standard International Trade Classification (SITC) OECD has developed a list of high-tech products ranked by research and development (R&D) expenditure per unit of sales.[2]

Taking into account the classification of high-tech products according to the EU standard on the basis of NACE Rev.2[3] in Russia at the national level, a list has been created, approved by the Ministry of Industry and Trade, in which the codification Russian Classification of Economic Activities (OKVED 2) are included: production of pharmaceutical substances (21.1), production of computers, electronic and optical products (26), production of computers and peripheral equipment (26.2), production of office equipment (except computers and peripheral equipment) (28.23), production of other finished products (32), production of aircraft, including space, and related equipment (30.3) [3]. Most of the points are in line with the OECD classification, except for the group 32, which is not part of the final list of high-tech products in Russian and Chinese trade.

The Chinese high-tech industry classification standard is based on the international classification of economic activities (ISIC Rev.3) which are based on the National Standard Industrial Classification of All Economic Activities (GB/T4754–2017). List of high-tech products of manufacturing industry was built and released by the National Bureau of Statistics of China in December 2017

[1] OECD (2011) ISIC rev. 3. Technology intensity definition. Classification of manufacturing industries into categories based on R&D intensities. Paris: OECD. URL: http://www.oecd.org/sti/ind/48350231.pdf.

[2] Standard International Trade Classification. Official UN website. URL: https://unstats.un.org/unsd/publication/SeriesM/SeriesM_34rev4r.pdf

[3] URL: https://ec.europa.eu/eurostat/cache/metadata/Annexes/htec_esms_an3.pdf

and divided into six subsectors[4]: production of pharmaceutical substances; aviation products, including aircraft and related equipment; production of electronics and communication equipment; production of computers and office equipment; production of measuring and medical equipment; information chemical elements. With the exception of the latter, the rest of the classification is largely consistent with that of OECD [4].

In order to analyze the mutual trade between Russia and China in the field of high-tech products, it is need to develop a narrow list of high-tech products. Taking into account the Russian and Chinese classification standards for the high-tech industry are based as well as on the international standard, the author determined to turn to the OECD standard for the classification of high-tech products. It has an advantage over other standards, firstly, because of the product approach, which takes better account of specific high-tech products that are used in mutual trade between countries. Secondly, it includes the "adapter" HS 2007-SITC Rev. 4., which would lead to harmonized the commodity description and coding system. The harmonized commodity description and coding system is a unified international product classification. Its application allows the collection of reliable and accurate statistics on all world trade that are consistent and understandable to all countries. Using HS 2007-SITC Rev. 4, a list of high-tech products in the trade between China and Russia was compiled[5] (see *Table*).

The *Table* shows that high-tech products are in groups 28, 29, 30, 32, 38, 39, 84, 85, 87,88, 90 and 93 and include chemical products, machine and mechanical devices, electrical equipment, record and sound-reproducing equipment, television equipment, vehicles, aircraft, optical, photographic, cinematic, measuring instruments, control, precision, medical and surgical instruments and equipment, watches and other clocks, weapons and ammunition.

DYNAMICS AND CHARACTERISTICS OF DEVELOPMENT OF MUTUAL TRADE IN HIGH-TECH PRODUCTS BETWEEN RUSSIA AND CHINA

China cooperates with Russia in many fields. Particular attention is given to one of the most important field, namely — high-tech products of manufacturing industry.

Analysis of development of bilateral trade of Russia and China in this field was carried out on the basis statistics of United Nations Conference on Trade and Development (UNCTAD), according to which in the period 2016–2020 trade turnover increased steadily (except 2020, due to the pandemic). It peaked at around 170 bln USD in 2019. It accounts for 15.23% of all bilateral trade of Russia and China (*Fig. 1*).

According to UNCTAD data for the period 2016–2020 (*Fig. 2*) the trade structure of China and Russia in high-tech products shows some stability: 4/5 of its total volume relates to the aerospace industry, production of computer and office equipment, and also — electronics and telecommunications.

As shown in *Fig. 2*, Russia's position in the non-electronic equipment and armament fields is generally stable during the analysis period, while in the aerospace industry it is leading, having a growing trade surplus in this group. The main products exported by Russia to China — are fuel elements, unirradiated (8 401.30); детали ядерных реакторов (8401.40); turbojet engines (8411.12); aircraft and others, mechanical (except helicopters), weight (unloaded) more than 15 thous kg (8804.40).

As for the rest, China maintains undeniable surpluses, especially in electronics and telecommunications, as well

[4] URL: http://www.stats.gov.cn/tjsj/tjbz/201310/P020131021347576415205.pdf

[5] Correspondence Tables. Untrade Statistics. Official UN website. URL: https://unstats.un.org/unsd/trade/classifications/correspondence-tables.asp

Table

List of high-tech products

Industry product groups (68)	SITC Rev.4	HS-2007
Aerospace industry	(714–714.89–714.99) + 792.1+ 792.2+792.3+792.4+ 792.5+ 792.91+ 792.93+ 874.11	8411(11,12),841210,841121,841122,8411(81,91),8802(11,12),8802(20,30),880240
Computers and office equipment	751.94+ 751.95+ 752+ 759.97	8843(31,32),8471(30,40,50),8741(60,70,80,90),847330
Electronics and telecommunications	763.31+ 763.8+ (764–764.93–764.99) + 772.2+ 772.61+ 773.18+ 776.25+ 776.27+ 776.3+ 776.4+ 776.8+ 898.44+ 898.46	851920,8521(10,90),8517,8504,844470,8540(81,91),8541, 8542,8523(51,80)
Pharmaceutics	541.3+ 541.5+ 541.6+ 542.1+ 542.2	2941,2937,2938, 3003,3004
Scientific instruments	774+ 871+ 872.11+ (874–874.11–874.2) + 881.11+ 881.21+ 884.11+884.19+ (899.6–899.65–899.69)	9018,9005,901841,901490,9015(10,90),900610,900711,9001(10,20,30,90),9021(10,40,50)
Electronic equipment	778.6–778.61–778.66–778.69) +778.7+778.84	8532(21,24,29,30),8543(10.20.90), 8531(10,80)
Chemical industry	522.22+522.23+522.29+522.69+525+531+574.33+591	280300,2804(61,69),2805(12,30),2825(20,90),2844(10,20,30,40,50),2845(10,90),3204(11,19),390760,3808(91,99)
Nonelectronic equipment	714.89+714.99+718.7+728.47+731.1+731.31+731.35+731.42+731.44+731.51+731.53+731.61+731.63+731.65+733.12+733.14+733.16+735.9+737.33+737.35	8411(21,22),84199,8401,840120,8456,845811,845891,8459(21,31,51,61),8460(11,12,31),8462(21,31,41),8466(93,94),8515(21,31)
Weapon	891	871000,93(0111,0200,0700,0621,0629,0630,0639,0310,0390,0400,0510,0521,0529,0591)

Source: compiled by the author URL: https://ec.europa.eu/eurostat/cache/metadata/Annexes/htec_esms_an5.pdf; https://unstats.un.org/unsd/publication/Series1M/SeriesM_34rev4r.pdf

as computers and office equipment, the share of which in the total turnover of high-tech manufacturing products in the period 2016–2020 was about 70%.

Russian imports of computers and office equipment from China in 2016 amounted to 2 863 mln USD, and in 2020–4 998 mln USD. In these five years, China's imports in this sector have almost doubled. For this reason, Russia's trade balance was negative, and the situation only got worse: –2 835 mln USD in 2016 and already –4 932 mln USD in 2020. Mostly imported from China are portable machines for automatic data processing not exceeding 10 kg, consisting of at least one central computing unit, keyboard and display (8 471.30).

Imports from China in electronics and communications accounted for almost 50% of the total turnover of high-tech products during the period under review. In four years, its scale increased from 5 363 to 8 071 mln USD. Negative balance of trade balance in this sector rose from –5 314 mln USD in 2016 to –7 711 mln USD in 2020. China supplies Russia with telephones, headphones and microphone/loudspeaker (8 518.31), base stations for receiving and transmitting voice,

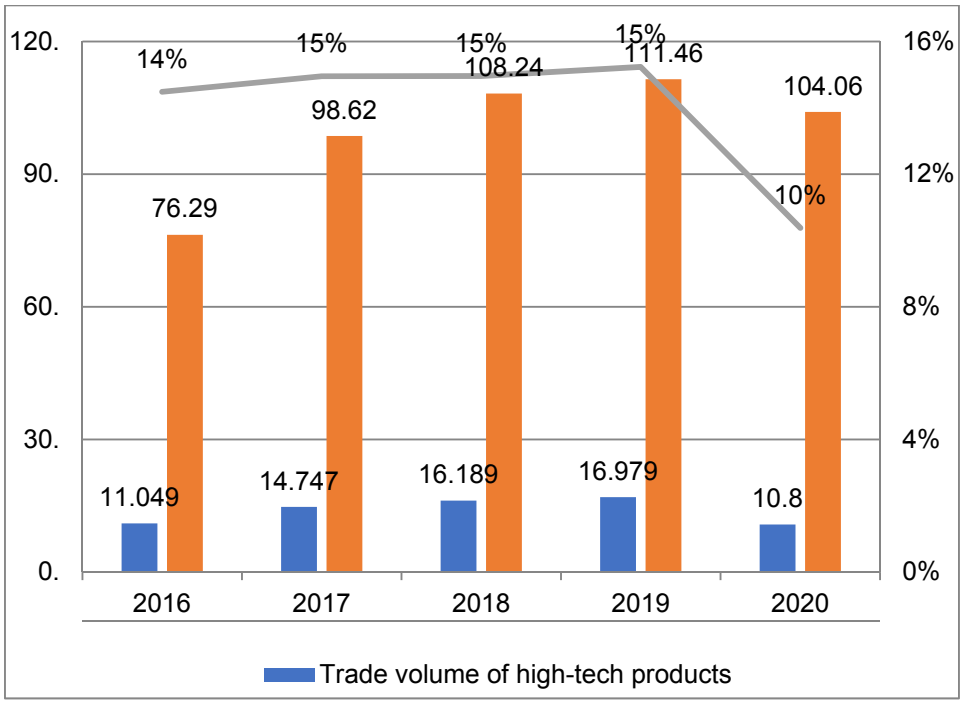
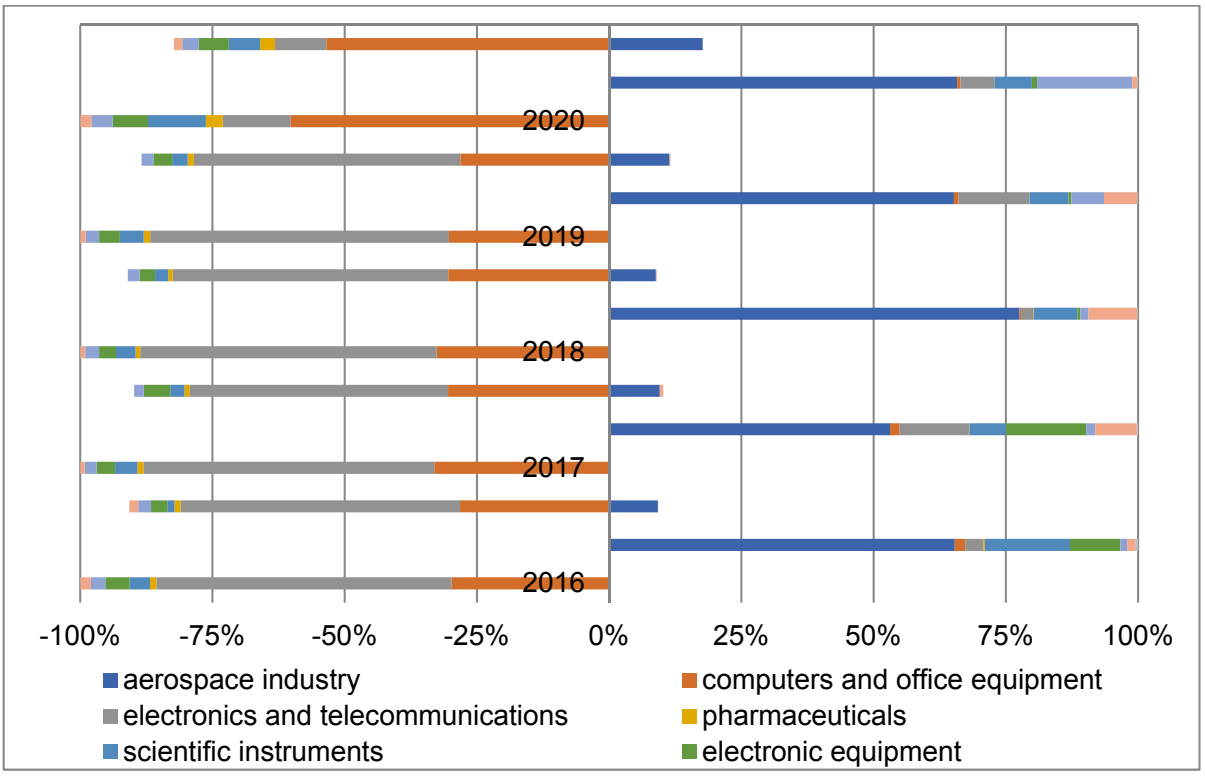


Fig. 1. **Dynamics of the development of trade on high-tech goods between Russia and China in 2016–2020 (billion US)**

Source: compiled by the author based on UNCTAD.



Puc. 2. **Dynamics of the structure of mutual trade between Russia and China by commodity groups of high-tech products in 2016–2020 (million US dollars)**

Source: compiled by the author based on UNCTAD.

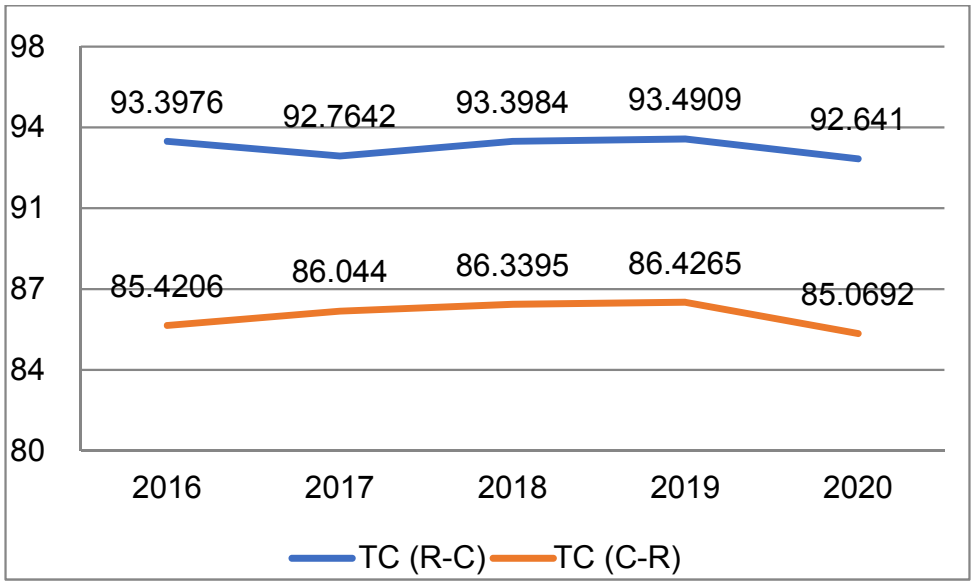


Fig. 3. **The assessment of Sino-Russian trade potential on High-Tech products with ITC index**

Note: TC(R-C) — Index of trade complementarity of Russia with China; TC(C-R) — Index of trade complementarity of China with Russia.

Source: compiled by the author based on the ITC Trade Map database at UNCTAD.

images and other data, as well as wireless communication devices.

Thus, in mutual trade with China, Russia remains mainly a net importer of high-tech products of manufacturing industry.

The complementarity index (Trade Complementary Index) should be used to analyze the degree of conformity of the trade structure and the possibilities for further trade cooperation between China and Russia in the field of high-tech products.[6]

TCI is calculated as follows:

$$c^{ij} = 100\left[1 - \sum_{k=1}^{m} |m_k^i - x_k^j| / 2\right], (0 \le c^{ij} \le 100),$$

where m_k^i — share of production k in total imports of country i;

x_k^j — share of production k in total exports of country j.

If the supply of country j s absolutely in line with the demand of country i, then $TCI^{ij} = 100$, i.e. country j is the ideal trading partner for country i. If TCI reached to zero, countries j and i — are ideal competitors.

According to the authors' calculation based on UNCTAD data (*Fig. 3*), the complementarity index for five years in China's trade with Russia in high-tech products averaged 85.6%. Russia's trade with China was more intensive, with an average of 93.2%. Analysis confirms that China and Russia have become ideal partners in this sphere.

PROBLEMS ARISING IN THE MUTUAL TRADE OF HIGH-TECH PRODUCTS BETWEEN CHINA AND RUSSIA

Products imported to China from Russia are mainly in the aerospace industry which depends on purchases of high-tech parts and components from western countries [5]. Russia receives mainly products related to the production of computers and office equipment, electronics and telecommunications from China, which is also largely dependent on imported key technologies from western countries [6]. After the imposition of Western sanctions, the two countries will have to find new ways to promote high-tech production and trade.

[6] A practical guide to trade policy analysis. WTO. URL: https://www.wto.org/english/res_e/publications_e/practical_guide12_e.htm

In general, there are three main ways to get new technologies: develop innovations internally, adopt and imitate foreign technologies and utilize foreign direct investment. Typically, different countries use combinations of these methods, but mostly someone.

The USA and the UK are the first models based on strong basic research and huge costs of technological innovation to promote exports of high-tech products.

Japan and South Korea are implementing the second model, focusing on product improvement and supporting high-tech export growth through secondary innovation.

China adopts the third model, attracting large-scale foreign direct investment oriented towards high-tech exports. It produces some high-tech products that do not possess the originality of basic technologies, so it is easily influenced by technological barriers from developed countries [7].

Russia is forced to conduct research and development on its own due to sanctions imposed by countries supplying high-tech products. Almost half of Russian companies in the field of high-tech products have chosen this model, innovative solutions range from 10 to 42%. In the high-tech production environment, as in other fields, R&D-oriented cooperation with foreign partners is not sufficiently developed, Russian import dependence in high-tech products is high enough [8].

In order to solve these problems, as part of the government import substitution plan, China and Russia should develop their own production in those industries, they are highly dependent on countries that have applied sanctions through measures such as increased spending on research work, provision of tax incentives, etc. However, both countries should strengthen cooperation between their scientific and research organizations and high-technology enterprises. In addition, China and Russia may find new partners instead of those who imposed sanctions [9, 10].

CONCLUSION

Trade potential of China and Russia in high-tech products is high enough. In recent years, however, trade sanctions have made it more problematic. Both countries will have to find new partners and strengthen cooperation in innovation and production.

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Managing the Costs of Constant Changes in the Activities of High-Tech Enterprises

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ABSTRACT

This article considers the solution of the actual scientific and practical task of managing the costs of planning and implementing organizational and production changes at enterprises from high-tech industries. The authors present a modification of M. Porter's model of competitive forces for high-tech industries and single out a separate managerial function — constant management of timely changes. The article considers the function of cost management, compares two approaches to change management and gives recommendations for optimization of corresponding costs taking into account the cost of management errors.

Keywords: change management; cost optimization; error cost; management function

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INTRODUCTION AND PROBLEM STATEMENT

Commercial success of enterprises in the 6th and 7th technological orders requires major changes in management models. High capital costs of the organization (and necessary continuous modernization) enterprises with high operational salary costs for highly qualified specialists and managers lead to a constant search for cost optimization methods as one of the key functions of enterprise management [1]. On the other hand, technological pressures and uncertainty of the environment in the context of the globalization of competition are additional factors complicating both business–planning and adequate assessment of investment in enterprise development. The need for constant management of successful changes in the management of technology companies became an appropriate response to the disturbances of the external environment and an independent competitive force, analysis of which allows building the optimal competitive strategy in the technological industries.

Mathematical models of management of economic systems are indeed often fairly criticized due to their excessive mechanicalness, inability to take into account psychological and social factors in the organization of work, for the irrationality of managers, insufficient flexibility to respond to market and geopolitical uncertainties [2, 3]. Sometimes such models are better adapted to describe the real world of the economy through the use of special mathematical devices (for example, fuzzy logic or elements of self–learning expert systems), but even in such cases their practical application is rather limited. The opposite of systemic economic theories, emphasizing the permanent indeterminacy of everything, such as the "black swan" [4] or "orderly chaos" [5], although replete with striking practical example, it is rather difficult to adapt to the creation of successful competitive strategies

of enterprises, and therefore lose much of their value to entrepreneurs.

In this article, as a hypothesis, it is assumed that in each economic system there is a parameter, the management of which is transparent and has a significant impact on the success of business — "costs on the managerial function of enterprise". Optimization is an important scientific and practical problem and cannot be universal for every industry or segment of the economy. Optimization of individual components of the enterprise management function seems to be a more promising. The proposed hypothesis asserts that the allocation of the function of permanent management of changes in the management of enterprises is economically justified in terms of view of minimizing the total costs. The main principle of this hypothesis is the theoretical provision on modification of the model of competitive forces by M. Porter, describing the fundamentals of industry competitive analysis.

FEATURES OF CHANGE MANAGEMENT IN THE ACTIVITY OF ENTERPRISES IN HIGH-TECH INDUSTRIES

Change management has a solid history of development, but for high-tech digital economy industries, the usual models E. Deming [6] and I. Adizes [7] required were more modification. Moreover, change management, from a management practice to solve a class of problems, has become a driving force for obtaining competitive advantages [8].

The hypothesis of separation of an independent function of change management from the structure of all management impacts (on the enterprise by management) is based on the idea of the value of permanent management of timely changes as a driving force of competition. The simplest visualization of industry analysis of competitive forces is the Michael Porter model [9]. As part of the author's idea, it is proposed to make a significant modification to this model [8]. It involves avoiding the influence of substitute products and replacing this type of competitive forces with risks associated with managing timely changes in the IT–business (see *Fig.*).

The proposed modification of classical industry analysis is connected with the following circumstances [8]:

1. On the one hand, the concept of "substitute products" and the sources of their appearance have changed in technological industries. Economic sectors of 6th and 7th technological orders and products of related enterprises are based on application of global economic trends: informatization, automation and digitalization. Almost any manual labor, paperwork and approximate qualitative estimates of business parameters applied instead of management approaches based on electronic processing and operation with precise numerical parameters, are outdated and often economically inefficient.

2. On the other hand, the products and services of the technology industries themselves are developing rapidly, primarily because of the intense and global competition among the technology companies themselves. For example, in the 80s of the last century, personal computers replaced mini–computers, and, in turn, they were driven out of the market by modern laptops, tablets and monoblocks. However, such modernization, which involves the introduction of new hardware models and software versions, from the perspective of M. Porter's theory, can be attributed to competition among technology companies rather than to the emergence of substitute products.

3. Managing timely changes in technology industries — is a condition for survival in the market, requires significant resources and carries significant risks. The whole history of mergers and acquisitions of technology companies shows that delay in responding to competitive challenges or ignoring the constant pressure of new technologies in such industries quickly lead to loss of market

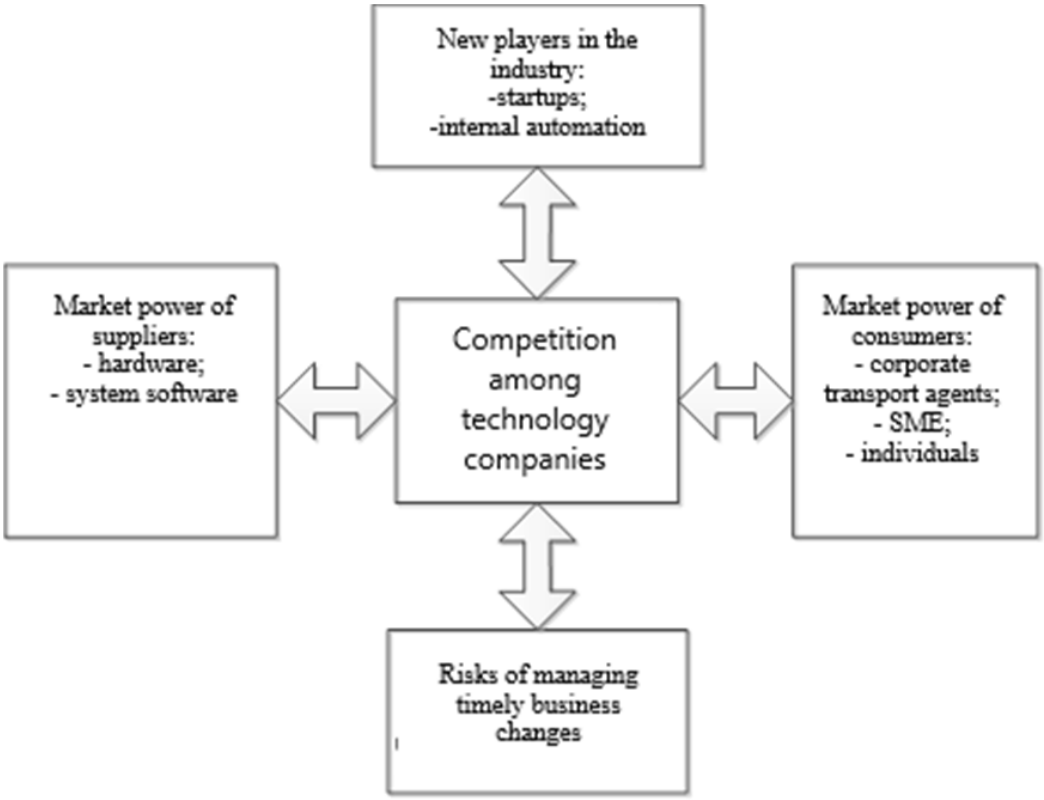

Fig. **Modification of the model of competitive forces of M. Porter for technological industries**

Source: compiled by the authors.

shares, decrease of product margins, outflow of talented professionals and managers [8].

The market power of suppliers in the technology industries — is not only hardware and telecommunications, but also basic system technologies (communication, energy, etc.). It has been declining for decades due to the emergence of Chinese production analogues and the constant growth of supply from manufacturers from around the world in the conditions of cheaper logistics. Decline in the power of supplier's leads to higher profitability in some industries, making entry more affordable for new players.

It should be noted that there are thousands of new players in the technology industry each year (especially in IT, Fintech and biotechnology), although the threshold for capital investment is constantly increasing. Despite the fact that the leading position of well-known American corporations is undeniable, the constantly growing market is opening new niches that are occupied by emerging players. Part of these companies — are start–ups creating completely new technological solutions, usually niche. Another part — is a team of engineers from the traditional business, whose management decided to transfer the positive experience of internal business initiatives to the foreign market. Such "start–up companies" as a rule are not able to create a competitive product for a long time, and in terms of production, management and marketing processes they are lose hopelessly to competitors [10].

Market power of consumers in technological industries is ambiguous. On the one hand, for common and easily repeated services and products, the pressure of corporate customers is quite significant: they expect continuous improvement in the quality of services while reducing their cost to consumers. Corporate customers (banks, network retails, mobile operators, etc.) do force manufacturers to work on product

quality, significantly improving it. In a similar way, individuals, small and medium enterprises exert considerable pressure on whole classes of products (services): gadgets, communication and Internet services, etc.

On the other hand, if it is an innovative or best–in–class product with an almost monopolistic market position, consumer power is extremely weak. Before the appearance and distribution of competitive analogues, the manufacturer always successfully sells the product (service) on advantageous terms and with the level of quality, which itself may choose to provide.

Competition among technology companies is different in the degree of intensity depending on the industry: different level of capital intensity of manufacturing, logistics complexity and regulatory requirements. However, should be allocated a common feature for the industries of the 6th and 7th technological orders: representatives of the "new economy" seek to create "blue oceans" [11], automate new areas and develop the needs of their consumers [12].

Equally important is the gradual erosion of the industry sector of technology companies. On the one hand, this is due to the emergence of new industries and specializations: Fintech (technological financial services), Edtech (technological education services), bio — and pharmaceutical (technological developments in health care, veterinary medicine, etc.). In such companies, it is technology (software and hardware, know–how, digital business models) that determines competitive opportunities in a certain area of activity.

On the other hand, the quality of products, technologies and the competitive opportunities that they create bring technology firms together, regardless of their industry affiliation [13]. So, IT companies specializing in automation, for example, the engineering industry, and high–tech and knowledge–intensive engineering enterprises, creating products whose competitive capabilities are determined by information technologies, significantly more like each other than similar from other applied field (for example, in mining industries and IT companies involved in the automation of accounting, respectively).

The shift in competitive analysis for the technological industries shown in this section makes it possible to consider the management of changes in the management of the company as a driving force for the commercial success of the enterprise. This means that it is possible to separate it from the general function of management and sets the vector of searching for directions of its optimization. Both time and cost can be a key parameter when considering such a function. However, reactivity of employees' thinking and psychological aspects of work organization (organizational resistance, combination of rational and irrational, prepared and spontaneous management decisions, negative unemployment in high–tech industries) [14] allow you to choose in favor of consideration of the function of financial expenses, in which the mathematical argument is the parameter of time.

COST FUNCTION FOR CHANGE MANAGEMENT AND PRICE OPTIMIZATION OF EACH ERROR

The calculation of costs directly for enterprise management includes several key aspects and depends on the selected corporate model (board structure, shareholder participation, decision–making style, etc.). Taking into account the above justification of expediency of allocation of the function for management changes in the company, consider only the necessary aspects relevant for this management function:

- Corporate coefficients — multipliers to determine how much real money a company spends per unit of work on an arbitrary number of employees (one person, project team, groups of related employees, such as a board of directors) per unit time. They

are calculated individually for companies and include the full list of costs — from wages and taxes to electricity consumption, equipment depreciation and office rent. In the "new economy" industries, corporate coefficients are the basis of calculation of variable operating expenses of business.

• Capital costs for the start–up of a particular management activity can be evaluated both for ongoing operations and for the launch of related projects.

• Financial reserves — risk management cash reserves (characterized by Fintech and pharmaceutical companies as simple way to mitigation risks and uncertainties of the environment).

The actual organization of the management of changes in the management of technological enterprises can be realized as an internal project [15].

If $F_{opt}(t)$ — enterprise cost function with optimal change management from time spent, i.e. the expression of costs associated with the timely change of business and technological processes, including the monitoring of the external environment (consumers, competitors, regulators, etc.), then:

$$F_{opt}(t) = \left(a \times t + C_{pro} + R_{pro}\right) + \left(b \times t + R_{corp}\right), \quad (1)$$

where $\left(a \times t + C_{pro} + R_{pro}\right)$ — Part of the cost function related to regular project activities in the area of managing timely changes in the cycle: research– analysis–implementation–consolidation;

a — corporate cost rate per unit of project time;

C_{pro} — capital costs for managing timely changes;

R_{pro} — financial reserves for risk management (for simplification without function parameter);

$a\left(b \times t + R_{corp}\right)$ — part of the cost function related to the reactive management of urgent changes in emergency operating mode, requiring the emergency intervention of the top management of the company, where:

b — this is the corporate cost rate per unit of work cost of all employees and top managers involved in emergency management;

R_{corp} — corporate financial reserves for general risk management in the enterprise (for simplification — without reference to function parameter).

Consider these corporate coefficients in more detail:

1. The corporate coefficient a can be expressed as:

$$a = Sal_T \times \left(\frac{Exp_{CC}}{N_{CC}}\right),$$

where: Sal_T — costs (including fees and taxes) on the wage fund for professionals engaged in timely change management;

Exp_{CC} — operating costs of the respective Cost Center in which these specialists work;

N_{CC} — number of specialists in this Cost Center.

2. The corporate coefficient b can be expressed as:

$$b = Sal_{CL} \times \frac{Exp_{CC}}{N_{CC}} + Er + SP,$$

where: Sal_{CL} — costs (including fees and taxes) on the wage fund of top managers of the company engaged in urgent works (in "emergency" mode) on the management of urgent changes;

Exp_{TM} — operating costs corresponding to the work of top managers in their Cost Center;

N_{CC} — number of top managers in the company, covered by the Cost Center;

Er — costs associated with the forced downtime of enterprise specialists due to the emergency operational management of urgent changes;

SP — costs associated with the forced downtime of enterprise specialists due to the emergency operational management of urgent changes.

Lead a logical inequality:

$$a < b, \quad (2)$$

Having economic sense into force of significant differences in the following indicators:

• remuneration of top management and middle management;

• the presence of forced stops of regular business processes when operating in "emergency" mode, which means — the growth of the corporate coefficient due to these costs;

• duplication of executable activities at work in "emergency" mode, reduction of motivation (and leaving — with the need to search and replace) of employees and other suboptimal processes that occur at unprepared large-scale changes in operational activities [16].

It follows from the previous section of the article that modern technology companies seek to minimize part $\left(b \times t + R_{corp}\right)$:

$$\left(b \times t + R_{corp}\right) \to min, \quad (3)$$

Thus, the cost function $F_{opt}(t)$ depends largely on $\left(a \times t + C_{pro} + R_{pro}\right)$, i.e. regular activities in the area of managing timely changes. Such activities may be organized as special projects or regular operational activities.

In the opposite approach, typical of companies with low maturity of management processes and managerial competencies to manage a modern high-tech enterprise, a similar function $F_1(t)$ should be considered. It also determines the costs of the enterprise in managing changes from the time spent, including reactive monitoring of the external environment (consumers, competitors, regulators, etc.):

$$F_1(t) = \left(b \times t^2 + R_{corp}\right), \quad (4)$$

where the enterprise refuses to some of the costs (notionally zero) associated with regular project activities to manage timely change $\left(a \times t + C_{pro} + R_{pro}\right)$, a uses only part of function (1).

In (4) formula expression $\left(b \times t^2 + R_{corp}\right)$ defines the enterprise cost function related to reactive management of urgent changes in the "emergency" mode, which requires direct intervention of top management of the company in its operational activities.

In this expression b — is the corporate expenditure factor per unit of work of all employees and managers involved in policy and operational management;

R_{corp} — corporate financial reserves for general risk management in enterprise (for simplification without function parameter).

In this expression, costs rise directly proportional to the square of the time spent by top management due to the significant increase in negative factors:

• forced downtime of regular business processes as large–scale operational changes are deployed;

• sub–optimal management results due to duplication of executable activities, inaccuracies in setting goals and targets, limited source data due to short period of collection;

• additional costs due to the need to overcome organizational resistance and the consequences of the associated risks — reducing motivation and leaving some employees.

Type function (4) inherent in enterprises where:

• reduce the time to changes implemented is largely due to decision procedure and resistance suppression, that knowledge–intensive innovative enterprises is fraught with direct economic losses due to reduced productivity and the departure of the best engineers;

• time parameters are often not kept up with significant changes in business and technological processes, which directly proportional to increases the cost of operating control in functions (1) and (4).

These conclusions show that in the absence of mature change management practices at the corporate level, time spent on change tends to maximize, and the expression (4) takes the form of:

$$F_1(t) = \left(b \times t^2 + R_{corp}\right). \quad (4.1)$$

Comparing the cost function expressions (1) and (4.1) when taking into account the expression (2) leads to the following conclusion No. 1:

• **with a significant increase in time of introduction of changes at enterprises of high-tech industries, in case of use of function (4), their costs increase faster than when using function (1).**

It is equally important to determine opportunities for enterprise cost function management in terms of the impact of operating costs on the implementation of necessary changes. The function of the total cost of enterprise management — $\omega(t)$ — depends on a set of significant factors (management costs, reserves, equity servicing, etc.) in which the operational management costs discussed above are present (5):

$$\omega(t) \sim F(t). \quad (5)$$

Postulate the discrete (rather than continuous) nature of management impacts on changes in transaction costs: every top management decision on additional operating costs changes a company's costs by a specific amount, which can be expressed in money and attached to corporate cost coefficients.

Determine the possibilities of changing the cost function (i.e. the potential controllability of the control cost per unit of time) for both approaches, by differentiating expressions (1) and (4.1). For enterprise cost function with optimal management:

$$\frac{dF_{opt}(t)}{dt} = a + b; \quad (6)$$

with the expression (3), will have:

$$\frac{dF_{opt}(t)}{dt} = a. \quad (7)$$

For cost function with opposite approach:

$$\frac{dF_1(t)}{dt} = 2b. \quad (8)$$

When comparing the expressions (7) and (8), taking into account the inequality (2), we will get conclusion No. 2:

• **each discrete step when selecting a cost function by type (4) is significantly larger than when choosing a type of cost function by type (1). Given the fact that the amount of time spent trying to change to the maximum, this means that any change management error that requires additional time to correct costs the enterprise significantly more when choosing a control function by type (4) than when choosing by type (1).**

Thus, due to the impact of operating costs on change management on total costs (5) and conclusions 1 and 2 for the vast majority of technological and knowledge-intensive enterprises from the "new economy" industries, a function of type (1), involving the organization of ongoing activities on timely change management.

Type function (4) can only be recommended for a small segment of enterprises: small by number of employees or having a clear preference in their corporate culture for a directive and command style of management.

CONCLUSION

The presented function of change management in the management of the company by type (1), taking into account the desire of "emergency" management to minimization, is the basis of the proposed in the work optimization of costs for enterprise management. For technological enterprises from the branches of "new economy", the allocation of an independent function of managing timely changes is economically feasible because it allows:

• save money allocated for the management of the organization;

• save money on correcting management errors in "emergency" management mode.

Moreover, further development of an independent function of managing changes

in enterprise management for part of new industries (Fintech, Farmtech) may be related to the strategic model of risks of the organization, which traditionally requires the allocation of appropriate reserves in the form of cash, that output of working capital (effectively frozen). In the future, with the development of this approach, it is possible to partially compensation the operating costs of this managerial function by reducing the necessary cash reserves associated with major industry risks.

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Ecosystem Changes in the Structure of Socio-Economic Relations

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ABSTRACT

The methodological base of the research includes the theoretical foundations of cluster structure, structural integration of ecosystems, the network method of their coordination, platform interaction, global reporting initiative (GRI), international and domestic regulations in the field of sustainable development, scientific publications of Russian and foreign authors. The article proposes clarifications of individual formulations in the definition of ecosystems and conducts their classification: bionomic, industrial ecosystem, business ecosystem, business, innovative ecosystem. The evolution of the definition of "ecosystem" is investigated, in which its qualitatively new stage in the global concept of sustainable development is revealed. The formulation of the ecosystem of sustainable development as the intellectual coordination core of the innovation ecosystem is derived. The concepts of capital components of the new economic formation of "accessism" are introduced. The risks and threats of economic, legal, and state security in the formation of the access economy are investigated. A model of integration of components has been developed: economic, social, environmental, infrastructural elements and directions. The directions of creating new organizational forms of interaction in the ecosystem with the participation of state technology (Gostech) are proposed. Recommendations are given to counter threats and risks caused by ecosystem changes in the structure of socio-economic relations that have historical significance.

Keywords: sustainable development; innovation; ecosystem platforms; financialism; accessism; information capital; platform and organizational capital; Gostech

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INTRODUCTION

Due to the slow pace of development, the domestic industry needs new approaches to the activation of innovative productions, new forms of interaction of subjects of socio-economic relations, which makes the studied direction relevant. These approaches are carried out using new models of integration of economic systems with a cluster structure and network-based coordination, which are able to combine and accumulate existing resources and efforts, provide infrastructure interaction to solve the problems of innovative sustainable development [1–3].

Rapid changes are taking place in the structure of the means of production and in socio-economic relations under the influence of digital transformation, leading to a new historical stage of development. Changing the dominant form of capital, which we see as the sum of resources used in production for profit (which is consistent with the Marxist interpretation of capital as a value that brings added value, as well as the purpose of business). As you know, the use of resources for profit is impossible without production relations, so capital — is resources (material, financial, labour), objects of labour, means of labour in terms of socio-economic relations, and not in relation to any property. Outside of socio-economic relations, property cannot make a profit and therefore is not capital.

The initial stage of capitalism, the key capital of which was the technical means of production (factories, conveyor, power capacity), was replaced by financialism with dominance of bank emission capital in socio-economic relations, including the management, control, own and dispose of emission/ credit fiat, reserve and credit flows. Socio-economic relations in Marxist terminology are called industrial relations.

Transition to digital economy leads to domination of new form — information capital. Information capital is a set of information and communication resources and value-added technologies. Opening up access of their owners to these resources and technologies becomes key in the system of international socio-economic relations. And changes are taking place both in the structure of the basis — industrial relations, and in the public superstructure: politics, ideology, religion, morality, etc. Financialism is being replaced by the economy of access — accessism. The term is introduced by E. Larina [4].

In this change of formation, with all its advantages, new specific threats of global significance are added to the threats of financialism. Owners of information capital acquire enormous influence and control over society, exceeding the capabilities of all previous historical formations, because they can, through the Internet of Things (IoT), and then the Internet of everything, extract, collect and regulate the flow of comprehensive information from users, which becomes all citizens, organizations and institutions of the state. By managing information flows in industrial relations and geopolitics, owners of information and communication resources, systems and technologies can restrict or deprive both individuals and organizations and entire States of resources, if they do not have enough (critical mass) of information capital to preserve the independence. Information capital opens up additional opportunities in hybrid wars to establish puppet regimes in States and destroy them.

In the emerging public superstructure is a struggle for control over the spiritual sphere of man and his social behavior through information systems and technologies (gadgets, social networks, etc.). When a person falls under external influence, his personal qualities are lost, he turns into a blinded, demoralized, led by “human capital”, bringing added value, deprived of human values and norms, orientations, self-awareness.

Thus, three types of capital become the key means of production during excision:

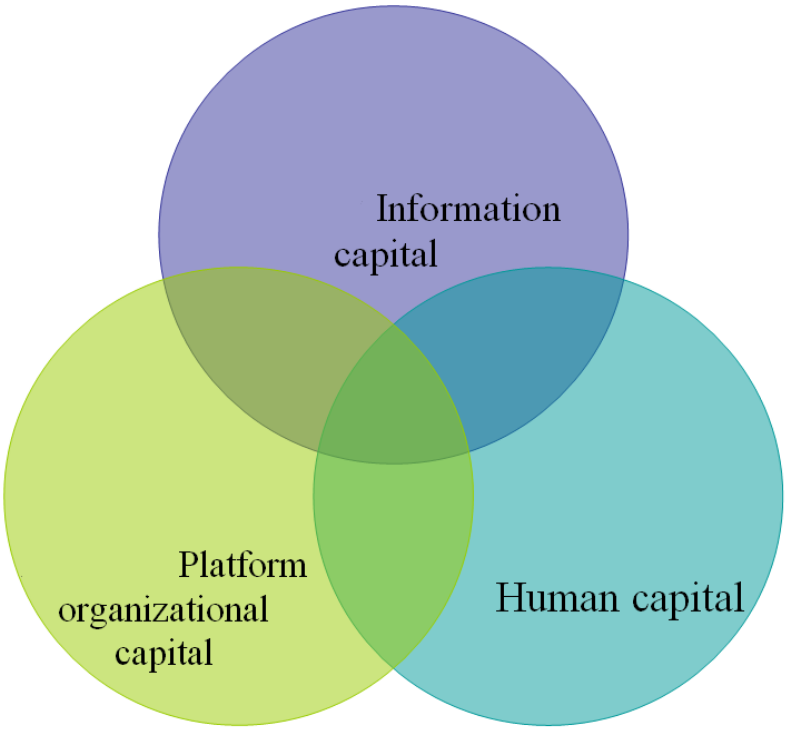

Fig. 1. **Structural components of socio-economic relations of accessism**

Source: compiled by the author.

platform-organizational, information, human (*Fig. 1*). Platform- organizational capital includes ecosystems that provide access for participants to interact on the platform for profit.

The influence of platform-organizational capital owners in society depends on the extent to which they own information and communication resources and technologies that work on the digital platform. The ecosystem approach offers new opportunities to enhance innovative development, but is accompanied by new risks and threats from the dominant role of information capital, reinforced by platform interaction. These risks and threats are far more dangerous than those of previous stages of capitalism.

The aim of the research is to find new forms of integrated interaction between the state and business in relation to information capital to solve the problem of economic growth, development of high-tech industries, overcoming threats and eliminating risks.

EMERGENCE AND EVOLUTION OF THE DEFINITION OF "ECOSYSTEM"

The concept of "ecosystem" was incorporated into the scientific vocabulary in 1935 thanks to A. Tansley [5, p. 284]. Ecosystems have come to represent relatively stable systems that form the habitat of communities of living organisms [6, p. 71].

By L. Bertalanfi's definition, an ecosystem — is a complex, self-organizing, self-regulating and self-developing system. It has a relatively closed, space- and time-stable exchange of substances and energy between its biotic and abiotic constituents. Historical changes in ecosystem terminology were noted by U.S. Podverbnykh [6, p. 75].

In economics and business, ecosystem theory first found its expression in the industrial ecosystem concept [7, p. 144]. The analogy of the development of living systems was borrowed due to the complexity of the chain of operations in creating values, increasing market uncertainty and the

emergence of new forms of interaction of economic actors.

Extrapolation of the regularity of interaction of biological phenomena in processes of economy appears in works M. Rothschild [8]. J. Moore in business strategy researches found similarities between business processes and biosphere behavior in the form of food chains [9, p. 76]. Analogies of ecological processes with those that take place in the business environment allowed to establish the postulates of the theory of the network society [10]. Thus, competing companies moved to open cooperation, mutual support for the creation of new products, trying to satisfy the needs of customers as much as possible, and their innovation activity increased.

Two types of economic ecosystems have appeared in the process of evolution: transactional and innovative. Ordinary business ecosystems are of the first type — *transactional ecosystems* (platforms). On such platforms, transaction relationships are built between interacting actors. Among them may be individual citizens or organizations: users, buyers, suppliers, etc. By interacting on the ecosystem platform, participating parties find each other. Examples of such ecosystems are: Uber, Alibaba, Airbnb, Google Search, Amazon Marketplace, eBay, Waze etc.

On innovative ecosystem platforms are interact together different developers of new applications. As a developer can be different citizens and organizations from all over the world. So work, for example, the ecosystems iPhone, Android, Windows.

The innovation ecosystem — is an open, dynamic, self-organizing and self-developing system composed of organizational, structural and functional units (institutions). Their relationships are manifested in the creation, consumption and transformation of scientific knowledge and ideas into innovative products [11, p. 93]. And knowledge can be generated through automated expert systems that are embedded in digital technology [12, 13].

Business ecosystems need to evolve in alignment with environmental imperatives to balance production growth, resource use and environmental conservation. This leads to an environmental direction for the further evolution of the ecosystem approach, which is in line with the concept of sustainable development adopted by the UN General Assembly Declaration from 25.09.2015, which says: "We are determined to pursue sustainable development in its three components — economic, social and environmental — in a balanced and integrated manner".[1]

In other words, in the strategic evolution of business ecosystems come to an inevitable relationship with the concept of sustainable development defined by the UN, initiated by Global Reporting Initiative (GRI) and Dow Jones Sustainability (DJS) [14].

In summary, we come to a new concept — "ecosystem of sustainable development" (*Fig. 2*).

As a result, we are seeing a transformation of the concepts of the ecosystem approach, which can be classified as follows: ecosystem in relation of living organisms to the environment; industrial ecosystem; bionomy, business ecosystem, entrepreneurial ecosystem, business ecosystem, innovative ecosystem; sustainable development ecosystem (*Table 1*). And a sustainable development ecosystem may include as a structural component the organizational forms of other, narrower ecosystems. And innovation will relate to the ecosystem of sustainable development if it encompasses three components: economic, social and environmental. Thus, the evolutionary cycle of ecosystems, starting from the habitat of communities of living organisms, after the industrial stages, returns to the biosphere, but at the level of the emerging need to preserve it.

[1] URL: https://unctad.org/system/files/official-document/ares70d1_ru.pdf

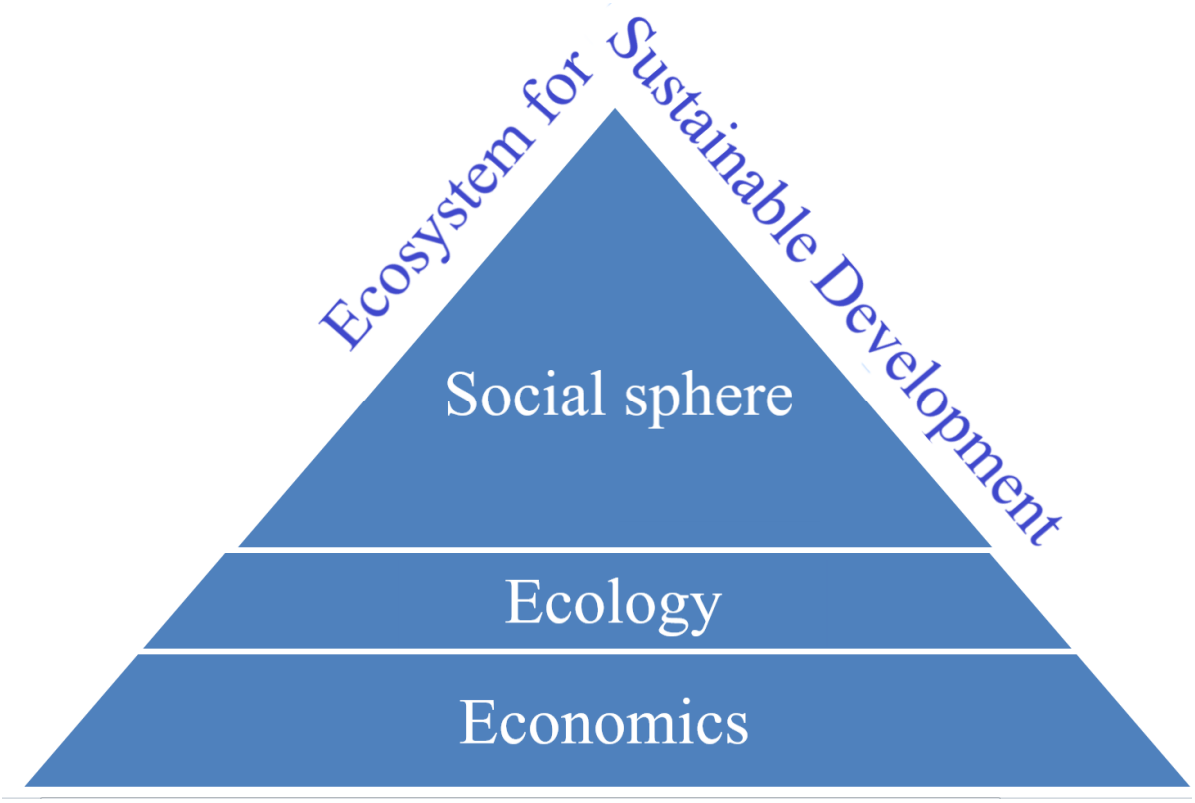

Fig. 2. **Components of a sustainable development ecosystem**

Source: compiled by the author.

The scheme of integrated interaction of the complex of structural components and target functions aimed at achieving sustainable development in its three components is presented at *Fig. 3*. It is based on — integrated thinking that involves active consideration by the organization of the links between its various operational and functional units and the capital it uses or influences [15, p. 97]. The main actors in the model are platform participants and service providers.

TRANSITION FROM TRADITIONAL BUSINESS MODELS TO PLATFORM ECOSYSTEMS

Currently, the external conditions for innovative sustainable development of the Russian economy are unfavorable. Low economic growth is reinforced by a long-term regime of unjust sanctions, limited opportunities to raise funds on world markets for Russian business, conditions of the COVID-19 pandemic. This leads to tighter monetary policy, increased opportunity costs, higher risk.

Traditional business strategies often fail to address emerging global threats and implement opportunities. Innovation in the country is not yet a key driver of economic growth, as the commodity orientation of the national economy has not yet been overcome.

Among the elements of innovative ecosystems, universities and research laboratories are the most important participants. The financial core of the ecosystem is the venture fund. An example of a venture financing system is Russian Venture Company (RVC). In Russia, due to lack of private sector funding, the State is a key player and occupies about one third of the venture fund market.

The problems of low financing lie in the state's fiscal and tax policies. At present, the

Table 1

Evolution of the ecosystem approach

Ecosystems	
Concept	**Definition**
Ecosystem	Complex self-organizing, self-regulating and self-developing system. Its main characteristic is the presence of relatively closed, space- and time-stable material and energy flows between its biotic and abiotic parts [5, p. 284]
Industrial ecosystem	The concept of the development of living systems applies to the transformation of industries under the influence of the complexity of value chains, the growing uncertainty of the environment and the emergence of new forms of interaction of economic actors [7, p. 144]
Bionomics	The transfer of biological concepts to real economic phenomena using the concept of "ecosystem" and allocation of a specific approach to the hotel direction of research, called "bionomics" [16, p. 39]
Company ecosystem	Network of interconnected "niches", organizations, communities, institutions that develop their products and services in a coordinated manner, support each other, so that investments and current activities give synergy effect [8, 9]
Entrepreneurial ecosystem	Enabling environment for the emergence of high-growth enterprises. The set of interrelated business entities (including enterprises, venture capital, business angels, banks), various institutions (universities, government agencies, financial bodies), which are connected by formal and informal ties [17, p. 44]
Business ecosystem	Group of companies involved in the creation or production of value, innovation development and commercialization [17, p. 44]
Innovation ecosystem	Inter-organizational, political, economic, technological and environmental systems through which a business environment is created, maintained and developed that creates, consumes and transforms scientific knowledge and ideas into innovative products*
Sustainability development ecosystem	An open, dynamic, self-organizing and self-developing system consisting of organizational, structural and functional components (institutions) that coherently develop their products and services to achieve economic, social and environmental development

Source: compiled by the author.

Note: * URL: https://www.rvc.ru/upload/iblock/06b/Innovation_ecosystem_ analytical_report.pdf

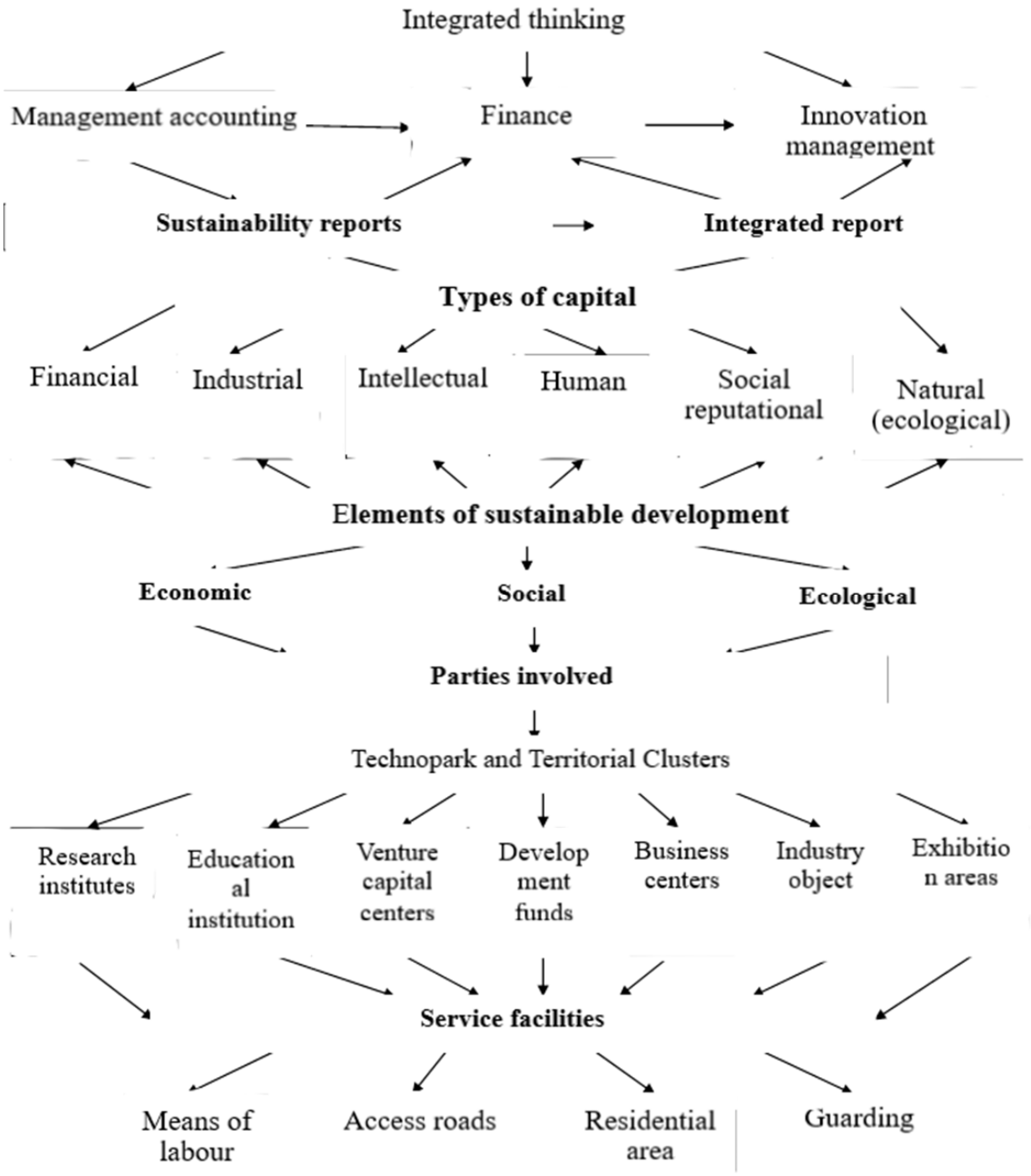

Fig. 3. **Model of integration of components and directions that determine innovative sustainable development of the ecosystem**

Source: compiled by the author.

Tax Code of the Russian Federation[2] exempts exports of fuel and raw materials from the payment of value added tax. Introduction of VAT on export of raw materials and increase of customs duties on them could be an additional source of replenishment of venture funds. Since fuel and raw materials

[2] URL: http://www.consultant.ru/document/cons_doc_LAW_28165/35cc6698564adc4507baa31c9cfdbb4f2516d068/

are supplied abroad, taxation of their exports will not increase the cost of domestic fuel and raw materials, a, on the contrary, will stimulate an increase in sales of energy resources in the Russian market, thereby contributing to a decrease in prices of fuel and raw materials for Russian business. Thus, the country's natural resources will become a competitive advantage of Russian producers and contribute to freeing our economy from fuel and raw materials dependence.

Tax policy justification for export of fuel and raw materials disclosed in monograph [18, p. 137]. They indicate that the introduction of VAT and customs duties on the export of fuel and raw materials will significantly increase the revenue portion of the budget, which will allow to replenish venture funds involved in the formation of new platforms for innovative collaboration, and to increase competitive advantages at the expense of the country's fuel and resources.

The ecosystem approach is implemented through platform interactions that differ significantly from traditional business models. In a traditional business model, values are created through linear processes, value chains. Therefore, this model is called "linear" or "pipeline". At the entrance comes raw materials and materials from which the output creates a finished product of higher cost.

The economic ecosystem is built on a platform that includes key assets. It includes the following:

- platform-defining firm movable and immovable property, which is called platform;
- ecosystem members (participants) from entities and individuals in the platform;
- resources invested in the ecosystem by its members, including software applications (Android, Windows, etc.), facilities, vehicles, products, ideas, information.

The platform firm itself does not directly create value. Its value (product) — is the organization of conditions (platforms) for interaction of ecosystem members and use of its resources, as well as the development of policies — rules of interaction between ecosystem actors and the use of its resources that support growth of the ecosystem.

Unlike the linear model, platform firms do not own or manage these assets, but rather coordinate them through standardization (e.g., API[3] and SDK[4]) and policy.

Traditional (linear) business models use internal resources as own property. Platform business model is built on external resources, no cost. For example, Uber, Airbnb, Alibaba ecosystems are bilateral platforms.

In the Uber ecosystem (the world's largest carrier) on one side of the platform — are the personal cars of citizens of different countries who choose to provide transportation services on their cars under the auspices of Uber, and on the other side — people who need a taxi.

Platform ecosystem business models show greater competitive advantages over traditional (linear) business models. They generate rapid growth and spread across the economy.

Having significant advantages, the platform has negative sides. Many start-ups who cannot compete with the ecosystem decide to become part of it. This leads to the absorption of individual entrepreneurs and business structures, the centralization of production and, consequently, the emergence of new risks and threats. Such processes require legal, antimonopoly regulation and State supervision.

In this regard, the greater share of government participation in the organization and financing of innovative high-tech projects in Russia has its advantages. State participation in ecosystem platforms can improve their safety and reduce risks. Digital ecosystem platform improves public administration and planning. Planning, monitoring the implementation of plans,

[3] Software interface for Windows application integration (API — Application Programming Interface)

[4] Standard source blocks for Windows application creation (SDK — Software Development Kit) — Program libraries, instructions, code samples, guides.

Table 2

The main indicators of science, innovation and advanced production technologies for the entities of the Russian Federation in 2020

Subjects of the Russian Federation	Number of staff in innovation	R&D costs, bln rub.	Number of advanced technologies developed	Number of advanced technologies used	Share of innovative products in total volume, %
Russian Federation, in general	679 333	1174.5	1989	242 931	5.7
Central Federal District	345 756	621.9	686	69 612	5.2
Northwestern Federal District	87 411	155.8	268	24 693	6.3
Southern Federal District	26 716	29.8	143	13 355	3.3
North Caucasus Federal District	6816	5.8	55	3060	5.1
Volga Federal District	101 929	180.9	323	70 100	11.3
Ural Federal District	44 486	74.5	321	30 512	3.8
Siberian Federal District	52 304	86.5	125	22 734	3.7
Far Eastern Federal District	13 915	19.4	68	8865	3.1

Source: compiled by the author according to Russian Statistical Yearbook.

control, system response at all sites and stages of the plan, correcting errors and adapting to changing conditions in real time.

Public technology models are being developed in international practice — Gostech (Government Technologies, GovTech). Gostech operates on a platform with neural network technology artificial intelligence "smart state". The platform unites all kinds of state information systems, creating a common online environment of interaction of citizens, business and state structures. Its resources improve coordination and communication between the State, citizens and business. Gostech makes State possible to regulate the access of platform participants to its resources. Thus, the state restrains the chaotic social and economic processes by establishing "rules of

the game", which is especially necessary in the context of weakening state regulation and planning capacities [19].

The ecosystem approach is spreading in Russian innovation projects. The main examples of territorial ecosystems — not only foreign ["Silicon Valley", MIT (Boston) Cambridge, Harvard], but also Tomsk region, Tatarstan, Samara, Kaluga, Far East [11, p. 93], Krasnodar region [20, p. 202] etc. In the Nizhny Novgorod region operates a technopark "Ankudinovka" — a state institution that supports small and medium-sized innovative business, forming an ecosystem.

Ecosystems become centers for innovation and high technology (*Table 2*). The share of innovative products in the total volume is the leading Volga Federal District (11.3%) — mainly due to the use of advanced production technologies in the amount of 70 100 units, which also exceeds the indicators of other subjects of the Russian Federation.

CONCLUSION

In response to emerging and increasing threats and risks in the transition to an access economy, the main task of States becomes the possession and taking under control of key resources of information capital, the development of domestic information and communication systems.

The most significant risks and threats of accessism are due to the fact that the management center of international servers, operating system, cybersecurity, cloud storage is located abroad. In the control center is the American company Wmware — software developer for virtualization head office in California.

Cyber security of servers is provided by Radar of the American company IBM. Management of cloud storage services is realized with the help of Azure products from Microsoft.

None of these companies systematically cooperates with Russian justice, does not provide source code and does not help in disclosure of media encrypted with its products.

The development controlled by of State and it regulates information and communication technologies and resources becomes a priority of historic importance in the transition to an access economy.

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