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Content

Biological sciences

- Tsygankova V.A., Kovalenko O.A., Mikolaychuk V.G., Andreev A.M., Pilyo S.G., Brovarets V.S.*
USING THE PYRIMIDINE DERIVATIVE - KAMETHUR TO ENHANCE THE GROWTH AND PRODUCTIVITY OF COWPEA
(VIGNA SINENSIS L.) 3

Economic sciences

- Blerim Kola, Jehona Gjermizi*
CUSTOMER LOYALTY IN BANKS, EVIDENCE FROM ALBANIA 8
- Sevinc İbrahimova, Mayil Orujov, Azer Orujov, Nermin Orujova, Mammadov Elgun*
PUBLIC INVESTMENT AND GLOBAL ECONOMIC RESILIENCE 15
- Guliyeva Jamila*
PROBLEMS AND SOLUTIONS OF THE DEVELOPMENT OF THE TRANSPORT-LOGISTICS SYSTEM IN THE MODERN PERIOD 28
- Nasibova Zumrud*
CURRENT ASPECTS OF THE DEVELOPMENT OF THE KARABAKH ECONOMIC REGION IN AZERBAIJAN IN THE CONTEXT OF HIGH TECHNOLOGIES 35

Medical sciences

- Arman Khozhayev, Bolat Abishev, Aigerim Magzamova, Meruyert Kanafina, Zhanna Shakenova, Meruyert Kapezova*
BREAST CANCER: MODERN POSSIBILITIES AND PROSPECTS 42

Pedagogical sciences

- Dynko M., Holliad R.*
THE ROLE OF A TEACHER IN A VOCATIONAL PRE-HIGHER EDUCATION INSTITUTION IN SHAPING THE CIVIC AND NATIONAL IDENTITY OF LEARNERS 54
- Samedov Kamran Enver oglu*
THE PECULIARITIES OF SOCIAL-PEDAGOGICAL WORK WITH TEENAGERS OF ADDICTIVE BEHAVIOR 59

Sociological sciences

- Poghosyan G.A., Poghosyan R.M.*
THE NEW FORMS OF MIGRATION IN DIGITAL SOCIAL REALITY 64

Technical sciences

- Fariz G. Amirov, Farid R. Muradov, Anar R. Mammadhuseynov*
METHODS FOR AUTOMATIC DIAGNOSIS AND PREVENTION OF FAULTS IN CNC MACHINES 68

Biological sciences

USING THE PYRIMIDINE DERIVATIVE - KAMETHUR TO ENHANCE THE GROWTH AND PRODUCTIVITY OF COWPEA (*VIGNA SINENSIS* L.)

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Abstract

This review article presents the results of 2-year field studies of the effect of a new synthetic plant growth regulator based on the potassium salt of 6-methyl-2-mercapto-4-hydroxypyrimidine (Kamethur) on the growth, development and productivity of an important agricultural crop - Chinese cowpea (*Vigna sinensis* L.), grown in the southern steppe zone of Ukraine.

Keywords: *Vigna sinensis* L., plant growth and productivity, Kamethur.

Introduction. Cowpea (*Vigna unguiculata* (L.) Walp.) is an important legume crop for agriculture, used as a source of food for people in poor arid regions, as well as as livestock feed [1]. Modern technologies for growing cowpea plants are based on the use of natural plant hormones or their synthetic analogues, organic and mineral fertilizers to improve growth and development, increase the yield of this crop and its adaptive properties to environmental stress factors [2 - 5]. A very promising approach is the development of new effective plant growth regulators of synthetic origin, which exhibit a stimulating effect similar to natural plant hormones on the growth and development of cowpea plants.

In recent years, new environmentally friendly plant growth regulators, Methyur and Kamethur, have been developed, based on synthetic compounds, derivatives of low-molecular weight azaheterocycles, which contribute to improving the growth of economically important grain, grain-legume and industrial crops, increase their productivity and improve the quality of plant products, which allows reducing the use of environmentally toxic chemical agents for plant protection and improving the ecological state of the entire agricultural system [6-12].

Using synthetic plant growth regulators such as Methyur and Kamethur, separately [6-8] or in combination with fertilizers [9-12], in agricultural practice has such main advantages as their broad specificity of action on various plant species and varieties, high physiological activity when used in the range of low concentrations from 10^{-4} M to 10^{-7} M, and environmental safety due to the absence of a toxic effect on human, animal, and plant cells.

This review article describes the results of a study of the regulatory effect of a synthetic plant growth regulator based on the potassium salt of 6-methyl-2-mercapto-4-hydroxypyrimidine (Kamethur) on the processes of growth and development, formation of productivity of Chinese cowpea (*Vigna sinensis* L.) plants grown in the southern steppe zone of Ukraine, published in our work [13].

Materials and methods. Field experiments were conducted in the field plots of the Department of Plant Growing and Horticulture of the Mykolaiv National Agrarian University for two years [13]. To conduct field research, we used the methods outlined in the methodological guides [14, 15]. The experiment variants were as follows: control variant – no treatment of cowpea seeds, experimental variant 1 – pre-sowing treatment of seeds with a Kamethur solution at a concentration of 10^{-5} M, experimental variant 2 – pre-sowing treatment of seeds with a Kamethur solution at a concentration of 10^{-6} M. After this procedure, the seeds were kept in a dark place until dry. When sowing, the seeds were immediately planted in the soil.

Field germination was determined in the field as the ratio between the numbers of seeds that germinated in the field to the total number of sown cowpea seeds in percent. Analysis of growth and development phases during the growing season of cowpea plants (emergence; emergence of true leaves, budding, flowering; seed formation, end of growing season) was carried out according to the methods given in the manual [16]. Morphometric parameters of cowpea plants throughout the growing season in each phase of development, leaf sizes were determined according to the methods [16, 17]. Cowpea bean and seed sizes (total bean weight, as well as seeds and pericarp separately to determine the proportion of each in the bean), the attachment height of the lower stalk, the number of beans per plant, and the number of seeds per bean were measured. To determine seed productivity of Chinese cowpea plants, methods [18, 19] were used. The structural components of the crop yield were determined such as the number of plants per unit area (per 1 m² or per 1 ha); the number of beans per plant; the number of seeds in one bean; the mass of one seed or 1000 seeds; the mass of seeds per plant; the total mass of one plant.

Statistical processing of the experimental data, performed in triplicate, was carried out according to the Student's t-test with a significance level of $P \leq 0.05$; mean values $\pm$ standard deviation ($\pm$ SD) [20].

Results and discussion. The obtained research results indicate that pre-sowing treatment of Chinese cowpea seeds with aqueous solutions of the plant growth regulator Kamethur, applied at concentrations of 10^{-5} M and 10^{-6} M, increased the morphometric indicators of cowpea plants and their beans, as well as the qualitative indicators of seeds compared to similar indicators of control plants not treated with the growth regulator.

It was found that treatment with the growth regulator Kamethur in different concentrations leads to a decrease in field germination by 1.5 and 5.8% compared to the control. At the same time, plant survival also decreases by 1.8% and 6.25%, compared to the control.

Analyzing the dynamics of the development of the root system of Chinese cowpea plants, and, in particular, the main root, we found that the main root in plants developed unevenly, the increase in its length actively occurred in the interphase period from the appearance of a true leaf to budding, regardless of the treatment of seeds with different concentrations of the growth regulator Kamethur. In 2021, root growth continued until the end of the growing season, the maximum indicators in plants in this phase were 16.7 cm for the control variant, and in plants of the experimental variants they were 17.4 cm and 18.3 cm, respectively. Thus, when treated with a 10^{-5} M solution of the growth regulator Kamethur, the increase in the length of the main root was 4%, and when treated with a 10^{-6} M solution of the growth regulator - 9.6%, respectively, compared to the control. The average root length in the control plants over two years was 16.24 cm, and in the experimental plants this indicator was 16.8 and 17.25 cm, respectively, which means that the control variant prevails by 3.45 and 6.15%.

Analyzing the effect of treating cowpea seeds with the growth regulator Kamethur on the total number and length of lateral roots of Chinese cowpea plants, it was found that this indicator depended on the weather conditions of the growing season and the concentrations of the growth regulator. Investigating the effect of pre-sowing treatment of cowpea seeds with the growth regulator Kamethur in different concentrations on the growth of lateral roots in the end-of-vegetation phase, we found that in 2021, there was an increase in the number of lateral roots in the experimental variants by 10.6 and 15.5%, respectively, compared to the control, and a decrease in the length of lateral roots in the experimental variants by 4.3 and 5.4%, respectively, compared to the control. We assume that the decrease in the length of lateral roots is associated with the weather conditions of 2021 - during the period of intensive root growth, intense precipitation was observed.

Investigating the effect of pre-sowing treatment of Chinese cowpea seeds with the growth regulator Kamethur in different concentrations on the morphometric indicators of shoots, we found that in 2021 the greatest growth of shoots was observed in the interphase period "the appearance of a true leaf - budding". In the following interphase periods "budding - flowering", "flowering - fruiting" and "fruiting - end of vegetation" it is relatively insignificant. Analyzing the effect of pre-sowing treatment of Chinese cowpea seeds with the growth regulator Kamethur in different concentrations on the length of shoots, it was found that in 2021 the height of plant shoots in the experimental variants exceeded the control ones by 16.5 and 17.5%, respectively. Analyzing the number of nodes in plants of the control variant of two years of vegetation, we found that they do not differ significantly and amount to 19.00 pcs. At the same time, in the experimental variants in 2021, the indicator exceeded the control variant by 5%.

When pre-sowing treatment of Chinese cowpea seeds with the growth regulator Kamethur in different concentrations, the number of flower stalks in the experimental variants in 2020 exceeded the control variant by 9.7 and 12.6%, respectively. In 2021, the formation of flower stalks occurred under conditions of sufficient moisture supply, therefore their mass was greater, and seed treatment with the

growth regulator Kamethur of various concentrations had a positive effect on the mass of flower stalks, which increased compared to the control by 67.0 and 73.3%, respectively.

Analyzing the effect of pre-sowing treatment of Chinese cowpea seeds with the growth regulator Kamethur on the dynamics of the number of leaves during the growing season, it was found that the increase in the number of leaves in the experimental variants is 5.6% in 2021, compared to the control. By the end of the growing season, the number of leaves in the experimental variants decreases by 95 and 77%, respectively, compared to the control. The maximum assimilation surface of the leaves reached in the flowering phase, after which the leaves died off and, accordingly, a decrease in the area of the leaves was observed. In 2021, with pre-sowing treatment of seeds with the growth regulator Kamethur, the leaf surface area index increased relative to the control variant by 6.7 and 7.8%, respectively.

Taking into account the leaf surface area index and the number of leaves on Chinese cowpea plants, we calculated the leaf index. The leaf index during the period of germination and the appearance of a true leaf in 2021 did not differ for the control and experiments and was 0.02 and 0.12, respectively. According to this indicator, the experimental plants grown during 2021 had the same leaf index during the period of germination and the appearance of a true leaf. In the flowering phase, the leaf index of the variants with pre-sowing seed treatment with the growth regulator Kamethur slightly exceeded the control variant. In 2021, during the fruiting period, the leaf index values of the experimental variants were 28.7% lower than the control variant. At the end of the growing season in 2021, the leaf index value of the experimental variants was 50% lower than the control variant.

Analyzing the effect of pre-sowing treatment of Chinese cowpea seeds with the growth regulator Kamethur on the main morphometric indicators of Chinese cowpea beans, it was found that these indicators depend on the weather conditions of the growing season and the concentration of the growth regulator Kamethur. It was found that the main morphometric indicators of the cowpea beans depend on the weather conditions of the growing season and the concentration of the growth regulator Kamethur. Comparing the morphometric indicators of cowpea beans, we found that in 2021, the length of the beans of experimental variants treated with the growth regulator Kamethur in different concentrations exceeds the length of the beans of the control variant by 4.5 and 5.3%, and the width of the beans in the experimental variants exceeds the width of the beans of the control variant by 1.9 and 15.4%, respectively.

It was found that the cowpea bean index (the ratio between length, width and thickness of bean) depends on weather conditions and pre-sowing treatment of seeds with the growth regulator Kamethur in different concentrations.

Analyzing the indicators of cowpea seeds formation during 2020 and 2021, we found that in the experimental variants with presowing treatment of Chinese cowpea seeds with the growth regulator Kamethur in different concentrations, in 2020 this indicator exceeded the control variant by 97 and 96%, respectively, and in 2021 this indicator in the experimental variants exceeded the control variant and reached 95%, while this indicator in the control variants of different years reached 91 and 92%, respectively.

As known, the mass fraction of the pericarp is influenced by the weather conditions of cultivation, especially precipitation during the period of seed formation, as well as pre-sowing seed treatment. In 2021, the mass fraction of the pericarp was 20% in the control variant and 19 and 17% in the experimental variants with presowing treatment of Chinese cowpea seeds with the growth regulator Kamethur in different concentrations, respectively. Thus, pre-sowing treatment of Chinese cowpea seeds with the growth regulator Kamethur in different concentrations has a positive effect on the mass fraction of seeds, slightly increasing this indicator to 81 and 83%, compared to this indicator of the control variants, which was 80%.

A positive effect of pre-sowing treatment of Chinese cowpea seeds with the growth regulator Kamethur in different concentrations on seed length indicator was observed; in 2021, this indicator in the experimental variants exceeded the control variant by 4.3 and 2.9%. At the same time, pre-sowing treatment of Chinese cowpea seeds with the growth regulator Kamethur in different concentrations also affects the seed width indicator: in 2021, this indicator in experimental variant 1 was 1.8% less than the control variant, and in experimental variant 2, on the contrary, it was 5.5% more than the control variant. It was also found that in 2021, the seed thickness indicator in experimental variant 1 was 2.4% less than the control variant, and in experimental variant 2 it was 4.9% higher than the control variant.

Analyzing the effect of pre-sowing treatment of Chinese cowpea seeds with the growth regulator Kamethur in different concentrations on the weight of one seed, it was found that in 2021, the experimental variants showed an increase in this indicator by 9.1% compared to the control variant.

According to the results of the influence of pre-sowing treatment of Chinese cowpea seeds with the growth regulator Kamethur on the biological productivity of plants in 2020 and 2021, it was found that in 2021 it was higher. The biological productivity of plants of the control variant in 2021 was 117.37 g/plant. Of these, the share of economic productivity was 10.15 g/plant, which is 8.6%. The largest share is made up of leaves, which accounted for 61.6% of the plant mass.

Compared to the control variant, the biological productivity of plants in experimental variant 1 exceeded by 58.2% and in experimental variant 2 exceeded by 55.6%, the difference between the experimental variants was 4.8%. Compared to the control variant, the proportion of leaves also prevailed in the experimental variants, which was 71.6%, respectively.

Conclusion. Thus, the results of the field studies indicate the prospects for practical application of the synthetic plant growth regulator Kamethur in low concentrations of 10^{-5} M and 10^{-6} M, non-toxic to the environment and human health, for pre-sowing treatment of Chinese cowpea seeds (*Vigna sinensis* L.) in order to improve the growth and increase the yield of this crop when introduced into the southern steppe zone of Ukraine. The use of a new effective synthetic plant growth regulator Kamethur will contribute to increasing the productivity of the important agricultural crop of Chinese cowpea against the background of adverse environmental factors, climate change, and systemic soil depletion, and will reduce the expenditure of public funds on the purchase of plant growth regulators of foreign production, which is of great importance for the economy of Ukraine in the conditions of war and post-war times.

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Economic sciences

CUSTOMER LOYALTY IN BANKS, EVIDENCE FROM ALBANIA

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Abstract

This article examines whether service quality of Albanian commercial banks increases customer satisfaction that fosters customer loyalty. Data is collected from 430 valued customers of scheduled commercial bank branches in Albania. A questionnaire elicited information on socio-demographic variables along with human, technical, and tangible aspects of service quality, customer satisfaction, and loyalty.

Results suggest that better human, technical and tangible aspects of service quality of the bank branches increase customer satisfaction. Human aspects of service quality were found to influence customer satisfaction more than the technical and tangible aspects. Customer satisfaction furthers customer loyalty. Increase in service quality of the banks can satisfy and retain customers.

In the Albanian banking sector, human aspects are more important than technical and tangible aspects of service quality that influence customer satisfaction and promote and enhance customer loyalty.

The hypotheses have been tested by analysing the responses to a questionnaire survey which was carried out on a sample of valued customers of scheduled commercial banks in Albania.

Keywords: Service, Customer, Banks, Albania

After liberalisation, Albanian banks were exposed to free market competition and consequently, the strategic need for customer retention. Banks tend to emphasise customer retention because the cost of acquisition of new customers is higher than their retention. Intense competition and continuously evolving customer demands have led Albanian banks to identify drivers of customer satisfaction and loyalty. Customers are the major decision makers in any marketing effort. They select a service offering that adds value to them and optimises their satisfaction. Therefore, bank managers are seeking out most influential determinants of customer satisfaction and loyalty. Customers' satisfaction leads to their loyalty that helps in realising economic success of the firm in terms of profitability, market share and return on investment (Reichheld, 1996; Scheuing, 1995). This paper examines whether service quality influences customers satisfaction that furthers customers' loyalty in Albanian commercial banks. Customers' expectations vary across cultures. Therefore, this study makes an attempt to identify which aspects of service quality of banks are important in determining customers' satisfaction in the Albanian context.

Customers' assessment about the service quality of a firm depends on their service encounter. Service quality can be assessed in terms of interaction with service personnel, technology interface and physical evidence. Traditionally, service quality is the difference between customers' expectation and performance of the service actually delivered. Reliability is the ability of employees to perform the promised service accurately. Responsiveness is the willingness of employees to provide prompt service. Assurance is the knowledge and courtesy of employees and their ability to instil trust and confidence in customers. Empathy is care and individualised attention given to customers. Tangibility includes physical evidence of the service. These dimensions focus on human aspects of service delivery and tangible aspects of the firm.

Customers perceive service on the basis of the attributes of service personnel and those of a service firm. Customer-oriented attributes of service personnel are reliability, responsiveness, assurance and empathy that reflects the soft quality attributes of service providers (Zeithaml & Bitner, 2000). Favourable interpersonal interactions between customers and employees based on these attributes can improve customer satisfaction (Hartline et al., 2000; Parasuraman et al., 1985). Reliability helps employees to consistently respond to customer needs and meet deadlines. Employees with responsiveness and assurance have a greater knowledge about the company's products, services and the needs of customers. Empathy

helps in improving communication process between employees and customers. Due to the psychological and physical closeness that exists between employees and customers in service encounters, employees' attitudes often have a 'spill over' effect on customer satisfaction. If employees experience favourable affective responses in their jobs, their customers are likely to receive positive service experiences.

The attributes of the service firm are called 'hard quality'. These are the technology and tangibles aspects of service quality. Changing nature of service delivery adopting speed, safety and integrity has led to the adoption of technology. Technology invasion in Albanian banks started with the introduction of magnetic ink character reader, currency note counting machine and automation of front-and-back-office operations of the branches. Bank branches are linked to the head office through centralised banking solutions in collaboration with information technology consultants. Information technology improves customer service as it is convenient to access and use (Bitner, et al., 2000). Accurate and timely information aids to managerial decision making for improving operational efficiency of the firm. Banking technologies help banks and customers to keep up-to-date information. When customers use ATMs, banks capture data about their current balance and amounts of withdrawal. Customers also realise the reliability of the computer systems. All these technology-enabled transactions incur benefits to bankers and customers. These transactions require less employee involvement and more banking technologies. Technology-enabled services thus provide constant reliable and quality service.

Tangible cues in the physical environment of a service firm influence behaviour of customers and their future purchase decisions (Burgers et al., 2000). Tangible elements include exterior facility of the firm like parking, interior decor, furniture and the equipment used. Consumers look at these tangible elements and infer about the firm and its service performance. Services are intangible and customers are often present during the process. Therefore, physical environment can have an influence on customer perception of service quality (Baker et al., 2002; Parasuraman et al., 1988). Accordingly, it is proposed that better human, technical and tangible aspects of bank services will increase the satisfaction level of customers.

Customers' satisfaction is a combination of their cognitive and affective response to service encounters. Service quality is the overall evaluation of a firm's service delivery system. Service quality is the managerial delivery of services while satisfaction is customers' experiences with those services. Improved service quality will result in more customer satisfaction. Customers' assessment of the product/service, its demand, alternative services available in the market and information gathered from others help them to evaluate the product/ service in comparison with other products/services. Cognitive evaluation through information search results in customers' affective responses in the form of satisfaction or dissatisfaction. In such an evaluation, if customers' expectations are met with respect to human, technical and tangible aspects of the service, they are more likely to feel satisfied with the product/service.

Therefore, service transactions in Albania are more likely to depend on interpersonal relationships of service personnel with the customers. Services are intangible, inseparable, perishable and heterogeneous. Though service firms adopt standardised and formal procedures in service delivery using technology, healthy interactions between employees and customers remain central because of the nature of services. Therefore, the human aspects of service quality are likely to be more important than the technical and tangible aspects in determining customer satisfaction. We therefore propose the following hypotheses:

H: Human, technical and tangible aspects of service quality will have a positive effect on customer satisfaction.

H: Human aspects of service quality will have greater positive influence on customer satisfaction than the technical and tangible aspects.

Customer loyalty is a deeply held commitment to repurchase a product/ service consistently in the future despite some alternatives available in the market. The cost of attracting new customers is more than the cost of retaining old customers. Loyal customers have an emotional attachment with product/service, and they cannot be attracted by any other brand that offers even a better deal. Customer loyalty consists of attitudinal and behavioural loyalty. Attitudinal loyalty is customers' favourable inclination towards a product/service based on the cumulative experience. If an alternative brand with better attributes and a cheaper price is available in the market, such customers are likely to defect. On the contrary, behavioural loyalty is strong commitment of customers to purchase the product/ service despite the availability of alternatives in the market. It represents the actual purchase behaviour of customers. It is also revealed through the willingness of customers to recommend that product/service to others. Loyal customers desire to continue the relationship with the firm. Repeat purchases and recommendations to other customers are indicators of loyalty.

A customer always prefers to buy a product/service that is safe and involves low risk. Risks involved in a transaction can be financial loss, poor performance of the product/service and loss of time. To avoid risk, customers try to learn more about the product/service through information search. Customers with higher income, education and awareness engage in more information processing prior to purchase of a product/service. Customers satisfied with the products/services are more likely to be loyal to the provider. Customers' satisfaction promotes loyalty in terms of patronage and repeat purchase. In the light of the above, we propose the following hypothesis:

H: Customer satisfaction will increase customer loyalty.

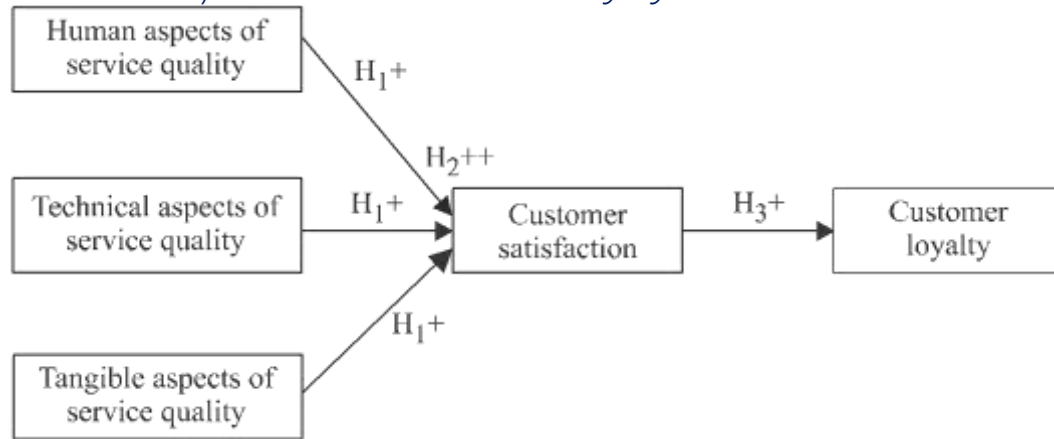


FIGURE 1

The Conceptual Model with Hypothesised Relationships

'+' indicates positive and direct impact.

Method

The hypotheses have been tested by analysing the responses to a questionnaire survey which was carried out on a sample of valued customers of scheduled commercial banks in Tirana.

Sample

25 bank branches were included in the survey. Using the purposive sampling plan, from each branch, a valued customer was surveyed. A valued customer is one who has a certain minimum amount of fixed deposit as specified by the bank. The valued customers who were included in the sample were identified by the branch managers of the respective branches.

The valued customers were given the questionnaires. They were assured complete confidentiality and were requested to return the filled-in questionnaires within a fortnight. The responses to the questionnaires were collected personally. A total of 120 responses were obtained resulting in a response rate of 90 per cent.

The salient demographic features of the customers are summarised in Table 1. The respondents were around 40 years of age, most of them had education up to graduation level and about a quarter had technical education. On the average, they had more than 16 years of transactions with the bank.

TABLE 1

Sample Profile of Customers

Customer

Variable	M	SD
Age (in years)	38.28	9.87
Years of transaction	16.72	2.04
Education in years	15.3	2.42
Technical education (%)	27.9%	
Management education (%)	17.8%	
Others (%)	54.3%	

Measures

Besides the socio-demographic variables on age, years of transaction and years of formal educational including technical, management and other professional education—data on service quality, customer satisfaction and customer loyalty were collected through self-reported questionnaires. The valued customers assessed service quality, their satisfaction with services and loyalty to the banks.

Human Aspects of Service Quality

Eight items depicting human aspects of service were adapted from the scale of Sureshchandar et al. (2002). Combining expectations and perceptions into a single measure, valued customers of the banks reported their perception of human aspects of service quality of banks on a five-point Likert type scale.

Item wordings were modified to suit bank customers. Sample items included were 'Bank employees are polite and friendly', 'Employees of this bank carry out customer transactions confidentially' and 'Employees of this bank provide customers with precise information of services available in the bank'. High total score on the eight items indicated improved human aspects of service quality.

Technical Aspects of Service Quality

Four items were used for this purpose. Valued customers were asked to rate each item, using a five-point scale ranging from 'much worse than I expected' (=1) to 'much better than I expected' (=5). Items included were 'The computerised system in this bank is fast, accurate and efficient', 'Ability to access the computerised service with minimal effort (like ATM, e-banking, and so on)', 'Reliability associated with the technical functioning of the computerised facility' and 'Data are not shared and credit information is secure in computerised transactions'. Higher additive scores on four items indicated improved technical aspects of service quality.

Tangible Aspects of Service Quality

Three items on tangible aspects of service quality were used. Valued customers of the banks were asked to rate each item using a five-point scale similar to the ones described above. The items were: 'The ambient conditions such as temperature, ventilation, noise and odour prevailing in the bank's premises', 'Extent of the physical layout of equipment and other furnishings being comfortable for customers to interact with employees' and 'Visually appealing signs, symbols, advertisement boards, pamphlets and other artefacts in the bank'. Higher score on three items indicated improved tangible aspects of service quality.

Customer Satisfaction

Customer satisfaction was assessed using a three-item scale. Response categories against each item were on a five-point Likert-type scale ranging from 'strongly disagree' (=1) to 'strongly agree' (=5). Items were: 'Overall, I am satisfied with the physical setting of the bank', 'I am satisfied with the banking skills, courtesy and friendliness of bank employees' and 'I am satisfied with the computerised facility of the bank'. Higher additive scores on three items indicated greater customer satisfaction.

Customer Loyalty

This was measured using three items of the scale developed by Zeithaml et al. (1996). The response descriptions against each item were on a 5-point Likert-type scale ranging from 'strongly disagree' (=1) to 'strongly agree' (=5). Items were: 'I consider investing in this bank in future', 'I recommend other people to invest in this bank', and 'I inform my friends of the advantages of investing in this bank'. Higher scores indicated more customer loyalty. The convergent and discriminant validities of the constructs were tested by Confirmatory Factor Analysis (CFA). We chose to eliminate items with factor loading of less than 0.4. The purpose of this stage of the analysis was to identify and eliminate poorly performing items. Only the items of the construct on technical aspects of service quality were eliminated. Along with descriptive statistics, various fit measures of the scales were obtained. These are given in Table 2. Along with validity of items, the inter-item consistency of each construct was reported (Cronbach alpha > .60).

Results

Each bank branch was the unit of analysis in the survey. The valued customers assessed the service quality, their satisfaction with the banks and loyalty to the bank branches. Pearson correlations among the variables were estimated to indicate the hypothesised relationships. Improved human, technical and physical aspects of service quality of the bank branches enhanced customer satisfaction. The more the customers were satisfied with service quality of the bank branches, the more they preferred to stay attached with the same service provider and recommended the service provider to their friends and acquaintances.

Path analysis of structural equation modeling tests the sequential relationships among a series of independent and dependent variables. It tests the complex models in a single analysis. A direct model was tested to see whether human, technical, and tangible aspects of service quality enhanced customer loyalty. The path coefficients from technical and tangible aspects of service quality to customer loyalty were non-significant. Only the path coefficient from human aspects of service quality to customer loyalty was significant suggesting that human aspects of service quality enhanced customer loyalty (see Figure 2).

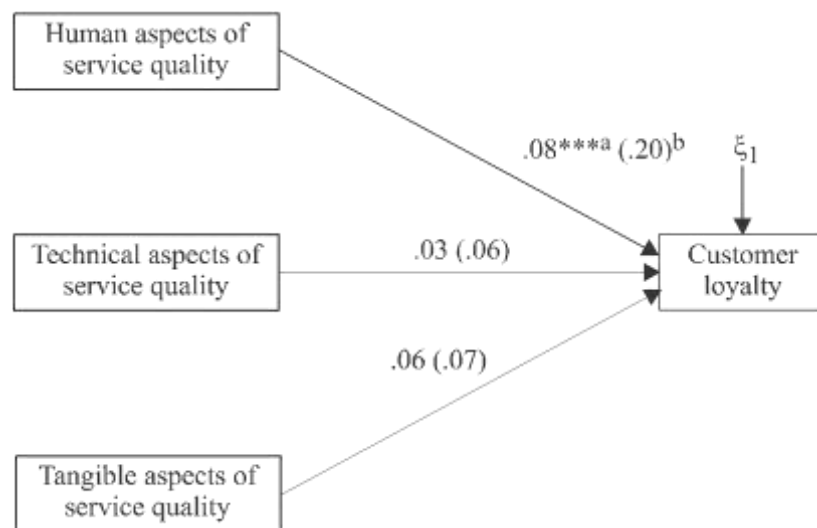


FIGURE 2

The Direct Model with Standardised and Unstandardised Path Coefficients

Notes: *** $p < .001$.

..... → Non-significant. ξ → Error terms.

^a Indicates unstandardised path coefficients

^b Values in parentheses indicate standardised path coefficients

A comparative model depicting the hypothesised relationship was also tested. The path coefficients from human, technical and tangible aspects of service quality directly determined customer satisfaction. With increase in these aspects of service quality in bank branches, the customers felt more satisfied. The results supported the first hypothesis (see Figure 3).

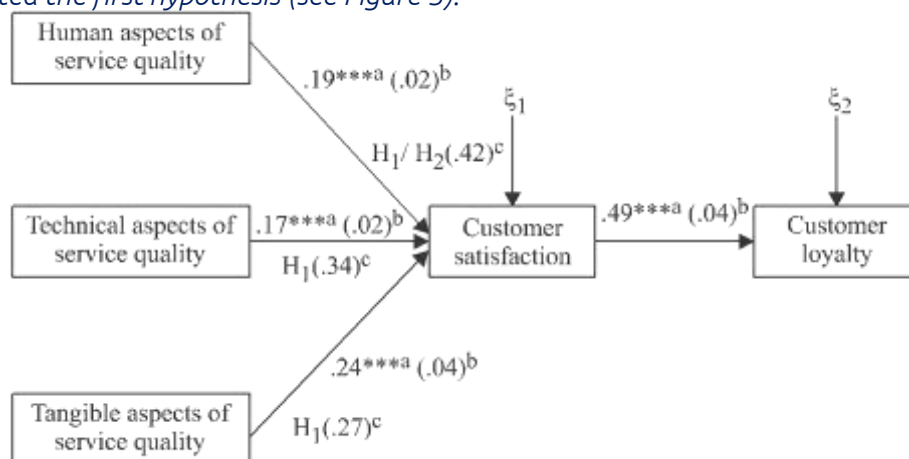


FIGURE 3

The Hypothesised Relationships with Path Coefficients

Notes: *** $p < .001$.

^a Indicates unstandardised path coefficient,

^b value in parentheses indicates its standard error.

^c Values in parentheses indicate standardised path coefficients

ξ → Error terms.

The path coefficients measure the hypothesised effect of one variable on another. When there are direct paths, standardised path coefficients reveal the relative importance of the independent variables (Bollen, 1989; Hair et al., 1998). First, the comparison of standardised path coefficients suggested that human aspects of service quality was the most important indicator of customer satisfaction followed by the technical and tangible aspects of service quality. Second, the coefficient of determination (R^2) of each service quality dimension with customer satisfaction was estimated to further ascertain the effects. The R^2 value of human aspects of service quality (0.27) was again most important followed by technical (0.20) and tangible aspects of service quality (0.18). This ascertained the earlier conclusions and supported the second hypothesis.

In the direct model, only the human aspects of service quality positively related to customer loyalty. But in the hypothesised model, service quality via customer satisfaction determined customer loyalty suggesting that customers' satisfaction promoted their loyalty. Findings thus, supported the last hypothesis.

Discussion

Findings revealed that improved human, technical and tangible aspects of service quality increase customer satisfaction. Human aspects of service quality were more potently found to influence customer satisfaction compared to technical and tangible aspects. Customers' satisfaction enhanced their loyalty to the bank branches.

Better tangible aspects of service quality of the bank branches enhance customers' satisfaction. We clubbed all the environmental cues of the bank branches to specify the tangible aspects of service quality that promoted customer satisfaction.

Nature of service transactions greatly depends on the physical layout of the workplace. Common complaints regarding servicescape include inability to concentrate on work because of noise and distraction, lack of privacy, poorly arranged work spaces, discomfort in temperature, lighting and ventilation. These tangible cues impact on how customers view a service firm. Customers in banks prefer those services which have comfortable and convenient physical evidence, planned layout and well-managed queues. Apart from the physical decor of the workplace, tangible aspects also include display of current guidelines regarding rate of interest in each investment plan, required charges for bank transactions (for example, issue and cancellation of drafts), charges to open an account and other facilities provided by the banks. These advertisements in bank premises draw customers' attention when they enter the bank.

Service quality was measured by the cognitive evaluation of services delivered by the bank employees, technology deployed by the banks and their physical evidence. Customers evaluated whether the services delivered by bank branches were convenient to them. A positive perception of service quality indicated the level of customers' satisfaction.

Albanian customers tended to accept dualism. They accepted modernity and also remained close to traditionality. Higher levels of occupation, education and income tend to reinforce the use of modern technologies and to embrace culturally-valued human relationships. Product attributes, price, speed and accuracy though essentials, cannot in and of themselves, generate competitive advantage for the bank. Products and technology in the banking sector are quickly imitated. Competitive advantage lies in the inimitable and tacit behavioural aspects. No matter how sophisticated the technology deployed, the decor and the amenities available in the bank branches, performance of the banks on the whole is judged on the basis of employee performance. The human aspects are very important drivers of service performance in Albanian banks.

Happy customers are the most cost effective form of advertising. Disappointed customers will not only take away their business but will probably tell several others about their experience.

There are certain limitations of the study that must be acknowledged. Only valued customers were studied. Therefore, caution must be exercised in generalising the findings. Notwithstanding the limitations, this study provides clear evidence in the Albanian context that human factors in service design and delivery are required to be given more importance because these are the main drivers of customer satisfaction. But, technical and tangible aspects cannot be neglected because they also bring satisfaction. Customer satisfaction promotes their loyalty. Further studies are needed to examine the successive direct link between service quality, customer satisfaction, customer loyalty and market performance of the bank branches in terms of total deposits and net profit.

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Abstract

By now, the fastest growing group of global investors has become specialized state institutions – sovereign funds. An analysis of the scale and nature of their activities shows that they make a significant, although not always adequately assessed, contribution to ensuring the strength of the world financial and economic architecture and the stability of the global economy, and in the long term – to the formation of an international system of sustainable development.

Keywords: global economy, sustainable development, investments, sovereign wealth funds, global assets.

Introduction

As history shows, in difficult periods, the state's participation in economic life invariably increases. Today, there are a number of fundamental macro trends indicating that the world has entered an extremely dangerous situation of the so-called polycrisis. These include the increasingly obvious dysfunction of the American-centric model of globalization, the inexorable formation of new independent centers of international power, and an extremely high level of geopolitical turbulence. The global financial and economic sphere continues to function due to large-scale debt pumping, which determines its internal fragility. This is why the formation of an effective system of sustainable development, proclaimed in the UN SDG program, is so relevant. To overcome the current state of instability, the global economy needs to find and attract stable and reliable sources of long-term capital instead of borrowed funds. Such capital is available to institutional investors, primarily sovereign wealth funds and pension funds. As for the former, in recent years they have significantly diversified the goals, directions and objects of their activities. The changes are so serious that the term "sovereign wealth funds 3.0" has entered the analytical discourse. The activities of most state investors tend to shift their focus from external to internal, which does not allow capital to completely dissolve in the global financial system. Geographical investment priorities are changing: if initially the focus of state funds was on the most developed economies of the world, now it is beginning to shift towards the global majority, which in the long term should contribute to a more even distribution of productive forces and wealth and, as a result, increase the sustainability of the global economy and improve the quality of its dynamics. "Sovereign wealth funds 3.0" are also characterized by new funding methods, when it is provided by granting the fund the right to use cash flows generated by the state assets entrusted to it. Some sovereign wealth funds, having reached a certain level of maturity, enter the global private capital market, partially replenishing the deficit of reliable debt instruments observed there. Due to the specifics of financing and long-term planning horizon, large sovereign wealth funds are able to painlessly absorb temporary financial losses, compensating them in the long term. This allows them to implement the most important long-term projects. Thus, state investment funds make a significant, although not always

visible and assessed contribution to the stabilization of the financial market and the global economy as a whole.

Discussion

The problem of state involvement in the functioning of the international financial and investment system has traditionally been outside the mainstream economic concepts and, as a rule, is reduced to private aspects of the regulatory practice of governments. Similarly, the activities of state investment institutions, in particular national wealth funds, or sovereign wealth funds, which theoretically belong to the category of institutional investors, have also often remained on the periphery of the attention of market analysts and academic scientists. By now, the situation has changed dramatically.

A LITTLE HISTORY

It is generally believed that the first significant organization that falls under the definition of a sovereign fund was the Kuwait Investment Authority, created in 1953. Thanks to the capital accumulated in the fund, the emirate was able to finally free itself from British rule in 1958. By the turn of the millennium, a fairly representative group of so-called raw material funds had formed in the world, operating with excess revenues from the export of oil, gas, various ores and other minerals.

Then - mainly due to the rapid economic development of China and the countries of Southeast Asia - non-raw material funds began to appear, financed by income from the supply of manufactured products to the external market. This group is not only not inferior to the first in size and influence on the global investment sphere, but also surpasses it.

The main sign of recent times has been the creation in an increasing number of countries of strategic state funds, which are charged with the function of institutions for the development of the national economy. Their capital base is often based not on foreign trade income, but on cash flows generated by state-owned enterprises of the respective country, which are systemically important in the banking and insurance sectors, energy, transport and other infrastructure, and telecommunications.

For the first time, sovereign wealth funds showed themselves as an element of the world economic system, significantly influencing its functioning, during the oil crisis of the early 1970s and the resulting explosion in world hydrocarbon prices. At that time, large oil-producing states, primarily the monarchies of the Persian Gulf, received huge export revenues that were impossible to "digest" within their own small, monocultural economies. The authorities of exporting countries began to create sovereign wealth funds en masse in order to find a use for the unexpectedly formed financial surplus by transferring it to the external circuit.

The appearance on the world economic scene of a group of highly capitalized state investment organizations was of fundamental importance for the entire world economy of that time. An effective mechanism for returning surplus income from raw material exporting countries back to the most developed countries – the USA, Western Europe and Japan, which acted as the three main centers of financial, economic and political power in the world – was formed and put into operation. In economic history, the resulting situation is known as petrodollar recycling.

In fact, this was the first episode in the post-World War II period when sovereign wealth funds played a significant role in restoring the stability and balance of the global economy, ensuring the introduction of long-overdue changes to its structure and macro proportions. It should be noted that at that time even large sovereign wealth funds were content with the position of minority investors in American and European banks/corporations, without claiming a place on their boards of directors or a voice in making strategic decisions.

The global financial crisis of 2008-2009 gave impetus to a rapid expansion of the scale and areas of activity of sovereign wealth funds, and the growth of their influence on the distribution of cross-border investment flows. Operating in their inherent countercyclical paradigm, sovereign wealth funds contributed significantly to the mitigation of the crisis phenomena in global finances during that period, investing multi-billion dollar sums in systemically important American and European banks that were on the verge of bankruptcy and in dire need of liquidity. This can be considered the next episode in the development of sovereign wealth funds as a mechanism for stopping major "market failures" on a global scale and ensuring the stability of the global economy.

Given the diversity and severity of the problems that the world is facing in the third decade of the 21st century, there is reason to believe that there will be a further increase in the role of government investments in the system of international financial and investment relations. Given the existing historical experience, it is logical to assume that such investments, carried out mainly through sovereign wealth funds, will be able to make a significant contribution to solving the problems of sustainable global development in the long term.

CURRENT MACROECONOMIC AND GEOPOLITICAL BACKGROUND

The main characteristics of the current situation, which is often characterized as a “poly crisis”, are the growing dysfunctionality of the American-centric structure of the world that emerged during the period of super-globalization, its fragmentation under the influence of a cascade of macroeconomic and geopolitical shocks, and the formation of new independent centers of international power. The listed macrorends objectively determine the instability of the global situation.

Assessing the prospects and risks of global development, the American financial guru N. Roubini, known for the accuracy of his assessments and forecasts, states that “the world is increasingly polarized - it is divided into two camps in the most significant areas, such as finance, monetary and currency policy, trade, investment and technology”. Analysts from the World Economic Forum (WEF) think similarly, emphasizing that “the continuing political, military and economic dominance of the Global North is causing increasing discontent in the Global South, which bears the main burden of the consequences of climate change, pandemic crises and geo-economic contradictions”. It is expected that anti-Western sentiment will only increase in the coming years, and that “in view of the deep divisions in the international arena, efforts to coordinate the isolation of rogue states will prove increasingly futile”.

Chief economists of leading international corporations, whose opinions were presented at the last WEF forum in Davos (January 2024), unanimously agreed that “the restructuring of the global economy, driven by geoeconomic factors, has become evident in recent years”. It is not surprising that pessimism prevails in the assessments and forecasts of international organizations, investment banks and various analytical centers (see, for example).

The UN report “World Economic Situation and Prospects 2024” estimates global GDP growth of 2.4% (preliminary data for 2023 - 2.7%) [source 5]. Other predictions vary around this level: IMF – 2.9%, OECD – 2.7, Reuters – 2.6, Citibank – 1.9%¹. It should be mentioned that, according to the standards adopted by the IMF, the threshold for the onset of a global recession is considered to be 2.5%. In other words, the world is balancing on the brink of a general economic downturn, and in a number of European countries and in Japan, quarterly statistics are already recording a transition to a technical recession.

The situation is aggravated by the aggravation of geopolitical turbulence associated with the Ukrainian and Taiwanese problems. In the first case, things have already reached an open armed conflict, into the maelstrom of which dozens of countries have been drawn, and the upward movement up the escalation ladder continues. The contradictions around Taiwan have so far been pushed into the background of world politics, although their conflict potential in terms of consequences for the world economy may be even more powerful. Geopolitical confrontation has become an extremely serious factor in the destabilization of the global economy, preventing it from entering a sustainable upward trajectory. This is unanimously pointed out by experts in finance and investment, emphasizing the urgent need for extraordinary conceptual approaches to the functioning of the global economy and radical practical measures to form a new paradigm of its development that is adequate to the existing challenges.

Obviously, to overcome financial and economic uncertainty and, in particular, progress in achieving the UN-proclaimed sustainable development goals until 2030, a powerful revitalization of global investment activity is necessary. Presenting the above-mentioned report on the prospects for 2024, UN Secretary-General A. Guterres once again emphasized that only “with the help of large-scale and targeted investments will we be able to ensure sustainable development and climate action to direct the global economy along the path of stronger growth in the interests of all people.” the volume of costs required for this is estimated at at least \$500 billion annually. The problem is where to find a source of investment of this scale.

Considering the current situation in the global economy, it should be recognized that the apocalyptic predictions of a total collapse have not yet come true. World markets are adapting to harsh exogenous operating conditions, having withstood the years of the COVID-19 pandemic and the shock of 2022, and showing some growth in 2023. From the point of view of the characteristics and trends of international investment activity, data on the dynamics of the profitability of the main classes (categories) of global assets are of immediate interest (Table 1).

Table 1. Dynamics of profitability of the main classes of investment assets, 2020–2023, %

Asset class	2020	2021	2022	2023	Index
Fixed income securities (fixed income)	+10,2	-0,8	-14,8	+8,4	S&P500B
Shares of companies listed on stock exchanges (public equities)	+13,1	+19,3	-18,7	+20,7	S&PGL1200
Real estate	-5,2	+2,5	-28,4	+8,3	S&P500RE
Infrastructure objects (infrastructure)	-8,7	+8,4	-3,7	+2,5	S&PGLInfra
Private equity, or assets not listed on stock exchanges (private equity)	+0,6	+37,8	-31,7	+33,6	S&PLPE
Hedge funds	+4,9	+9,6	-3,6	+5,9	EH HFI

The data presented in the table clearly demonstrate the fundamental fragility of the global financial and investment sphere. Some improvement in asset profitability indicators is transient, it occurs against the background of previous failures and, at best, only partially compensates for them. Deepthe reason, it seems, is that the world economic system continues to function mainly due to massive debt pumping, the infusion of new and new portions of unsecured private and public debts into it. To reduce volatility and increase the stability of the global economy, sources of reliable long-term capital are needed.

SOVEREIGN WEALTH FUNDS: RISING DYNAMICS

As is known, such capital is held by institutional investors, primarily sovereign and pension funds (see, for example: Many of them have long been operating in the global market and have become its full-fledged and influential participants. At the same time, the former clearly belong to the category of state investment organizations. As for the latter, there are many institutions among them that have the status of private. However, since in most countries all pension funds operate within the framework of strict legislation, they are usually classified as public/government finance. Pension funds remain the largest group of holders of global assets, but now, due to the rapid aging of the population of the most economically developed countries, they are faced with enormous difficulties in maintaining the necessary ratio between income and expenses.

Table 2. Investment activity of major global asset holders, annual value and number of new deals, 2018–2023.

	<i>Sovereign Wealth Funds, billion dollars</i>	<i>Pension funds, billion dollars</i>	<i>total number of new transactions</i>
2018	66.4	92.5	612
2019	95.1	84.8	526
2020	89.1	83.2	552
2021	111.1	119.7	892
2022	155.8	108.8	749
2023	124.8	80.4	592

Let us consider the current data on the annual operations of the main holders of global assets - sovereign and pension funds - in recent years (Table 2). it is clearly visible that the investment activity of the former is generally on an upward trend; according to current indicators, they have already overtaken pension funds. The reason for this, as it seems, is related to the differences in the status and the peculiarities of the functioning of both.

Pension funds have a maximally conservative investment strategy. They are contraindicated in any significant market risks and losses, since it is necessary to generate a cash flow annually for uninterrupted payments to a multi-million contingent of individual clients. Sovereign funds, according to the fundamental feature of their status, on the contrary, are not burdened with such obligations. Being functionally "sharpened" for long-term financial results for future generations of citizens of the country and directly responsible for them only to the governments that created them, this category of state investors, as practice shows, feels quite good in an environment of global instability. With a mandate to manage the funds entrusted to them quite freely, the largest sovereign wealth funds with accumulated experience in market operations have significantly diversified the goals, directions and objects of their activities in recent years. Authoritative foreign experts claim that their *modus operandi* is now fundamentally different from what it was just a few decades ago, and have even introduced the term "sovereign funds 3.0" into analytical circulation.

Interestingly, recently there has been a tendency to establish interaction between sovereign and pension funds. Joint investment projects make it possible to increase the total volume of invested funds while reducing risks for each of the participants, as well as to obtain emergent effects by combining the partners' existing competencies and experience. In 2023, a similar approach was actively practiced by the Persian Gulf states and Singapore. The total value of joint investments of sovereign and pension funds was estimated at over \$ 30 billion.

An integral indicator of the global economic positions of different investor groups is the value of assets under management (AuM). In order to present the picture as clearly as possible, it makes sense to compare the dynamics of AuM of sovereign funds and their main counterparts in the category of institutional investors – pension funds. Moreover, recently foreign analytical centers have suggested considering the investment potential of governments in a broader interpretation, taking into account also the funds at the disposal of central banks (gold and foreign exchange reserves).

Table 3 provides the relevant data. It can be seen that the positions of the group of sovereign wealth funds are gradually but steadily strengthening, while pension funds and central banks have reached a plateau and are actually losing ground.

Table 3. Assets under management (AuM) of sovereign wealth funds, pension funds, and central banks, 2018–2023, \$ trillion.

	<i>Sovereign Wealth Funds</i>	<i>Pension funds</i>	<i>Sovereign and pension funds</i>	<i>Central banks</i>	<i>Total</i>
2018	7.4	17.9	25.3	13.4	38.7
2019	8.4	19.7	28.1	14.0	42.0
2020	9.3	21.3	30.6	15.1	45.7
2021	10.9	23.8	34.7	16.2	50.8
2022	10.5	22.3	32.8	15.5	48.3
2023	11.2	23.1	33.3	15.4	49.7

The calculations of the London-based Thinking Ahead Institute (TAI) lead to the same conclusion. According to them, in 2022, among the 100 largest owners of global assets, the share of sovereign funds reached a record high for the entire history of observations (in absolute terms - \$ 9.1 trillion). If in 2017, in the TAI-100 list, the ratio by AuM volume between pension and sovereign funds was 60.8 versus 32% (the rest was accounted for by management companies), now the situation is different: for the former, the figure dropped to 52.8%, while sovereign funds rose to 38.9% (Table 4).

Table 4. Top 100 Global Asset Holders, Shares of Total, 2017–2022, %

	2017	2018	2019	2020	2021	2022
<i>Sovereign Wealth Funds</i>	32.0	33.5	32.1	34.5	36.7	38.9
<i>Pension funds</i>	60.8	59.1	60.8	58.4	55.9	52.8
<i>Management companies</i>	7.2	7.4	7.1	7.1	7.4	8.3

In other words, there is a tendency towards a redistribution of power in the global financial and investment system. British experts explain this process by the fact that “due to higher investment efficiency in conditions of strong market turbulence, state funds increased their assets faster than other investor groups”.

Analysts from the world's largest private investment corporation, BlackRock, also point to this circumstance, although from a slightly different angle: “in the current macro regime, banks are experiencing major problems with funding. Investment funds are partially filling the vacuum that has arisen” [source 14, p. 7]. A similar opinion is held by specialists from another international giant of the private investment business, State Street, as well as the British Official Monetary and Financial Institutions Forum (OMFIF).

In general, the statistical data considered support the hypothesis of a latent increase in the global economic role of state investors. First of all, we are talking about their most efficient and active part – sovereign funds.

CONCEPTUAL ASPECTS OF THE TOPIC

Before turning to the specific signatures of “sovereign funds 3.0”, let us dwell on some conceptual aspects of the subject of state investments. The UN, OECD, and other international organizations are dealing with the relevant issues, although mostly sporadically in connection with some significant events. However, private sector organizations are increasingly actively and in-depth engaged in it – global consulting firms with a wide profile (for example, PwC), leading investment, pension and insurance companies (Blackrock, State Street, Invesco). Specialized analytical centers are appearing (Global SWF, SWF Institute, OMFIF, Thinking Ahead Institute). Their interest is not so much academic as purely pragmatic.

The fundamental reason is the shortage of capital in the world capable of ensuring sustainable economic development both at the global and national levels. Market sources are unstable and close to exhaustion. Bringing debt mechanisms, both private and public, to their maximum capacity only allows us to postpone the solution of problems. Many analysts rightly point out the risk of a sudden and uncontrolled collapse of the entire existing global economic architecture.

That is why private financial and investment, consulting and management companies, as well as expert organizations, are now paying increasingly close attention to the potential of state investment institutions. Due to the specifics of funding and a long-term planning horizon, large sovereign funds are effectively immune to market shocks and imbalances. The stability of the capital base allows temporary financial losses to be absorbed painlessly enough, and then more than compensated for. The main thing is the ability to make large-scale investments in the most important long-term projects, the prospects and terms of return on which are not obvious. Such “patient” capital is now in demand more than ever in light of the tasks of restoring and maintaining the stability of the global economy.

The importance attached to sovereign wealth funds by the Western investment community is eloquently illustrated by the headlines of recent reports, articles and reviews: “State investors grow stronger through crises”, “the most influential capital on the planet”, “Sovereign funds own a record share of

global assets”, “The revolution in asset and wealth management 2023: a new context” [source 16], “Investing in transit”.

There is a fundamental change in narratives and conceptual approaches compared to those that were characteristic of the global financial crisis of 2008–2009 and the subsequent decade. At that time, most Western studies, on the one hand, noted the growth of state investment, and on the other, the refrain was that they were an alien and undesirable element in the global market system, since, as US Secretary of the Treasury L. Summers put it, “they violate the logic of capitalism”. Nowadays, such narratives are not in fashion. It should be noted that the analysis of sovereign wealth funds has its own specifics. It stems primarily from the lack of generally accepted statistics - similar to those that exist, for example, in relation to foreign direct investment, where the situation has been monitored for many years by UNCTAD. In the case of state investment funds, there is a diversity and often inconsistency of data provided in various publications. Moreover, the growing interest in this issue leads to the fact that there are more and more different types of surveys and, accordingly, statistical and factual information entering scientific and analytical circulation every year, but it is not at all standardized. The discrepancies in published data can be quite striking even in terms of the most basic indicators.

Everything depends on the objectives of a particular study, the chosen angle, the basic definitions and even the preferences of experts. In particular, of primary importance is which financial organizations are included in the group of investors under consideration, which, accordingly, determines its numerical composition.

However, such a situation does not mean that analysis is fundamentally impossible, since the integrated performance of the entire group is almost entirely determined by a narrow circle of its largest members included in all lists and ratings. Thus, according to one recent study, in 2023, the top ten sovereign funds accounted for approximately 80% of the total AuM of the group. If we take into account another 10-15 similar state organizations adjacent to them, we can assume that the leaders determine all the main parameters of the functioning of the entire group of sovereign funds as a whole. This allows us to analyze and give it general characteristics, despite its inherent heterogeneity.

Current indicators characterizing modern pr The profile of sovereign wealth funds as a class of global investors is presented on the website of the International Forum of Sovereign Funds (IFSFWF):– distribution by original source of funding: 40.4% – commodities, 59.6% – non-commodities;– by main functionality: savings – 36.3%, hybrid (stabilization) – 32.6, strategic – 31.1%;– ratio of asset classes used: 30% – stocks, 28 – bonds and other fixed-income instruments, 23 – illiquid alternative assets, 10 – strategic investments, 5 – cash, 4% – liquid alternative assets.

SOVEREIGN WEALTH FUNDS 3.0: KEY SIGNATURES

***State funds as development institutions.** The implementation of traditional stabilization and savings functions by sovereign funds was based on the withdrawal of part of public finances to the external circuit. Investments were directed mainly to the United States and the EU countries. For national governments, the goal was to preserve and increase excess budget revenues. At the same time, a significant global economic effect arose: cross-border recirculation of huge capital served as a factor in the accelerated globalization of the world economy.*

In the third decade of the 21st century, much has changed significantly. The “coronavirus shock” of 2020, and then the explosion of geopolitical confrontation led to the breakdown of production and distribution chains that had developed during the period of super-globalization and the financial flow schemes that ensured them. In addition, in the context of fragmentation and regionalization of the world economy, the risks of foreign investment have sharply increased, and its opportunities and attractiveness have decreased due to the growth of politically motivated restrictions. The unprecedented politically motivated sanctions pressure of the collective West on Russia, including freezing and attempts to seize its foreign assets, both public and private, is an extremely alarming signal for the countries of the Global South. It has become obvious that a similar approach can be applied to anyone who tries to challenge the hegemony of the United States in one way or another and pursue a course towards more independent and harmonious development “in all directions”.

In such conditions, many states have begun to give priority to strategic investments in their own economies in order to solve problem areas, primarily in infrastructure and the real sector. Such tasks are primarily assigned to sovereign funds. Current statistics show a steady increase in the share of intra-national projects in their operations. It is estimated that by the end of 2023, domestic investments accounted for \$4.6 trillion, or 40%, of the total AuM of the entire group of sovereign wealth funds – \$11.2 trillion (Table 5).

Currently, only four of the largest sovereign wealth funds are entirely focused on foreign operations. For example, in Norway, the Government Pension Fund – Global (GPFG) invests (as reflected in the fund's name) exclusively in foreign assets, while the much smaller state fund Folketrygdfondet is responsible for domestic investments. In the UAE, ADIA also operates on the external circuit, while domestic investments are handled by the state holding company ADQ 4 and, in part, Mubadala. In Singapore, GIC is focused on foreign operations so as not to create competition for the country's second sovereign wealth fund, Temasek, which, on the contrary, is mainly engaged in domestic projects. In the Republic of Korea, the sovereign wealth fund KIC is required to concentrate on external operations, while half of the investment portfolio of the state pension fund National Pension System consists of domestic assets.

Table 5. Top 25 global sovereign wealth funds: ratio of foreign to domestic operations, 2023

	Fund	AuM total, billion USD	Foreign		Internal	
			billion dollars	share, %	billion dollars	share, %
1	Government Pension Fund Global, GPFG (Norway)	1379	1379	100	0	0
2	Abu Dhabi Investment Authority, ADIA (Abu Dhabi/UAE)	984	984	100	0	0
3	Government Investment Corporation, GIC (Singapore)	769	769	100	0	0
4	KIA (Kuwait)	801	721	90	80	10
5	China Investment Corporation, CIC (China)	1240	413	33	827	67
6	QIA (Qatar)	429	304	71	125	29
7	State Authority of Foreign Exchange Investment Company, SAFE IC (Hong Kong/PRC)	1082	281	26	801	74
8	Public Investment Fund, PIF (Saudi Arabia)	700	217	31	483	69
9	Mubadala (UAE)	276	213	77	63	23
10	Temasek (Singapore)	288	210	73	78	27
11	Korea Investment Corporation, KIC (Republic of Korea)	181	181	100	0	0
12	Investment Corporation of Dubai, ICD (Dubai)	341	174	51	167	49
13	Future Fund (Australia)	164	131	80	33	20
14	National Fund – National Investment Corporation, NF-NIC (Kazakhstan)	61	58	95	3	5
15	Libia Investment Authority, LIA (Libya)	68	44	65	24	35
16	State Oil Fund of Azerbaijan, SOFAZ (Azerbaijan)	56	42	75	14	25
17	Abu Dhabi Developmental Holding Company, ADQ (Abu Dhabi)	199	40	20	155	80
18	Brunei Investment Authority, BIA (Brunei)	50	40	80	10	20
19	Queensland Investment Corporation, QIC (Queensland/Australia)	68	39	57	29	43
20	Emirates Investment Authority, EIA (UAE)	91	36	40	55	60
21	NZ Superannuation Fund (New Zealand)	41	36	87	5	13
22	Dubai World (Dubai)	47	31	67	16	33
23	National Welfare Fund, NWF (RF)	145	25	17	120	83
24	Alaska Permanent Fund, PFC (Alaska/USA)	74	20	27	80	73
25	Oman Investment Authority, OIA (oman)	47	18	49	29	61
	TOTAL	11164	6647	4517	60	40

The shift in emphasis in the relationship between international and domestic projects in the activities of state investors means that their capital does not “dissolve” in the incredibly swollen global financial sphere, but is directed into assets that ensure the modernization and diversification of the economies of formerly peripheral countries that are striving to extricate themselves from the shackles of neocolonial dependence and independently determine the paths and models of their development. In this way, the foundations are laid for leveling the enormous disproportions that exist in the structure of the global economy, which are among the root causes of its current imbalance and conflict.

Geographical shifts in government investment flows. Another characteristic feature of “sovereign funds 3.0” is the change in the geographical priorities of their foreign operations in terms of the world's main macro-regions. Traditionally, the focus of sovereign wealth funds' investments was on the most developed economies in the world. Now, the counterbalance is a conglomerate of developing countries, referred to as the Global South or the global majority.

International organizations and numerous experts agree that continental Europe, Great Britain and Japan have effectively entered stagnation. The United States is trying to achieve a “soft landing” by ramping up the government debt machine to maximum speed, but even many Western experts doubt that this will be successful. The centers of real economic growth in 2024 and beyond can only be found in the vast expanses of the Global South. This is where the macro-regions and states that will be the drivers of global growth and the most attractive places for investment are located.

Until recently, China undoubtedly played this role. However, by all indications, the period of rapid export-oriented development has come to an end there. Due to global stagnation and increasing political restrictions from the West, demand for Chinese goods is declining. In addition, some capital outflow from China has begun, and risks of debt and currency crises are visible. According to Chinese data, GDP growth in 2023 was 5%. Expert growth forecasts for 2024 vary between 4.4–4.7%, with the long-term trend expected to reach 4%].

The main hopes are now pinned on other large Asian economies, primarily India, which has already overtaken China in population and is demonstrating more attractive GDP dynamics (at least 6% is predicted for 2024). In addition, the international investment community considers other large economies of the developing world to be promising, in particular Brazil, as well as Indonesia, Vietnam, the Philippines, and the East Asian region as a whole.

Accordingly, many sovereign funds are also reorienting their investments. For example, funds from Middle Eastern countries are actively investing in various projects being implemented in India as part of ambitious national development programs. Indian “green” energy projects look especially attractive. Since the country does not have sufficient internal fossil fuel resources for intensive economic development, its authorities are actively stimulating the development of “green” energy. By 2030, the central government plans to create 450 GW of new generating capacity in this sector, and does not hide the fact that it is mainly counting on attracting “patient” capital to the country, that is, investments from foreign sovereign funds.

A number of such deals have already been completed. The Emirates ADIA fund and Singapore’s GIC jointly spent \$0.7 billion to recapitalize one of India’s leading producers of “green” electricity, Greenko. Qatar’s QIA fund acquired 3% of Adani Energy, the UAE’s Mubadala invested in Tata Power, and ADIA, together with the Canadian pension fund CPP, invested in ReNew Power. GIC actively supports projects in the field of “green” hydrogen, in particular, it participated in the financing of the construction of a large plant in India for the production of “green” ammonia and, together with partners from Australia, in a number of other similar projects.

At the same time, sovereign funds do not lose interest in China. In addition to general considerations of diversification, they are looking for access to advanced technologies, which are increasingly difficult to obtain from the United States, Europe and Japan due to the tightening of regulatory policies in this area there. In addition, Middle Eastern states consider it expedient to deepen relations with Beijing in light of the fact that China is a major consumer of their oil. For its part, Beijing, among other things, is interested in promoting the yuan as a means of payment in oil trade instead of US dollars and very favorably views the influx of Arab investments.

Recently, KIA, QIA, Mubadala, ADIA and other Persian Gulf sovereign wealth funds have been actively acquiring shares of Chinese companies on the Shanghai Stock Exchange. For example, ADIA invested in the energy company China Shenhua Energy and the mining company Zijin Mining (the latter received a license for a lithium mine in Congo as part of the UN energy transition programs). Investments in China are attractive and risky. The value of transactions and investments in China by Middle Eastern sovereign wealth funds in the first 10 months of 2023 alone amounted to \$2.6 billion, which meant a more than 10-fold increase compared to 2022 (\$246 million).

In general, modern geographic preferences for investment activities of sovereign wealth funds mean a move towards a more even distribution of productive forces and wealth across the global space. Ultimately, this will contribute to increasing the stability of the global economy and improving the quality of its dynamics.

Features of funding. *“Sovereign Wealth Funds 3.0” are also characterized by new funding methods. Such organizations are increasingly being created by countries that are not among the world’s major suppliers of raw materials or non-raw materials and, accordingly, do not have an excess of free foreign currency. In such a situation, the authorized capital of the investment fund is formed by transferring a set of state-owned companies and enterprises (“national champions”) to it for management. In other words, funding is provided not by transferring “live” money, but by granting the fund the right to use cash flows generated by the state assets entrusted to it.*

A typical example is Turkey, chronically burdened with serious macroeconomic imbalances, but, despite this, striving to pursue an active industrial and investment policy. Established in 2016 on the initiative of R. T. Erdogan (then Prime Minister), the Turkish Wealth Fund (Türkiye Varlık Fonu) is officially described in its statutory documents as an “asset-based development fund”.

The size of the Turkish sovereign wealth fund’s AUM is \$33 billion; it manages the country’s largest state-owned banks: Ziraat Bank (100% of the authorized capital), HalkBank (fund’s share – 91.5%),

Vakıfbank (fund's share – 74.8%), Istanbul Stock Exchange (Borsa Istanbul, fund's share – 80.6%), state-owned insurance companies Türkiye Sigorta (fund's share – 74.8%) and Türkiye Hayat Emeklilik (fund's share – 74.8%). In general, financial sector organizations provide 71.85% of the authorized capital of the Turkish state fund 5. The rest is accounted for by leading national companies with state participation, primarily in key sectors of the economy: energy (Botaş, Türkiye Petrolleri, TWF Energy, TWF Refinery and Petrochemical - 12.04%), transport and logistics (Türk Hava Yolları, PTT, İzmir Alsancak Limanı - 9.72%), telecommunications (Turkcell, Türksat, Türk Telekom - 4.36%). The importance attached to the fund is evidenced by the fact that its president is R. T. Erdogan himself.

Private capital market operations. Having reached a certain level of maturity, some sovereign funds enter the global private capital market, borrowing funds there to expand the scale of their investment operations. In 2020, at least 30 sovereign funds issued debt securities or were authorized to do so.

The main Chinese investment fund, China Investment Corporation (CIC), stands out, having issued debt securities worth more than \$70 billion on the global market in the period 2015–2020 alone. Thanks to the use of all possible funding sources, CIC, which was founded in 2007, has grown rapidly and confidently holds second place in the group in terms of total AuM (\$1.24 trillion according to the 2022 annual report) after the Norwegian GPIF.

Similarly, over the same period, Singapore's Temasek has expanded its capital base by \$25 billion and continues to do so. In January 2024, it announced the issuance of another package of its short-term (up to 364 days) euro-denominated bonds under the ECP (European Commercial Papers) program launched in 2011, which provides for the possibility of borrowing up to €5 billion from the private capital market [source 19]. In addition, the fund has programs for issuing medium-term bonds denominated in other currencies: Guaranteed Global Medium Term Notes for a total of \$25 billion and MTN for a total of SGD 5 billion [source 20]. Temasek's commercial papers are in good demand, given the highest reliability indicators for all ratings (Aaa - Moody's Investor Service, AAA - S&P Global Ratings).

The Saudi PIF, Mubadala (UAE), Khazanah Nasional (Malaysia), Mumtalakat (Bahrain), Samruk-Kazyna (Kazakhstan), as well as Qatari, Omani, Dubai, and Turkish funds are entering the global private capital market. It is characteristic that they increasingly carry out their borrowings without using the US dollar and relying on the principles of Islamic banking *sukuk*, which involves, instead of paying interest (since usury is prohibited by the Prophet Muhammad), participation in the division of expected investment income.

A striking example is Saudi Arabia. Its sovereign fund constantly needs additional capital to implement the ambitious economic development programs assigned to it in the Kingdom. In particular, at the end of 2023, PIF attracted \$3.5 billion from the money market by selling a package of 5- and 10-year Islamic bonds. In terms of yield, they compete with US Treasury bonds: the Saudis offered a premium of 120 basis points for the former, and 140 for the latter.

From a global economic point of view, it is important that by entering the global borrowing market, sovereign funds are partly making up for the deficit of reliable debt instruments observed there. This is acknowledged by foreign experts. In this way, state funds are making their contribution to the stabilization and deepening of the global financial market, and, more broadly, to the creation of an international system of sustainable development.

Conclusion

As history shows, in times of crisis, the state invariably becomes more active in economic life. Now, in the context of the obvious insufficiency of private capital resources to overcome the depressive manifestations observed in most parts of the world, the importance of financial resources at the disposal of state bodies at various levels - national, regional, intergovernmental - is increasing. In fact, they are assigned a central role in implementing an investment breakthrough into a new, more stable global economy of the future.

The number of organizations belonging to the category of state investors, primarily sovereign funds, is steadily growing. They are becoming more diverse in the volume of funds at their disposal, sources of financing, statutory tasks, and geography of operations. There is a fundamental shift in the paradigm of state investments, reflecting the need to adapt to new global economic and geopolitical realities. This is clearly seen in the change in the ratio of the scale of foreign and domestic operations, as well as the distribution of investments across macroregions of the world. Thus, through the activities of state funds, among other things, the general tendency towards the formation of a polycentric structure of world economic relations is being realized, which will be characterized by greater stability than the current one, based on the American hegemony that is dying out.

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PROBLEMS AND SOLUTIONS OF THE DEVELOPMENT OF THE TRANSPORT-LOGISTICS SYSTEM IN THE MODERN PERIOD

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Abstract

The article examines the problems and solutions of the development of the transport-logistics system in modern times. International experience in the field of transport-logistics is considered and taken into account. Transport-logistics models of a number of countries of the world are analyzed and generalized. Opportunities for improving and developing the existing mechanisms of the transport-logistics system are considered. Development problems of the transport-logistics system of Azerbaijan are explained and priority areas of action are given. Transport-logistics opportunities in post-conflict areas are assessed. Prospects of the Zangezur global transport corridor are considered. Proposals are made on ways to solve the problems of efficient use of global transport corridors passing through Azerbaijan.

Keywords: Azerbaijan, global challenges, modern realities, international experience, transport-logistics system, development problems of the transport-logistics system, development prospects of the transport-logistics system.

Transport and logistics activities in Azerbaijan are important in terms of the development of the non-oil and gas sector and becoming one of the main engines of economic progress. Improving the organization and development of transport and logistics activities in the fields of production, transportation, distribution and consumption of products contributes to achieving the country's economic well-being. The issues of organizing and improving transport and logistics activities are of great importance for any enterprise and the country as a whole. For modern enterprises operating in conditions of intense competition, it is important to improve their supply chains. Consumers' demands for services are increasing day by day, and in order to meet these consumer demands, countries and their companies must adopt progressive foreign experience in order to constantly develop transport and logistics activities and apply new technologies. Currently, the leading countries in the transport and logistics industry in the world are the USA, Germany, Italy, Great Britain, France, China and others. There is a trend in the European Union to unify logistics operators and integrate logistics centers into associations, including the global logistics system. A relatively new trend in the development of logistics in the European Union is the formation of a pan-European commodity distribution system, which involves the presence of several logistics hubs and regional logistics transport and distribution centers interconnected with them. Such a system is designed to accelerate the flow of cargo flows and ensure the continuity of the process of transporting goods. The main directions of the development of the transport and logistics system in the European Union: attracting large private investments in the construction of transport and logistics centers; creating efficient systems of engineering, communication and information support; building high-tech production and warehouse facilities and a complex roadside service infrastructure; applying modern information technologies for tracking shipments and optimizing transport loads; creating an effective distribution network for the development of large retail chains.

The transport and logistics infrastructure has achieved the greatest development in Germany. Transport and logistics centers in this country are mainly formed on the basis of existing railway lines and junctions. Most of them are designed for the parallel use of road and rail transport. There are also three-module logistics centers in Germany. There are two types of logistics centers in Germany: private logistics centers and municipally owned logistics centers. 80% of all logistics centers in Germany are located near railways, they are objects of railway infrastructure. In addition, about 75% of logistics centers are connected to public transport, and 60% use combined transport in their activities. Large transport hubs in Germany, such as Bremen and Lübeck, have direct connections to water transport, and Hamburg - to water and air transport.

Geographically located in the center of Europe and having modern developed transport systems and extensive airport networks, Germany creates wide opportunities for interaction with international markets. Such advantages have allowed the country to take a leading position in the management of transport and logistics infrastructure and create extensive networks of logistics centers. German logistics centers are created on the basis of large ports and railway junctions. Most logistics centers operate by synchronizing the interaction of automobiles and railways. The following features of the development of transport and logistics centers in Germany can be noted: significant state assistance for the development of logistics centers; provision of extensive financial support for the construction and operation of logistics centers at all levels of the state budget, attraction of investors, targeted subsidies, lending, private financing; inclusion of participants performing control functions in the management apparatus of transport and logistics centers built with state support. These can be various associations, municipal authorities, investors. Large multimodal logistics centers located in Dresden, Bremen, Hamburg and other developed transport hubs of Germany base their work on the desire to provide a high level of logistics services, including timely delivery, storage and necessary processing of goods. Revenues from the activities of logistics centers in the German budget account for up to 25%. Optimization of the activities of transport and logistics centers allows reducing the costs of loading and unloading operations and storage of goods by 30%, transportation costs by 20%, and other costs related to logistics activities by up to 35% [1]. Germany has a system of state regulation of logistics, which is developed on the basis of consultations between the country's authorities and business entities and based on their views on problems and development prospects. Business entities can develop in the direction they see fit, but must be based on clear guidelines developed by the government [2]. Thus, the German model of construction of transport and logistics centers is characterized by a number of features: strong state support at all levels; participation of the public sector based on federal and state laws; participation of the federal budget in financing investments; widespread use of targeted subsidies and lending of specific investment projects; provision of financial support for investments by federal states and local governments. The created logistics centers are managed through supervisory bodies organized by various companies participating in the project, which are investors and investment consortia, development companies, municipalities, associations and unions. The public sector is involved in the development of logistics centers both at the planning stage and at the stage of investment implementation. On the other hand, it makes an additional contribution to the economic security of the country and the development of the energy system [3].

The experience of implementing transport and logistics projects in the United States differs significantly from the German model. The most important difference is the lack of a single federal law that would establish uniform approaches to the implementation of these projects. However, each country has a legal framework regulating the forms of cooperation between the state and private business in the development of transport and logistics infrastructure. Among the main areas where projects are implemented with the help of public-private cooperation, one can note transport infrastructure. The experience of Great Britain is interesting, where there is practically no legislative framework regulating relations between participants in transport and logistics projects [4]. The British model for the development of transport and logistics centers is associated with the construction of the Channel Tunnel and envisaged the creation of 10 intermodal terminals and logistics centers to serve industrial zones. The initiator of their creation was Rail Freight Distribution, a subsidiary of British Railways. With the privatization of this company, the concept of forming transport and logistics centers in Great Britain changed, the basis of which was intermodal terminals and grant systems for freight transportation by rail. This contributed to the development of a special form of financing projects for the development of transport and logistics centers, within which there were two main budget financing schemes: grants for freight infrastructure facilities and for access to the railway line. The first scheme for allocating budget funds made it possible to cover the costs of creating infrastructure facilities for processing railway cargo. With its help, the rehabilitation of existing freight terminals was also carried out. The second scheme allows companies to make payments for the use of railway infrastructure [5].

In another European country, Italy, the geographical and economic feasibility of the formation of transport and logistics centers is determined by their proximity to the intersection of important national and trans-European land and sea routes, airports, and production centers. The first logistics center in Italy was established in 1971 [6]. Successful projects are being implemented in Italy to form a transport and logistics infrastructure, for example, one of the largest transport and logistics centers located at the intersection of 5 railways and 4 highways is the Bologna Logistics Center, established in 1971. This center manages more than 35% of domestic cargo flows and 16% of international cargo passing through the

country. The Bologna Logistics Center is a large transport and logistics center that combines about 100 national and international transport and logistics companies, as well as customs services, banking institutions, postal organizations and a group of other enterprises. In general, the transport and logistics infrastructure of Italy has undergone significant development as a result of the implementation of the national master plan for the development of transport in 1986. The main goal of creating a network of transport and logistics centers in Italy was the concentration of cargo flows, taking into account balanced transport solutions. Financing of projects for the development of transport and logistics centers in this country was carried out on the basis of public-private partnership principles.

In France, transport and logistics centers were formed as part of the project to improve the transport system of Paris. The French model of development of transport and logistics centers is characterized by the fact that its planning, development and management are carried out only by private investors who fully ensure the creation and operation of these infrastructure facilities. Currently, the largest investors in the French logistics infrastructure market are Garonor SA, owned by the American investment company ProLogis, and Sogaris SA, owned by the state and municipalities. The biggest drawback of this model of development of transport and logistics centers is the lack of coordinated centralized planning of projects for the development of international logistics centers, since the state participates in their implementation only by permitting their construction [7, s 10].

In Austria, a special program has been adopted for the development of transport and logistics infrastructure, which provides for state assistance in optimizing logistics chains for cargo delivery. The basis for this is the elimination of economic constraints in the planning of multimodal transportation, the informatization of logistics chains, the improvement of transport connections with remote regions, and the increase in the efficiency of transport infrastructure. According to the Federal Ministry of Transport, only one transport and logistics company in Austria has a state share, which is the Austrian Railways. The state directly makes strategic decisions regarding the development of this company and coordinates the work of its infrastructure. The remaining logistics companies are private, and therefore there is no general organization coordinating their activities in Austria. There are no government structures coordinating the work of logistics centers in Belgium. There are also non-governmental organizations that assist investors in the creation and operation of transport and logistics infrastructure. In total, there are more than 250 transport and logistics systems in Belgium, where more than 20 thousand employees work.

Let's look at some of the nuances of transport and logistics activity in Russia. Great importance is attached to projects for the creation of Russian transport and logistics centers. An interesting project is the company "Magnat Logistics", which includes modern universal multifunctional logistics complexes for the provision of contract logistics services in the field of storage, transportation and customs clearance of goods and cargo in the largest cities of Russia. This company is one of the largest logistics operators in Russia, whose infrastructure includes 45 distribution centers with a total area of about 2 million m². Russian Railways OJSC has developed a methodology for organizing the activities of international transport corridors based on a cluster approach using multimodal logistics centers. The formation of an integrated transport and logistics system is important in terms of contributing to the development of the Russian economy and increasing the country's competitiveness in the international transport and logistics services markets. Asian countries are currently leading the world in terms of economic growth rates, and according to forecasts of international organizations, their leadership is likely to remain in the future. The need to develop the transport and logistics system of China, one of the Asian countries, was chosen as the main target model in the late 1970s. This was due to the expansion of the volume of foreign trade requiring transport and logistics services. The modern stage of the formation of China's transport and logistics system began in 2004 [8, s.77]. China's significant successes are largely due to its active integration into the world economy. On the modern world stage, China is one of the main centers of economic development, and logistics is recognized as the most promising industry here. Innovations in the field of logistics and distribution have begun to be actively used in China, which has led to the rapid growth of e-commerce. In general, the development of the transport and logistics system based on innovative approaches and modern technologies is an important condition [9; 10; 11]. Many leading Chinese companies are introducing new approaches, creating new business models and processes that focus on developing innovative ways to attract consumers, changing the way consumers shop, pay and deliver [12, s.789].

In modern times, expanding the use of the potential of the transport and logistics system in Azerbaijan helps to provide high-quality services, develop international transport corridors, increase the competitiveness of the country's economy, etc. Currently, one of the main tasks for increasing the

country's economic power is to expand the potential of the transport and logistics system. On the other hand, this factor is closely related to the expansion of Azerbaijan's export potential and the introduction of local products to world markets. The role of transport and logistics systems in the Azerbaijani economy is determined by the systematic interaction of various factors. It is known that currently supply is beginning to exceed demand, therefore, businessmen and entrepreneurs are increasingly realizing the importance of applying logistics principles and approaches in their activities. Transport and logistics systems are of great importance in terms of the arrival of large international manufacturing and trading companies to the regions, the creation of new jobs and an increase in tax revenues to the budget [13, s.61]. The main functions of transport and logistics infrastructures can be: warehouse function; storage function; transport function; distribution and sales function; function of ensuring optimal consumption. These functions apply to all transport and logistics systems. In the theory of transport and logistics systems management, as well as at the level of management of territories (regions, municipalities), there is a general approach to the identification of transport and logistics infrastructure facilities [14, s.10].

The main task of the transnational use and development of transport and logistics infrastructure is to maintain its competitive potential, thanks to which any country can penetrate deeper into the formation of global value chains. The functioning of global value chains largely depends on the level of development of integrated logistics, which directly provides transport and logistics solutions between the stages of global production located in different regions [15, p.17]. Currently, in all advanced countries of the world, almost all foreign trade turnover is carried out through regional transport and logistics infrastructures. They are important for maintaining the economic potential of the country. A significant amount of foreign currency enters the country through transport and logistics infrastructures. Taxes collected from such centers are usually a significant contribution to the budget. Transport and logistics infrastructures are a means of converting reserves into finished product supplies in accordance with current demand. In addition, the role of transport and logistics infrastructure in the socio-economic development of regions is great [16].

Transport and logistics infrastructures of European countries are distinguished by their competitive advantages. The most important aspects of achieving competitive advantages of these infrastructures include: the presence of a developed infrastructure of transport and logistics centers; favorable geographical location; cooperation with customs and government; availability of an extensive transport system; diversification of services and types of transport; efficiency and maximum simplicity of procedures; reliance on the latest high technologies. In modern times, the use of any form of public-private cooperation has the potential to reduce the burden on the state budget related to investments and to direct part of this burden to the private sector and create conditions for sharing risks in social infrastructure projects [17, s.42].

Transport and logistics companies themselves should also be interested in expanding the potential of transport and logistics systems. Transport and logistics companies should first of all try to solve the following issues: maximum use of existing cargo space; identify and eliminate even the smallest shortcomings, plan in advance; attract new employees to the industry through motivation and training; search for alternative ports, air cargo hubs and transport routes; restore the balance between labor and working time [18]. Digitalization also has a significant impact on expanding the potential of the transport and logistics system. The digital transformation of this system is one of the most important areas in the development of the digital economy worldwide. The directions of expanding the country's transport and logistics capabilities and organizing a competitive transport and logistics system that meets international standards have been raised to a strategic level. In this direction, the processes of modernization and electronicization of border crossing points, renewal and modernization of border and customs technologies are developing rapidly [19, s.106].

Increasing Azerbaijan's foreign trade turnover depends on the opportunities for expanding the potential of transport and logistics systems. A number of international transport corridors passing through the territory of Azerbaijan show how important it is to expand this potential. Azerbaijan's favorable geographical position in the South Caucasus region and its strategic advantages in many areas create a material basis for the country to become an international transport and logistics center in the future [20, s.69]. Currently, a number of international transport corridors play an important role in expanding the potential of transport and logistics systems in Azerbaijan. One of such corridors is the Europe-Caucasus-Asia transport corridor. The volume of cargo transported through the territory of Azerbaijan through the Europe-Caucasus-Asia transport corridor is increasing. The effective use of these corridors also has a positive impact on the development of various sectors of the Azerbaijani economy [21]. In particular, it can be noted the expansion of foreign economic relations and the increase in export

potential [22]. At the same time, Azerbaijan, which has unique geographical and geopolitical opportunities, is involved in the processes taking place in the transport sector of the world economy. In other words, the result of taking complex measures aimed at specific goals was the effective use of Azerbaijan's strategic position, the transformation of the country into a regional trade center with developed transit and transport services, the improvement of transport infrastructure and a further increase in transit potential [23, s. 122].

Another important corridor is the North-South transport corridor. Another major project for the development of the North-South transport corridor is the Astara-Astara railway project. The implementation of this project, in addition to increasing Azerbaijan's ability to attract additional cargo to this transport corridor, has the opportunity to connect Russia, Iran, Pakistan, India and Northern Europe. Azerbaijan is the only country in the world with a land border with Russia and Iran, and this geographical position is of great importance in terms of the development of trilateral regional cooperation. The North-South transport corridor is mainly intended for the delivery of cargo from the Indian and Persian Gulf regions to Russia, the Baltic and Scandinavian countries, and Western Europe. The main advantage of the North-South transit corridor over other routes is that the distance and travel time are 2-3 times shorter. Sea transport to Helsinki via the Suez Canal, the Persian Gulf and the Indian Ocean, the Mediterranean and Baltic Seas takes 45-60 days, while the North-South transit corridor takes 20-25 days. Work is underway to connect the railways of Azerbaijan and Iran within the framework of the North-South international transport corridor. This transport corridor provides access to the European countries of the Persian Gulf, as well as to the Indian Ocean region. The construction of the section of this corridor passing through the territory of Azerbaijan will be completed in the near future. This will ensure convenient international transportation from north to south and vice versa [24, s. 66]. Using the advantages of public-private cooperation in the transport and logistics system allows us to significantly reduce the investment burden of the state budget on the transport industry and improve the quality of the work performed. It is known that the favorable geopolitical position of Azerbaijan allows it to become the center of a number of international transport corridors. In particular, Azerbaijan Railways responds very effectively to these challenges, and Information Communication Technologies are widely used in this sector. On the other hand, we believe that the most important condition for digitalization is the presence of new infrastructure. In addition, the internal transport and logistics network is being strengthened, which allows us to use software, process automation, as well as information technology equipment platforms. In addition, convenient use of the Internet by passengers also leads to increased customer satisfaction. Automation of processes in various types of transport, passenger transportation, traffic safety, human resources, finance, supply, etc. areas continues. Thus, through the automation and digitalization of passenger and cargo transportation processes, conditions are created for these processes to become more transparent, faster and more accurate [25].

In our modern world, the digital transformation of transport and logistics systems can be considered one of the main criteria for ensuring speed, flexibility and delivery time standards. Thus, the digitalization of transport and the use of digital technology are one of the leading trends in the transport and logistics system. Digital transformation in the transport and logistics system covers several important elements, such as vehicle management, information system, navigation support, automated traffic management, etc. Here, one of the main indicators of digitalization is the use of digital technologies to control and manage the movement of vehicles [26, s. 81]. One of the main advantages of the digitalization of transport and logistics systems is that customers can benefit from the service they want from anywhere, 24 hours a day, 7 days a week. Also, the use of advanced digital technologies in the organization of transportation in order to protect customer data requires ensuring a high level of cybersecurity. As a result, the digitalization process leads to an increase in the quality of service in the transport and logistics sector of Azerbaijan, and thereby consumer satisfaction. In this regard, the application of new economic mechanisms should be given special attention [27]. Increasing the level of digitalization helps to optimize the work process in transport, save money and time, increase competitive advantages and the capacity of the transport and logistics infrastructure. All this ultimately leads to an increase in the quality of service.

In the modern globalized world, we are increasingly witnessing the digitalization of services provided by various types of transport, as well as the application of modern innovative technologies in the organization of transportation. It is necessary to ensure the digital transformation of transport services in the transport sector. Currently, states interact with each other, exchange information and use transport and logistics services to achieve higher sales of products. In transport and logistics services, this refers to the set of processes for managing the movement of products from any point of origin to the

point of consumption in order to meet customer needs. In transport and logistics, this also includes information on transportation, maintenance, storage, material collection and line safety. As a result of the digitalization of transport and logistics services, cargo and passenger flow management, navigation support, automation of transport flows, and coordination of information systems can be ensured. At the same time, it is possible to note the processes of implementing transport projects in post-conflict areas [28]. Thus, the implementation of similar projects in the region has a beneficial effect on the more intensive restoration of territories liberated from occupation [29].

Based on world experience in organizing transport and logistics activities, in order to determine ways to solve the problems of improving and developing the transport and logistics system in Azerbaijan, a group of issues and factors should be considered in a comprehensive manner:

- all areas of development of the transport and logistics industry should be covered by state participation and comprehensive support;
- when planning locations for transport and logistics centers, a preliminary analysis of efficiency should be provided, the construction of logistics centers in places with favorable characteristics: at large transport junctions, in free economic zones or in regions with active economic development;
- optimization of logistics processes should be carried out based on the use of digital technologies and automation of technological operations;
- It is important to expand the potential of the transport and logistics system and improve the mechanisms for managing its development, etc.

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CURRENT ASPECTS OF THE DEVELOPMENT OF THE KARABAKH ECONOMIC REGION IN AZERBAIJAN IN THE CONTEXT OF HIGH TECHNOLOGIES

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Abstract

The article examines the current aspects of the development of the Karabakh economic region in Azerbaijan in the context of high technologies. The role of high technologies in the revival of post-conflict territories is substantiated. The issues of efficient and productive use of the resource potential of the Karabakh economic region are analyzed. The problems of expanding and developing social and production infrastructure are considered. The possibility of achieving higher successes as a result of the application of high technologies is assessed. Priorities and directions for accelerating the development of traditional and promising economic sectors are determined. Recommendations have been developed and proposals put forward for more efficient organization of Karabakh development projects in order to intensify the return of former internally displaced persons to their native lands.

Keywords: *Azerbaijan, Karabakh economic region, high technologies, economic development priorities, Karabakh revival targets, directions of application of high technologies, current aspects of Karabakh development.*

It should be noted that the development of innovative segments of economic regions, high-tech industries and the formation of a modern professional composition of their population can contribute to the creation of favorable institutional conditions for attracting investment to the regions [1]. Financial support for the development of regions has a great influence on their development. This determines the existence, continuous development and normal functioning of regions [2]. The considered components of the financial system allow us to explain and reveal its role and importance from this position. Important components of the financial markets of economic regions are investment funds and companies [3]. The need to create investment funds in economic regions is very high [4]. This is due to the increasing role of each region in the overall economic development of the country, where the main incentive is investment [5].

Thus, the creation of such funds reduces the burden on the budget of economic regions and increases investment attractiveness [6]. This mechanism is implemented through public-private partnership, and the financial and credit system of the economic region is closely linked to other spheres of its economic and social life and has a significant impact on them [7]. After the Great Karabakh Victory, new realities emerged in Karabakh in the territories liberated from occupation [8]. Our public buildings, industrial infrastructure and degraded lands, which had been destroyed for almost 30 years, were liberated from the enemy in 2020. In such conditions, the strategic task is the earliest possible revival and ensuring the socio-economic development of these territories, the comprehensive and systematic implementation of measures related to the return of the population. In Azerbaijan, work in this direction is carried out at the state level, construction work has begun, related conceptual ideas, approaches, main directions of the state economic policy have been identified and appropriate measures are being taken in this direction [9].

According to the analysis of the pre-occupation period, there was a large volume of natural resources in the territories liberated from occupation, due to the effective use of which it would be possible to restore the infrastructure destroyed during the occupation and form sources of socio-economic development. In addition, the issues of improving the management system of the liberated territories, establishing a more flexible form of governance in accordance with the challenges of the modern era deserve attention. Each of the newly created Karabakh and East Zangezur economic regions has its own development features, natural and economic resources. At present, the main task is the effective use of these economic resources, taking into account the realities of modern economic development in addition to the traditional sectors of the region's economy, assessing the priorities of the effective use of the resource

potential associated with the Great Return, forming a production infrastructure, improving the standard of living and providing employment to the population. At the same time, one of the important conditions is to take into account the emerging problems [10]. From this point of view, solving the problems of development of the Karabakh economic region is a topical topic for discussion by both the state and society. Among the traditional sectors of the Karabakh economic region, there are undoubtedly more agrarian-oriented areas. Even during the Soviet Union, various branches of agriculture developed in Karabakh and, especially, in the Aghdam, Fizuli, Barda, Aghjabedi, and Terter regions [11].

Taking into account global challenges and from the point of view of approaches to the problems of development of the Karabakh economic region, it can be noted that the formation of the main branches of the economy here requires a certain amount of time [12]. And it is possible to restore the activity of agricultural lands in a short time, given that preference is given to the use of modern technologies, including "smart" technologies. In this regard, providing modern technologies in the development of the Karabakh economic region will increase productivity, optimize costs and generate greater income [13]. On the other hand, in the context of the existing production infrastructure, we consider it important to develop, prepare and put into operation a wider network of agro-industrial processing enterprises. Thus, there are great prospects for the development of agriculture and the agricultural sector, in general, in Karabakh and other territories liberated from occupation [14].

We believe that when considering these issues, special attention should be paid to the European experience, including the experience of other countries of the world, and issues related to their application should be studied, local conditions should be taken into account, and, first of all, financial mechanisms for appropriate measures should be found. On the other hand, given the peculiarities of the socio-economic development of Karabakh, special attention should be paid to the comprehensive development of economic sectors that may be of great importance in the modern period. We believe that tourism can be such a sector. Tourism was a fairly typical sphere for Karabakh even in Soviet times. A large sanatorium known throughout the Soviet Union operated in the city of Shusha. In addition, there was the Istisu complex in Kelbajar. Karabakh's opportunities in terms of tourism are much more extensive - almost every district of the region has tourism potential. But here, in our opinion, the main issue of tourism development is associated with the city of Shusha. Currently, the processes of restoration and activation of the city of Shusha have entered an intensive phase. Hundreds of ancient buildings and monuments of historical significance are being restored here. Despite the fact that the territory of the city of Shusha is small, there are great opportunities for the creation of hotel complexes and tourism enterprises, and this, in turn, will attract tourism industries and tourism brands to the city. The formation of national tourism brands can create additional conditions for the intensive development of the tourism sector in Shusha, and the impulses for the development of Shusha will contribute to the Karabakh economic region as a whole, and play an important role in accelerating its development [15]. At the same time, it is important to objectively assess the tourism and recreational opportunities and build tourism and hotel complexes accordingly. This, in turn, can provide an incentive and motivation for the development of other areas of public catering, transport, other professions and crafts in the city of Shusha to expand added value and financial sources, increase employment opportunities, and create new jobs.

It should be noted that the potential for socio-economic development in the territories liberated from occupation is quite high. The development of various segments of the agricultural sector here will allow the creation of highly competitive processing enterprises. Such processing enterprises, along with the production of various types of food products, will create new jobs, form infrastructure, develop villages and towns, and increase the income of the population. On the other hand, this will expand the structure of non-resource exports and enrich the range with new products, and form new brands - the "Karabakh" brands. At the same time, these regions have resources for the development of other sectors of the economy [16]. In the restoration of the city of Shusha, which is the center of Karabakh, more importance is attached to the development of service sectors and ensuring the development of the transport sector - public transport, urban economy, and service sectors [17]. The formation of spheres of activity in Shusha based on intellectual resources, a revival due to the knowledge economy and digital technologies may be more attractive and suitable for the current situation in the city [18]. Thus, taking into account the protection of the city of Shusha by the state, it is important to evaluate these issues when modeling the socio-economic development of the city]. But, at the same time, we believe that in order to ensure the socio-economic development of the city, solving the problems of supplying the urban population, creating suburban infrastructure and more effectively using the potential of the villages adjacent to the city of Shusha, they should be under strict control. In our opinion, the creation of various

segments of the light industry, including food industry enterprises producing competitive high-quality food products, could be effective here. At the same time, the development of all segments of the ancient art of carpet weaving, which is very typical for Karabakh, light industry sectors, the creation of a carpet weaving museum, expansion of activities in the direction of carpet weaving, including processing enterprises for various segments of textiles, and the formation of national brands could be more effective. The use of local toponyms in the branding of manufactured products, mainly the use of the toponyms Karabakh and Shusha, contributes to the popularization and greater attention to the city of Shusha and Karabakh at the world level [19]. Intensification of the socio-economic development of the Karabakh economic region, the implementation of the existing potential, the creation of a transport and logistics complex, warehousing are some of the important conditions for solving the issue of economic security of the region, first of all, food security with quality food products. All these measures should be considered in the context of the socio-economic development of the city of Shusha.

It should be noted that the recovery after the Patriotic War should be carried out through the reintegration of Karabakh and its inclusion in the production and distribution chain as part of the overall development strategy of our country. With the involvement of international experts, damage to water, land, forest resources, property and cultural resources, minerals and, most importantly, the civilian population is being calculated in Karabakh. Therefore, the state must take and strengthen measures in this direction. After the implementation of these measures, it will be possible to turn this economic region into a favorable zone for tourism, and the investment attractiveness of the region will increase many times over. The factor determining the development of tourism in Karabakh is the creation of infrastructure and ensuring the safe return of the population to the region [20]. We believe that Karabakh has great potential for the development of sericulture and the creation of industrial and processing enterprises. Their use will contribute to the development of the textile industry in our country, strengthening its activities in certain areas, using the raw materials available here, including cotton cultivation, wool processing, etc. This can give a serious impetus to the creation of processing enterprises and, as a consequence, additional jobs. Thus, the prospects for the creation of a large number of industrial enterprises, primarily manufacturing enterprises, in the cities of Aghdam and Fizuli, as well as in Zangilan and Jibrail are quite high.

During the Soviet Union, there were a large number of enterprises here, and now it is possible to expand economic development based on new technologies, primarily smart technologies, to create appropriate conditions and on this basis there are opportunities to form a network of more competitive enterprises. The registration of residents of the industrial park created in Aghdam has already begun, and in the near future, in our opinion, more important steps will be taken in this direction. Of great importance is the "Economic Zone of the Araz Valley" created in the Jabrayil region. Attracting foreign investment to the region, developing high technologies, including "smart technologies" - will be an important role of this economic zone. The mechanisms of benefits and state support that will be applied in the economic zone are very attractive, and these factors will give a serious impetus to the development of manufacturing industries in various industries of the region [21]. We believe that a fundamental basis for the development and application of innovations for the technological development of the region will be created here [22]. Along with this, in the modern era, the urgent problems of the development of the Karabakh economic region come to the fore, because After the Great Karabakh Victory, new realities emerged in the territories liberated from occupation [23]. Finally, our public buildings, production infrastructure, degraded lands that had been destroyed for almost 30 years have been liberated from the enemy. In such conditions, the strategic goal is the earliest possible revival of these territories and ensuring their socio-economic development, as well as the comprehensive and systematic implementation of measures related to the return of the population. In Azerbaijan, work in this direction is being carried out at the state level. Even before the end of the war, the relevant conceptual ideas, approaches, and main directions of the state economic policy were determined and adequate measures were launched in this direction [24]. Undoubtedly, first of all, it is necessary to demine these territories and create appropriate conditions for the safe life and work of the population. In our opinion, work in these areas is going according to plan, but we believe that additional measures are needed to further intensify these issues. Separately, I would like to note one issue: given that demining the territories takes time, more intensive measures are needed to accelerate construction and restoration activities, in general, the processes of socio-economic development.

In terms of approaches to the problems of development of the Karabakh economic region and taking into account global challenges, it can be noted that the formation of the main sectors of the economy here requires some time. It is possible to restore the activity of agricultural fields in a short period of time

using modern technologies, including "smart" technologies. In this regard, the introduction of modern technologies in the development of the Karabakh economic region will increase labor productivity, optimize costs and generate more income. On the other hand, we consider it important to put into operation a wider network of enterprises for processing agricultural products in the context of the production infrastructure that has already begun to be created. Thus, in Karabakh and other territories liberated from occupation, there are good prospects for the development of agriculture and the agricultural sector as a whole. We believe that when considering these issues, special attention should be paid to the European experience, as well as the experience of other countries of the world, and issues related to their application should be deeply studied, taking into account local conditions and relevant financial mechanisms. On the other hand, referring to the peculiarities of the socio-economic development of Karabakh, special attention should be paid to the comprehensive development of economic sectors that can be of great importance in the modern era. We believe that such a territory can become a tourist zone. Tourism is a very typical sphere for Karabakh even in Soviet times. In the city of Shusha, there was a large sanatorium, famous throughout the Soviet Union. In addition, in Kelbajar there was the Istisu complex. Of course, there were not many of them - the potential of the Karabakh economic region in terms of tourism is much greater [25]. Here, in our opinion, the issue of tourism development is mainly related to the city of Shusha. Thus, it is important to objectively assess the tourist and recreational potential of the city of Shusha and the Karabakh economic region as a whole and build tourist and hotel complexes accordingly. This, in turn, can provide a powerful stimulus and motivation for the development of other areas: public catering, transport, which will have a positive effect on the expansion of sources of added value, an increase in employment opportunities, the creation of new jobs, etc. However, the development potential in these areas requires objective analysis and assessment [26]. On the other hand, systematic and continuous measures are needed to ensure the socio-economic development of this important strategic city [27]. In addition, in order to ensure food security in the region and increase employment opportunities, it is more expedient to create agro-processing enterprises at the level of small and medium-sized businesses and organize farms in suburban areas. Thus, from the point of view of the development of villages in the Shusha district and the solution of socio-economic development processes, there is a need to take effective and consistent measures in the context of solving employment problems. In the process of comprehensive development of the city of Shusha, it is very important to create agro-parks, various enterprises for processing meat and meat products, milk and dairy products, and create fruit processing enterprises to meet domestic demand for these products and export opportunities abroad. In these areas, the prospects for organizing economic activity zones with the status of free economic zones are also of interest [28]. In such zones, the potential for attracting investments to create competitive tourism industry enterprises is quite high [29]. Free economic zones provide additional incentives for strengthening economic security [30]. Diversification of the economy and mobilization of its development determinants are among the priority postulates of modern development [31]. On the other hand, as we noted at the beginning, in the processes of revitalizing post-conflict territories, serious importance should be attached to the reliability of financial mechanisms and measures to ensure financial stability [32]. Such approaches can provide an additional incentive for intensifying economic development processes, primarily the formation of real sectors of the economy in the territories liberated from occupation. In general, increasing the competitiveness of the real sector of the economy should be carried out systematically [33]. For the intensive development of the economy, it is envisaged to apply more productive mechanisms and use practical tools [34]. Nowadays, the Karabakh region resembles a large construction site. On the one hand, new infrastructure projects are being implemented, and on the other, effective projects developed on the basis of international standards [35].

In the near future, the issues of modeling the socio-economic development of the Karabakh region will remain relevant and in this regard, we have summarized a number of proposals:

- Carrying out activities in the specified areas is one of the factors of great importance in the development of the city of Shusha, and taking all of them into account in the near future will lead to the activation of the development of the city of Shusha, more efficient use of its development elements through "smart" technologies, intensification of urban development and infrastructure network processes, acceleration of the Great Return;

- Development of entrepreneurship in economic regions, ensuring effective employment, reducing poverty, ensuring the continuity of development of processing enterprises;

- Implementation of investments in economic regions for the development of regional entrepreneurship, including the development of agricultural technologies, preparation and implementation of investment programs;

— Taking into account the unique features of the development of the Karabakh economic region, we consider it important to attach greater importance to the development of the textile and tourism industries, while creating high-tech enterprises in the agricultural sector;

— It is important to urgently resolve financial and insurance mechanisms to accelerate the socio-economic development of the Karabakh economic region and form the appropriate infrastructure in the region;

— We consider it important to give priority attention to the creation of processing enterprises in Karabakh, especially in the Aghdam and Fizuli regions;

— In accelerating the socio-economic development of the Karabakh economic region, it is important to improve financial mechanisms with the formation of an appropriate package of services in the region, etc.

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BREAST CANCER: MODERN POSSIBILITIES AND PROSPECTS

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Regional Hospital, Kokshetau, Kazakhstan**Abstract**

This scientific and analytical work presents modern global and local-regional data on incidence, mortality, lethality and five-year survival of the most common oncological pathology, such as breast cancer. The issues of etiology and pathogenesis, features of distribution, modern principles of diagnostics, including screening, as well as prognosis, preventive measures of this formidable disease are covered in detail. The epidemiological characteristics of this pathology in our republic are given in the context of the regions of the country.

Keywords: oncology, breast cancer, phenotype, biological markers, risk factors, etiopathogenesis, diagnostics, treatment, epidemiology, incidence, mortality, lethality, five-year survival rate, prognosis, prevention.

Breast cancer (BC) is the most common global malignancy and the leading cause of cancer deaths [1]. There is much evidence showing the influence of life style and environmental factors on the development of mammary gland cancer (high-fat diet, alcohol consumption, lack of physical exercise), the elimination of which (primary prevention) may contribute to a decrease in incidence and mortality. Secondary prevention, comprising diagnostic tests (e.g. mammography, ultrasonography, magnetic resonance imaging, breast self-examination, as well as modern and more precise imaging methods) help the early detection of tumours or lesions predisposing to tumours. It is estimated that nearly 70% of malign tumours are caused by environmental factors, whereas in BC this percentage reaches 90-95%. There are national programmes established in many countries to fight cancer, where both types of prevention are stressed as serving to decrease incidence and mortality due to cancers. Cancer prevention is currently playing a key role in the fight against the disease. Behaviour modification, as well as greater awareness among women regarding BC, may significantly contribute towards reducing the incidence of this cancer [2].

Speaking about the diagnostic criteria for making a diagnosis, women complain about the presence of a formation in the mammary gland; enlarged axillary, supra- and subclavian lymph nodes; the presence of skin changes on the mammary gland; swelling of the mammary gland. The history is noteworthy of

the presence of cancer in close relatives; early onset of menstruation; age of first pregnancy and first birth, taking oral contraceptives and/or hormone replacement therapy, gynecological diseases. During a physical examination, attention is paid to the symmetry of the location and shape of the mammary glands; level of position of the nipples and their appearance (retraction, deviation to the side); skin condition (hyperemia, swelling, wrinkling, retractions or protrusions on it, narrowing of the areolar field, etc.); presence/absence of pathological discharge from the nipples (quantity, color, duration); presence of swelling of the arm on the affected side. Palpation of the mammary glands is carried out in the vertical and horizontal positions of the subject; regional and cervico-supraclavicular lymph nodes are usually performed in a vertical position [3].

From laboratory tests, if metastatic BC is suspected, it is recommended to perform detailed clinical and biochemical blood tests, and a study of the blood coagulation system. In case of hormone-dependent BC in women under 50 years of age, to assess ovarian function and plan hormone therapy, it is recommended to study the level of follicle-stimulating hormone in the blood serum and the level of total estradiol in the blood. A cytological study is also carried out (an increase in the size of atypical cells up to giant ones, a change in the shape and number of intracellular elements, an increase in the size of the nucleus, its contours, different degrees of maturity of the nucleus and other cell elements, a change in the number and shape of nucleoli); histological examination: histological type of tumor, degree of differentiation (grade - ability to form tubes, nuclear polymorphism, number of mitoses), presence of necrosis, vascular invasion, tumor of infiltrating lymphocytes, presence of calcifications. Immunohistochemical study for key markers: 1) determination of estrogen and progesterone receptors, HER2, Ki67 - it is recommended to evaluate biological markers again at least once during metastasis, if clinically possible; 2) if the result of IHC analysis of HER2 is controversial, the HER2/neu gene amplification should be determined by in situ hybridization; 3) determination of PD-L1 in triple negative BC to decide on the prescription of immunotherapy; 4) if necessary - Cytokeratin 5/6, Calponin-1, E-Cadherin, GCDPF-15, Mammaglobin, p120 and Topoisomerase IIa.

Molecular genetic testing to determine germline BRCA1/2 mutations is indicated in all patients, regardless of age, family history, or type of BC with mBC and during progression to decide whether to prescribe PARP inhibitors (olaparib 1 and talazoparib). In women with a positive germline mutation of the BRCA1 or 2 gene, the incidence of BC development before 70 years of age is 45-65%. More often detected: 1) with a burdened family history (close relatives have BC aged ≤ 50 years, BC in a man, ovarian cancer, metastatic prostate cancer, pancreatic cancer); 2) in patients under 45 years of age; 3) in patients under 60 years of age with a triple negative BC phenotype; 4) with primary multiple BC; 5) in patients with HER2 negative BC phenotype who have a high risk of relapse after surgical treatment and neoadjuvant or adjuvant therapy; 6) for BC in men. Comprehensive genomic profiling is carried out in patients with a severe clinical course, aggressive tumors, with a high risk of progression, lack of effect from traditional methods of antitumor treatment [in advanced BC (triple negative and progressive HER2+)] [3].

Instrumental studies: 1) ultrasound of the mammary glands, regional lymph nodes: the presence of a hypoechoic structure of the formation with large/small microcalcifications in the structure, the contours are uneven, stellate, there may be areas of mixed echogenicity, the structure of the node is heterogeneous, increased vascularization is possible; 2) mammography (mammograms in two projections visualize shapeless heterogeneous compactions with multiple microcalcifications in the structure, pronounced deformation of the stroma, thickening of the skin, nipple-areolar complex, the nipple can be retracted, the presence of enclosed lymph nodes); 3) contrast-enhanced spectral mammography (CESM) method, which consists of performing mammography with soft and hard images after intravenous administration of an iodinated contrast agent. The CESM method is informative in the diagnosis of early forms of BC, allows you to detect pathology in the dense part of the mammary gland, and is used as a differential diagnosis of benign and malignant neoplasms; before the study, creatinine and urea levels in the blood are assessed, an iodine-containing contrast agent is administered intravenously in an amount of 1.0-1.5 ml per kg of the patient's weight; images are taken in two projections, craniocaudal (CC) and media-lateral (MLO), in a period of time from 2 to 7 minutes after administration of the contrast agent; 4) magnetic resonance imaging (MRI) of the mammary glands to assess the local spread of BC for the following indications: age up to 30 years; the presence of mutations in the BRCA1, BRCA2 genes; high radiological density of the mammary glands; the presence of breast implants when it is impossible to perform a high-quality mammographic examination; presence of lobular carcinoma in situ; 5) ductography (in the presence of an intraductal formation behind the nipple, it is carried out to clarify the size and distance of the formation from the nipple-areolar complex); 6) puncture biopsy of a tumor formation (cytological examination reveals an increase in the size of cells up to giant ones, a change in the shape

and number of intracellular elements, an increase in the size of the nucleus and its contours, different degrees of maturity of the nucleus and other cell elements, a change in the number and shape of nucleoli); 7) trephine biopsy or sectoral resection of the mammary gland with express histology (histological verification of the tumor: histological type of tumor, degree of differentiation (grade - ability to form tubes, nuclear polymorphism, number of mitoses), absence of necrosis, vascular invasion, tumor of infiltrating lymphocytes, the presence of calcifications; 8) ultrasound of the abdominal organs and retroperitoneal space/ultrasound of the pelvis (with metastatic lesions of the liver, its structure is heterogeneous, rounded in shape with uneven clear contours, with single or multiple formations with a hypoechoic rim along the periphery); 9) computed tomography (CT) or MRI of the abdominal organs with intravenous contrast if the results of ultrasound of the abdominal organs are ambiguous or not very informative; 10) survey X-ray examination of the CT of the chest organs (in case of metastatic lesions of the lungs across all pulmonary fields or in a segment, multiple/single mid-focal shadows with clear contours, of various sizes are determined); 10) scintigraphy of skeletal bones (hyperfixation of an osteotropic drug in foci of pathological bone formation) if metastatic lesions of skeletal bones are suspected to assess the extent of BC prevalence; 11) positron emission tomography (PET) (accumulation of the drug by pathological foci), combined with CT with tumor-tropic radiopharmaceuticals (with or without contrast) (PET-CT) to assess the extent of BC spread in cases where standard methods of staging examinations are ambiguous, especially when locally advanced process, when the detection of metastases fundamentally changes treatment tactics; 12) MRI or CT scan of the brain with IV contrast to exclude metastatic lesions if the presence of metastases in the brain is suspected.

To standardize and simplify the criteria for assessing response to tumor therapy, the international Response Evaluation Criteria in Solid Tumors (RECIST) scale is used. According to RECIST 1.1, the following types of response are distinguished for targeted lesions.

1. Complete response – disappearance of all tumor foci.
2. Partial answer – a decrease in the sum of the largest diameters of each lesion by more than 30%.
3. Stabilization of the disease – reduction of the sum of the largest diameters of each lesions from 20 to 30% (for RECIST 1.0 from 25 to 50%).
4. Progression of the disease – an increase in the sum of the largest diameters of each lesion by more than 20% or the appearance of new tumor lesions.

The overall response of solid tumors to treatment is based on a combination of data on measurable lesions, non-measurable lesions and the appearance or absence of new tumor lesions. The duration of overall response is from the date of documentation of the disease until its progression. Relapse-free interval (time to progression) – from the end of treatment to the date of documented disease progression [3].

As part of outpatient drug therapy, it is recommended to use hormone therapy in the adjuvant mode for patients with hormone-positive BC for at least 5 years (tamoxifen, letrozole, anastrozole, goserelin, triptorelin) and with progression or metastatic luminal BC before progression (tamoxifen, letrozole, anastrozole, goserelin, triptorelin, toremifene, fulvestrant, exemestane, everolimus). The use of bisphosphonate therapy when metastatic bone lesions are detected is recommended for two years (zoledronic and pamidronic acid, denosumab). CD 4/6 inhibitors (palbociclib, ribociclib, abemaciclib) are recommended for patients with HER2-negative metastatic luminal BC in combination with an aromatase inhibitor or fulvestrant, until progression or unacceptable toxicity develops; the use of monotherapy with Poly(ADP-ribose) polymerase inhibitors (olaparib or talazoparib) is recommended for patients with metastatic BC with germline BRCA1 or BRCA2 mutations, regardless of hormone receptor and HER2 status, as an alternative to chemotherapy. In patients with high-risk BRCA-associated BC, olaparib is prescribed as adjuvant therapy. The use of targeted therapy (trastuzumab) is recommended for patients with early and metastatic HER2-positive BC in combination with chemotherapy, targeted therapy or monotherapy (up to completion of 18 cycles). The use of targeted therapy (lapatinib) is recommended for patients with HER2-positive metastatic BC, either alone or in combination with capecitabine and/or trastuzumab, until progression or development of unacceptable toxicity. The use of capecitabine in the adjuvant treatment of chemo-resistant triple negative BC, or in metastatic BC in combination with lapatinib and hormone therapy.

Indications for radiation therapy: 1) morphologically established diagnosis of malignant neoplasm; 2) in case of relapses, continued growth of the tumor or progression of the disease after previously carried out combined or complex treatment. Methods of radiation therapy: 1) continuous radiation therapy; 2) single-fraction radiation therapy for SRS; fractionated radiation therapy for Single Focal Dose from 1.6

Gy to 12.0 Gy 2-5 fractions per week (standard fractionation, hypofractionation, hyperfractionation, accelerated fractionation, multifractionation). In this case, external beam radiation therapy is carried out 2D, 3D, IMRT, RapidArc, IGRT conformal irradiation Single Focal Dose 1.8-2.0-2.66, 2.67, 5.2 Gy 5 fractions per week up to Total Focal Dose 50 Gy, 42.56 Gy, 40.05 Gy, 25 Gy and 60-70 Gy in independent mode, Total Focal Dose 10-16 Gy ("Boost") in the postoperative mode after organ-sparing operations. A continuous course of radiation therapy is used, using γ -therapy devices or linear accelerators. Tomotherapy is used as a standard fractionation technique for administering single and total focal doses. The main advantage is hypofractionation in Single Focal Dose 2.5 Gy. Intraoperative radiation therapy is used in breast-conserving operations for T1-2N0-1M0. The bed of the removed tumor is irradiated with an electron beam at a dose of 10-20 Gy in order to devitalize the remaining malignant cells [3].

Now, regarding chemotherapy. There are several types of chemotherapy that differ in purpose: 1) neoadjuvant chemotherapy of tumors is prescribed before surgery, in order to reduce an inoperable tumor for surgery, as well as to identify the sensitivity of cancer cells to drugs for further use after surgery; 2) adjuvant chemotherapy is prescribed after surgical treatment to prevent metastasis and reduce the risk of relapse; 3) curative chemotherapy is given to shrink metastatic cancers. Depending on the location and type of tumor, chemotherapy is prescribed according to different regimens and has its own characteristics.

Indications for chemotherapy: 1) cytologically and histologically verified BC; 2) in the treatment of locally advanced tumors; 3) metastases in regional lymph nodes/distant organs - lungs, liver, brain, bone structure; 4) tumor recurrence; 5) a satisfactory blood picture in the patient: normal hemoglobin and hemocrit, the absolute number of granulocytes is more than 200, platelets are more than 100,000; 6) preserved function of the liver, kidneys, respiratory system and cardiovascular system; 7) the possibility of converting an inoperable tumor process into an operable one; 8) patient's refusal to undergo surgery; 9) improvement of long-term treatment results in unfavorable tumor phenotypes (triple negative, HER2-negative cancer).

Contraindications to chemotherapy can be divided into two groups: absolute and relative. Absolute contraindications: hyperthermia >38 degrees; disease in the stage of decompensation (cardiovascular system, respiratory system, liver, kidneys); the presence of acute infectious diseases; mental illness; the ineffectiveness of this type of treatment, confirmed by one or more specialists; tumor decay (threat of bleeding); the patient's serious condition according to the Karnofsky Performance Scale is 50% or less. Relative contraindications: pregnancy up to 16-18 weeks; intoxication of the body; active pulmonary tuberculosis; persistent pathological changes in blood composition (anemia, leukopenia, thrombocytopenia); cachexia.

The rationale for prescribing neoadjuvant systemic therapy for BC is: high probability of latent (micrometastatic) spread; the ability to reduce the amount of surgical intervention within the "clean" resection margins; the ability to evaluate the clinical response to therapy *in vivo*; availability of accurate pathomorphological assessment of the degree of tumor regression; the possibility of special studies of biopsy tumor material before, during and after completion of primary systemic treatment. For medullary carcinoma and adenoid cystic carcinoma, adjuvant chemotherapy may not be required (in the absence of lymph node involvement).

And a very important and decisive aspect when prescribing adjuvant/neoadjuvant systemic therapy is the molecular biological subtype of BC:

1. Luminal type A. In early BC (T1-2N0M0), hormone therapy is carried out only in the presence of severe concomitant diseases and/or there are absolute contraindications to surgical treatment until the maximum effect is achieved, followed by radiation therapy. For T2-4N1-3M0 locally advanced inoperable BC, it is recommended to prescribe hormone therapy with antiestrogens and aromatase inhibitors; it is advisable to carry out treatment until the maximum effect is achieved with clinical and instrumental assessment every 3 months. At the same time, in most cases, the appointment of adjuvant/neoadjuvant chemotherapy (in addition to hormonal therapy) is possible in the presence of at least two parameters: widespread process (≥ 4 regional lymph nodes affected by metastases; $\geq T3$); GIII; young age; presence of pregnancy; increase in initial Ki67 values during repeat biopsy/postoperative material after neoadjuvant hormone therapy.

2. Luminal B (HER2 negative). Hormone therapy + chemotherapy in most cases. For T1a (≤ 5 mm) and N0 - only adjuvant hormonal therapy. In other cases, chemotherapy with anthracycline- and taxane-containing regimens in addition to hormone therapy. Adding platinum drugs to adjuvant chemotherapy only in the presence of a BRCA1/2 gene mutation.

3. Luminal type B (HER2 positive). Chemotherapy + anti-HER2 therapy + hormone therapy. For T1a

(≤ 5 mm) and N0: adjuvant hormone therapy only; chemotherapy and trastuzumab are not indicated. For T1b, c (> 5 mm but ≤ 20 mm) and N0: chemotherapy with paclitaxel (without anthracyclines) in combination with trastuzumab (followed by hormone therapy) is possible. For T2-T4 (> 20 mm) or N+: the first step is anthracyclines, then taxanes + trastuzumab $\pm$ pertuzumab (followed by hormone therapy).

4. HER2 positive (non-luminal). Chemotherapy + anti-HER2 therapy. For T1a (≤ 5 mm) and N0: systemic therapy is not indicated. For T1b (> 5 mm but ≤ 10 mm) and N0: taxane chemotherapy (without anthracyclines) in combination with trastuzumab is possible. For T1c-T4 (> 10 mm) or N+: the first step is anthracyclines, then taxanes + trastuzumab $\pm$ pertuzumab.

5. Triple negative (ductal). Chemotherapy including anthracyclines and taxanes. For T1a (≤ 5 mm) and N0, systemic therapy is not indicated. Adding platinum drugs to adjuvant chemotherapy only in the presence of a BRCA gene mutation. There are also features when prescribing adjuvant chemotherapy to patients who have received neoadjuvant chemotherapy in full.

Also, a very important section is the use of hormone therapy in the adjuvant or neoadjuvant mode. In the premenopausal period, hormone therapy is used as follows. After completion of systemic chemotherapy and continued menstrual function, bilateral oophorectomy or ovarian suppression with luteinizing gonadotropin releasing hormone agonists followed by an anti-estrogen for 5 years is indicated. When menstrual function ceases after receiving courses of chemotherapy and the level of estradiol in the blood is determined, an anti-estrogen is prescribed to confirm true menopause. The following regimens with tamoxifen are used: 1) tamoxifen 20 mg/day orally daily for 5 years; 2) tamoxifen 20 mg/day orally daily, for 10 years, in the presence of at least one unfavorable prognosis factor: age ≤ 35 years, preserved ovarian function after adjuvant chemotherapy, T3-4, involvement of ≥ 4 axillary lymph nodes, GIII, positive HER2, high Ki67; 3) tamoxifen 20 mg/day orally daily for 5 years, then aromatase inhibitors (letrozole 2.5 mg/day orally daily, or anastrozole 1 mg/day orally daily, or exemestane 25 mg/day orally daily) for 5 years. For patients who have achieved stable menopause by the time they stop taking tamoxifen, with at least one poor prognostic factor: age ≤ 35 years, preserved ovarian function after adjuvant chemotherapy, T3-4, involvement of ≥ 4 axillary lymph nodes, GIII, HER2 positive, high Ki67; 4) ovarian suppression + tamoxifen 20 mg/day orally daily / aromatase inhibitors (letrozole 2.5 mg/day orally daily, or anastrozole 1 mg/day orally daily, or exemestane 25 mg/day orally daily) for 5 years, and also if there are indications for adjuvant chemotherapy and preserved ovarian function after completion of chemotherapy; 5) bismaclic 150 mg 2 times a day in combination with endocrine therapy for the adjuvant treatment of hormone receptor positive (HR+) and human epidermal growth factor receptor type 2 (HER2) negative BC in early stages with involvement of regional lymph nodes and a high risk of relapse [3].

In pre- or perimenopausal women, endocrine therapy with aromatase inhibitors should be combined with a luteinizing hormone-releasing hormone agonist. To achieve ovarian suppression, it is possible to use the following methods: 1) surgical castration (bilateral oophorectomy); the most effective method, causes irreversible shutdown of ovarian function; 2) medicinal (analogues of luteinizing gonadotropic hormone: goserelin 3.6 mg intramuscularly once every 28 days or 10.8 mg subcutaneously once every 12 weeks; or buserelin 3.75 mg intramuscularly once every 28 days; or leuprorelin 3.75 mg IM 1 time in 28 days): causes reversible suppression of ovarian function; does not always provide complete suppression of ovarian function, especially in young women; to confirm complete ovarian suppression, it is necessary to determine estradiol in the blood serum; determination of follicle-stimulating hormone during treatment with luteinizing gonadotropic hormone analogues is not informative; aromatase inhibitors should be started 6-8 weeks after the first administration of luteinizing gonadotropin hormone analogues; luteinizing gonadotropin hormone analogues are administered monthly; 3) radical; causes irreversible shutdown of ovarian function. The optimal method of ovarian suppression has not been determined; it is usually prescribed for a period of 2-5 years.

Hormone therapy for BC for menopausal patients is carried out in the following variations: 1) tamoxifen 20 mg/day orally daily for 5 years; 2) aromatase inhibitors (letrozole 2.5 mg/day orally daily, or anastrozole 1 mg/day orally daily, or exemestane 25 mg/day orally daily) for 5 years; in the presence of at least one unfavorable prognosis factor: preserved ovarian function after adjuvant chemotherapy, T3-4, involvement of ≥ 4 axillary lymph nodes, GIII, positive HER2, high Ki67; 3) tamoxifen 20 mg/day orally daily for 10 years; in the presence of at least one unfavorable prognosis factor: preserved ovarian function after adjuvant chemotherapy, T3-4, involvement of ≥ 4 axillary lymph nodes, GIII, positive HER2, high Ki67; 4) tamoxifen 20 mg/day orally daily for 5 years, then aromatase inhibitors (letrozole 2.5 mg/day orally daily, or anastrozole 1 mg/day orally daily, or exemestane 25 mg/day orally daily) for 5 years. For patients who have reached stable menopause by the time they stop taking tamoxifen, in the presence of

at least one unfavorable prognosis factor: preserved ovarian function after adjuvant chemotherapy, T3-4, involvement of ≥ 4 axillary lymph nodes, GIII, positive HER2, high Ki67; 5) abemaciclib 150 mg 2 times a day in combination with endocrine therapy for the adjuvant treatment of hormone receptor-positive (HR+) and human epidermal growth factor receptor type 2 receptor-negative (HER2-) BC in the early stages with involvement of regional lymph nodes and a high risk of relapse - continuously for 2 years or until disease relapse or intolerable toxicity develops [3].

And, of course, the surgical method remains one of the leading methods in the treatment of this pathology, and in some cases, it is the only method of treatment (cancer in situ). For BC, the following types of surgical interventions are performed: 1) radical mastectomy according to Halstead - single-block removal of the mammary gland along with the pectoralis major and minor muscles and their fascia, subclavian, axillary and subscapular tissue with lymph nodes within the anatomical cases; 2) extended axillary-thoracic radical mastectomy, single-block removal of the mammary gland with the pectoral muscles, subclavian-axillary and subscapularis tissue, as well as a section of the chest wall with parasternal lymph nodes and internal mammary vessels; 3) functionally sparing operations (modified radical mastectomy - differs from Halstead mastectomy by preserving the pectoralis major muscle; modified Madden mastectomy - differs from Halstead mastectomy by preserving both pectoral muscles; 4) simple mastectomy - removal of the mammary gland with the fascia of the pectoralis major muscle (indications: decaying tumor, advanced age, severe concomitant diseases; 5) radical sectoral resection - removal of the sector along with the tumor, part of the underlying fascia of the pectoralis major and minor muscles, subclavian, axillary, subscapular tissue with lymph nodes in one block; 6) sectoral resection - removal of the breast sector to the underlying fascia (performed only for diagnostic purposes or in combination with radiation therapy for cancer in situ); 7) biopsy of the sentinel lymph node is carried out for diagnostic and therapeutic purposes in the early stages of the disease (1st level lymph nodes are removed with a histological express study to determine the presence of elements of a malignant tumor); detection of sentinel lymph nodes is possible using radioactive colloid and/or blue dye; a combined determination method is preferred.

Indications for performing organ-preserving operations: the presence of a nodular form of cancer up to 2.0 cm in size; absence of multicentricity and multifocality of tumor growth (on mammograms, ultrasound data, clinical examination); slow and moderate growth rate, doubling of tumor size no faster than 3 months (according to medical history); a favorable ratio of the size of the mammary gland and the tumor to obtain a good cosmetic result of the operation; absence of distant metastases; the presence of single metastases in the axillary region is acceptable; the patient's desire to preserve the mammary gland; satisfactory objective tumor response (partial and complete tumor regression) to previous neoadjuvant systemic treatment.

Reconstructive operations can be performed for stages I-III of BC at the request of the patient at any tumor location: 1) reconstruction (primary or delayed) of the mammary gland using an endoprosthesis (implant) (this type of operation involves the installation of a temporary (expander) or permanent prosthesis under the pectoralis major muscle, which allows compensation for the defect due to its volume, after mastectomy); 2) one-stage reconstruction: a skin-skin-sparing mastectomy is performed with the fascia of the pectoralis major muscle (if tumor cells are detected in the tissue behind the nipple during express histological examination, the nipple with the areola is removed); 3) reconstruction (primary or delayed) of the mammary gland using one's own tissues (autoplasty); this type of reconstruction involves replacing the defect using one's own tissues; basically, 2 types of operations are used - breast reconstruction by replacing with a TRAM flap (using a flap based on the rectus abdominis muscles) and breast reconstruction by replacing with a thoracodorsal flap, which is used in combination with an endoprosthesis.

Types of surgical interventions for metastatic BC: 1) sanitary/simple mastectomy (if there is a threat of bleeding for health reasons); 2) open liver biopsy (diagnostic surgery for suspected liver metastases); 3) other diagnostic manipulations on the liver (liver resection in the presence of single metastatic foci in the liver); 4) excision of the affected area or tissue of the meninges (in the presence of solitary metastatic foci of the meninges); 5) other types of excision or destruction of the damaged area or brain tissue (in the presence of solitary metastatic foci in the brain); 6) precision resection of a segment of the lung (in the presence of solitary metastatic foci in the lungs); 7) laparoscopic salpingo-oophorectomy (prophylactic bilateral removal of appendages for hormone-dependent BC tumors in premenopausal patients); 8) total hysterectomy with appendages (for metastatic lesions of the ovaries, uterine body); 9) electrochemotherapy for intradermal metastatic lesions (combination treatment that uses the administration of chemotherapeutic drugs in association with electroporation of the cell membrane).

Contraindications to surgical treatment for BC: the patient has signs of inoperability and severe

concomitant pathology; distant metastases, the presence of a disseminated tumor process; synchronously existing and widespread inoperable tumor process of another localization, for example lung cancer, etc.; chronic decompensated and/or acute functional disorders of the respiratory, cardiovascular, urinary system, gastrointestinal tract; allergy to drugs used in general anesthesia.

Also, a very important point is preventive measures for BC. Primary prevention of BC is the prevention of the disease by studying the etiological and risk factors (normalization of family life, timely implementation of childbearing, breastfeeding the baby, avoiding marriages in cases of mutual cancer). Secondary prevention of BC is the early detection and treatment of precancerous diseases of the mammary glands. Tertiary prevention is prevention, early diagnosis and treatment of relapses and metastases; using a nutritious diet rich in vitamins and proteins, giving up bad habits (smoking, drinking alcohol), preventing viral infections and concomitant diseases, regular preventive examinations with an oncologist, regular diagnostic procedures (radiography of the lungs, ultrasound of the liver, kidneys, neck lymph nodes).

Prophylactic mastectomy - risk-reducing surgeries, such as mastectomy with reconstruction, may be offered to women at risk. The risk of developing BC is reduced by approximately 90-95%, however, absolute guarantees regarding the occurrence of BC in the future are impossible. Indications for performing bilateral prophylactic mastectomy in women who do not currently have BC (in order to reduce the risk of developing primary BC): mutations of the BRCA1 and BRCA2 genes; family history (presence of BC in first- and second-line relatives) without a proven mutation; histological risk factors are atypical ductal or lobular hyperplasia. Indications for performing prophylactic contralateral mastectomy in women with current or past BC: newly diagnosed unilateral BC stage I-II, or a history of stage I-II BC (in order to reduce the risk of developing cancer in the contralateral mammary gland and achieving symmetry with the operated mammary gland); lobular carcinoma in situ. Contraindications for use: age over 70 years; general contraindications to surgical treatment; synchronous and metachronous malignant tumors, with the exception of skin cancer [3].

Next, of course, it is necessary to discuss in detail the issue of BC screening. The key concept of BC screening is the detection of oncological pathology in the early stages, when the prognosis is most favorable and allows you to get the best long-term treatment results. A preventive examination always has advantages over a diagnostic examination when symptoms of the disease are already present. At the same time, upon receipt of the M2 and M3 indices according to the BI-RADS classification, it is possible to timely additionally examine these patients and, if necessary, take them to the dispensary record by a district mammologist with effective dispensary examinations and treatment of precancerous breast diseases. Along with this, it must be understood that the main conditions for screening for BC are the availability of trained personnel and a standardized approach to identifying the trait under study and evaluating the results. The methods used should be sufficiently simple, reliable and reproducible, and also have sufficient sensitivity and high specificity. Such qualities are fully possessed by modern digital mammography [4,5,6].

Now, regarding this pathology in our country at the republican level. BC ranks first in the structure of the frequency of malignant neoplasms in both sexes in the population with a share of 14.9% (14.7% in 2022). This situation has been stable since 2004, in addition, BC ranks first and stably remains in this position in the structure of female oncopathology.

The incidence of BC in 2023 as a whole in the country increased to 27.7 per 100 thousand of the population with a growth rate of 4.3% compared to the previous year (in 2022 - 26.5). In the structure of cases, BC ranks first in the absolute majority of regions and cities of the country [7].

The incidence of BC in 12 regions of the country is higher than the national average (27.7 per 100 thousand of the population). The top three regions by this indicator are North Kazakhstan - 45.1; East Kazakhstan - 41.7 and Karaganda - 40.4. Next come: Kostanay - 39.1; Abay - 38.1; Pavlodar - 37.5; the city of Almaty - 36.2; Akmola - 35.9; the city of Astana - 34.3; Ulytau - 33.4; West Kazakhstan - 28.7 and Aktobe - 28.4 regions. This indicator is below the national average in 8 regions: Turkestan - 11.4 (the lowest level); Zhambyl - 15.8; Mangistau - 16.7; the city of Shymkent - 17.9; Almaty - 20.0; Kyzylorda - 20.2; Atyrau - 22.5 and Zhetysay - 22.8 per 100 thousand population. Mortality from this pathology was 5.3 per 100 thousand population. In the structure of causes of death in women in 2023, this pathology continues to occupy a leading position (1st rank place), amounting to 17.3% or 1056 people (17.2% and 1060 women, respectively).

The regions with the BC mortality rate above the national average (5.3 per 100,000 population) are: East Kazakhstan - 9.6 (maximum level); Pavlodar - 8.2; the city of Almaty - 7.8; Abay - 6.7; the city of Astana - 6.5; West Kazakhstan - 6.2; Kostanay - 6.1; Karaganda and North Kazakhstan - 5.6 and Akmola - 5.5 regions of the country. The lowest rates were recorded in Turkestan - 2.3 (minimum level); Ulytau -

3.2; Aktobe - 3.4; Atyrau - 3.6; Zhetysu - 3.7; Mangistau - 4.0; Kyzylorda - 4.3; Almaty - 4.6; in the city of Shymkent - 4.7; in Zhambyl - 4.8 regions per 100 thousand population [7].

The number of deaths from BC, not registered with oncology organizations and established posthumously in the Republic of Kazakhstan in 2023 amounted to 4 people; at the same time, the specific weight was 0.1% and this is the 22nd ranking place, as in the previous year.

At the same time, the one-year mortality rate was 3.4%. At the same time, the ratio between one-year mortality and neglect (stage IV) was, as in 2022, 0.7. At the same time, we recall that the farthest from "1" is the worst ratio between the indicators of one-year mortality and neglect.

Now, regarding preventive examinations. It should be noted that during large-scale preventive examinations of the population in 2023, significantly more patients with malignant neoplasms were actively identified than in 2022. This is 25,193 patients against 23,623 patients identified in 2022, i.e. +6.6%. This is due to the further abatement of the epidemiological situation with coronavirus and the increased availability of preventive care for the population. The proportion of patients identified during routine examinations increased from 62.0% to 62.4% of the total number of patients identified per year.

The number of newly identified BC patients registered with oncology organizations in 2023 amounted to 5,426 people (5,101 in 2022).

As for preventive examinations. The absolute number of BC patients identified during routine examinations amounted to 3,072 people (2,822 a year earlier). At the same time, the proportion of those identified during routine examinations increased from 55.3% in 2022 to 56.6% in 2023. At the same time, despite the fact that the absolute number of people diagnosed with this pathology increased from 2474 to 2636 people, the proportion of patients diagnosed with BC at early (I, II) stages decreased from 87.7% to 85.8%. Of course, when analyzing the epidemiological situation, early diagnostic indicators are very important issues.

The regions where the proportion of patients with early stage I of the pathology in question is above the national average (35.8% and 9th place) include the following: Ulytau - 56.8% (the best indicator); Kyzylorda - 50.3%; Turkestan - 47.3%; the city of Shymkent - 46.0%; West Kazakhstan - 45.4%; the city of Astana - 44.6%; Mangistau - 44.2%; North Kazakhstan - 41.4%; Karaganda - 38.7%; Almaty - 38.5%; Pavlodar - 38.1% and East Kazakhstan - 36.1%. The lowest rates of early diagnosis were recorded in the Zhambyl region - only 14.0%; Atyrau - 24.4%; Akmola - 25.2%; the city of Almaty - 26.2%; Kostanay - 27.4%; Zhetysu - 31.4%; Aktobe - 35.0% and Abay - 35.7% regions of the country [7].

The average indicator in the country for detecting patients with BC at early (I and II) stages was 88.4%, and this is a high 4th rank place among all nosological forms of malignant neoplasms.

The regions where the proportion of patients with BC detected at stages I-II is above the average in the republic include the following regions: Atyrau - 94.2%; Aktobe - 92.4%; Kyzylorda - 92.3%; Pavlodar - 92.1%; the city of Shymkent - 92.0%; West Kazakhstan - 91.8%; North Kazakhstan - 91.6%; the city of Astana - 91.3%; Turkestan - 90.9%; Ulytau - 90.5%; Almaty and the city of Almaty - 89.0%; Abay - 88.5%. Mangistau region is on par with the national average. Below the national average are: Karaganda - 79.8%; Kostanay - 81.1%; Akmola - 82.4%; Zhetysu - 86.2%; East Kazakhstan - 86.6%; and Zhambyl - 87.6% of the regions [7].

As can be clearly seen from the above data, there is a very wide range in early diagnosis rates (at stage I of the disease) across the country, from very good to dismal. Of course, it is necessary to take into account migration processes and other factors affecting the early diagnostic rates, but nevertheless, the obtained results give a reason not to stop there, both for oncologists and mammologists, obstetricians-gynecologists, radiologists, and, naturally, for general practitioners, since improving the early diagnostic rates of malignant tumors, as one of the main postulates and one of the main tasks of medicine in general, continues to be relevant today. Among the visual localizations of malignant tumors in the reporting year, the proportion of seven main forms determines the picture of late diagnostics (stages III-IV) and amounts to 13.3% in total, with a decrease compared to the level of the previous year (2022 - 14.2%). At the same time, with BC, the neglect rate was 11.6% (13.8% - in 2022).

The proportion of stage IV BC among all nosological forms of malignant neoplasms was 4.3%. The following indicators were noted by regions of our country: in East Kazakhstan - 8.4% (the worst result); Karaganda - 7.4%; Mangistau - 6.2%; Kyzylorda - 5.9%; Almaty - 5.3%; Atyrau - 5.1%; Akmola and Kostanay - 5.0%. At the same time, the lowest neglect of this cancer localization was established in the West Kazakhstan region - 2.1% [7].

The morphological verification rate of the disease in the country was 99.4%. At the same time, the leaders in this aspect with a 100% indicator are Almaty, Zhambyl, Mangistau, North Kazakhstan, Ulytau regions and the city of Shymkent. Next come: the city of Astana and the Karaganda region (99.8%); East

Kazakhstan (99.7%); the city of Almaty, Turkestan and Abay regions (99.6%); West Kazakhstan (99.5%). At parity with the national average are Kostanay and Atyrau regions. Then come: Aktobe (98.9%); Pavlodar (98.2%); Zhetysay (98.1%); Akmola (97.8%); Kyzylorda (97.0% - the worst indicator in the republic) regions.

The total number of patients with malignant neoplasms registered with specialized oncology organizations of the republic continued to grow and by the end of 2023 amounted to 218,186 people, with an increase of 6.0% compared to the level of the previous year (2022 - 205,822, +5.8%). The overall incidence rate of malignant neoplasms increased by 3.9%, from 1055.3 to 1096.4 per 100 thousand people. The growth of this indicator is due to both the increase in the incidence and detection of pathology, and the increase in the survival rate of cancer patients. In addition, statistical data on patients diagnosed with malignant neoplasms, who have been under observation for 5 years or more, and continue to be observed in 2023, showed that the number of patients under observation by oncological organizations in Kazakhstan for over five years continued to grow and at the end of the reporting year amounted to 117,616 people, with an increase of 6.2% (2022 - 110,790 people, +6.6%) (form. No. 7).

It is impossible to ignore such an important clinical aspect as the coverage of patients with a diagnosis of BC in the Republic of Kazakhstan with special treatment.

In 2023, the number of hospitalizations for all nosological forms of malignant tumors in the country's oncology organizations amounted to 108,252 cases (2022 - 101,095), with an increase of 7.1% compared to the previous year, which is associated with a constant increase in the number of cancer patients, improved standardization of oncology care, and the development of palliative and rehabilitation services.

At the end of 2023, the absolute number of BC patients who completed specialized treatment amounted to 3,419 people, continuing treatment - 1,729 patients. The following results were obtained in percentage terms by methods and types of treatment: 40.9% of patients received complex treatment, 21.8% received only surgical treatment, 20.0% received only drug treatment, 12.6% received combined treatment, 1.1% received only radiation treatment, 0.7% received chemoradiation treatment.

Next, regarding the five-year survival rate of patients. As for BC, at the end of 2023, 48,496 people were registered with the dispensary, or 243.7 per 100 thousand of the population. At the end of 2022, there were 45,728 patients, or 234.5 per 100 thousand of the population, respectively.

At the same time, the lethality of the observed contingents decreased slightly from 2.3% in 2022 to 2.2 in 2023.

The five-year survival rate of patients with BC was 57.7% in 2023 and 57.1% in 2022 [7].

Mass screening to identify BC patients should mainly involve healthy women without any signs of the disease or symptoms. Screening not only helps to detect hidden forms of cancer that can be treated, but also has psychological value for women. As a result of screening, women are convinced that they do not have BC, and this is the most important potential success of such programs. While the ultimate goal of screening is to reduce BC mortality, its immediate goal is to detect cancer before clinical manifestation. However, BC is a heterogeneous disease, which can significantly affect the effectiveness of screening. Screening models for BC are usually based on the fact that the majority of detected tumors are invasive cancers in the early stage of progression. In addition, it must be taken into account that the detection of cancer (or its precursors) before clinical manifestation increases the risk of false positive diagnosis [8,9].

Mammography has a sensitivity of 95% and a specificity of 97%. These indicators decrease when examining women with denser mammary glands (young age, use of hormone therapy), with low quality mammography, and also with insufficient qualifications of the radiologist. Detection of high-grade invasive cancer by screening, when the tumor is not yet detected by clinical examination (palpation), means the possibility of reducing mortality from BC [10].

Preventive screening for early detection of BC in the Republic of Kazakhstan includes [11]:

- 1) mammography of both mammary glands in two projections - direct and oblique in the mammography room of the city, district polyclinic (mobile medical complex). All digital mammograms in the presence of a system for archiving and transferring medical images are copied to CDs and other electronic media and transferred to the server of the mammography room of the Cancer Center using specialized licensed software integrated between medical organizations; in case of impossibility of digital transmission - they are printed on X-ray film at a scale of 1:1 - 100% (1 patient - 1 set - 2 or 4 mammograms) with subsequent transfer to the mammography room of the Cancer Center;

- 2) interpretation of mammograms according to the BI-RADS classification (M0t, M0d, M1, M2, M3, M4, M5) by two or more independent radiologists of the same medical organization - double reading or

different medical organizations: a radiologist of the mammography room city, district polyclinic (mobile medical complex) - the first reading, and the radiologist of the mammography room of the Cancer Center - the second reading;

3) in-depth diagnostics - targeted mammography, ultrasound examination (hereinafter - ultrasound) of the mammary glands, trepanobiopsy, including under ultrasound or stereotaxic control for histological examination, which is carried out in case of detection of pathological changes on mammograms (M0d) in the mammography room of the Cancer Center.

✓ An average medical worker or a responsible person of the organization of outpatient care sends the patient for mammography to the district, city polyclinic.

✓ The X-ray laboratory assistant of the mammography room of the city, district polyclinic (mobile medical complex) performs mammography, fills out a referral for double reading of mammograms and transmits the referral through information interaction.

✓ Radiologist of the mammography office of the city, district polyclinic (mobile medical complex): fulfills the requirements for the safety and quality of mammographic examinations; evaluates the quality of the images provided and the correctness of the installation; performs repeated mammography in the M0t category (technical errors of mammography); determines the radiological density of the mammary glands on the ACR scale (A, B, C, D) indicating this parameter in the study protocol; conducts the first reading of mammograms with interpretation of the BI-RADS classification results. In the M0d category (undetermined or suspicious radiological changes requiring additional examination), the study protocol indicates the predominant pathology: education, asymmetry, violation of architectonics, microcalcifications; sends mammograms, electronic copies of mammograms through the archiving system and transfer of medical images to the workplace of the mammography office of the Cancer Center together with directions for double reading of mammograms; directs low-dose CT images through the system of archiving and transferring medical images to the workplace of the CT office of the Cancer Center together with copies of images recorded on CD-ROMs or other electronic media and directions for double reading.

✓ The radiologist of the mammography room of the Cancer Center: evaluates the quality of the provided images and the correctness of the styling. Viewing digital X-ray images transferred to the server or on digital media (CD, DVD) is carried out on a monitor for interpreting digital X-ray images with a resolution of at least 5 megapixels, which has a certified grayscale transmission in accordance with the DICOM standard; conducts a double (second) reading of mammograms with the interpretation of the results according to the BI-RADS classification, using, if necessary, archival images. Organizes the third reading according to indications. With double reading, an independent interpretation of the images is carried out (blinding method - the second radiologist does not know the results of the first reading); in the M0m category (technical errors in mammography), recommends repeat mammography; in the M0d category (uncertain or suspicious radiographic changes requiring additional examination), the study protocol indicates the predominant pathology: education; asymmetry, violation of architectonics, microcalcifications; recommends that the outpatient care organization, according to indications, invite the patient for in-depth diagnostics (targeted mammography, ultrasound of the mammary glands, trephine biopsy, including under ultrasound or stereotaxic control, followed by histological examination of the material); collects and archives all mammograms (films and electronic media) made as part of the examination. The shelf life of mammograms is at least 3 years after leaving the age subject to a screening study; the results of the double (second) reading are transferred to the outpatient care organizations through information exchange.

✓ Indications for in-depth diagnostics are the conclusions of double reading mammograms M0d (uncertain or suspicious X-ray changes requiring additional examination).

✓ In-depth diagnostics is carried out in two stages. At the first stage, ultrasound is performed, according to indications, targeted mammography, possibly with an increase (with asymmetry, violation of architectonics and the presence of microcalcifications). When visualizing a suspicious pathology (M4 and M5), the second stage is performed - trepanobiopsy, including under ultrasound control and stereotaxic control for histological examination.

✓ Histological examination is carried out in the laboratory of pathomorphology or pathological bureau. Morphological interpretation of the biopsy is carried out in accordance with the recommendations of the World Health Organization.

✓ Physician or responsible person of the outpatient care organization:

1) upon receipt of a mammography result according to the BI-RADS classification:

- in case of M0t (technical errors in mammography) - sends the patient for a second X-ray examination to the mammography room of the city, district polyclinic (mobile medical complex);

- with M0d (undefined or suspicious X-ray changes requiring additional examination) - sends the patient for in-depth diagnostics to the mammography room of the Cancer Center;

- with M1 (no changes detected) - recommends that the patient undergo a follow-up mammography examination after 2 years. With radiological density of the mammary glands, C and D are sent for ultrasound of the mammary glands to exclude a false-negative result of mammography;

- with M2 (benign changes), refer the patient for a consultation with an oncologist (mammologist) of the clinical diagnostic department, followed by a screening mammography examination after 2 years;

- with M3 (probable benign changes) - sends the patient for short-term dynamic radiation observation to the local doctor with the recommendation of control mammography or ultrasound in 6 months;

- with M4 (signs that cause suspicion of malignancy), M5 (practically reliable signs of malignancy) and if it is technically impossible to perform a trepanbiopsy or a biopsy is refused, a referral to an oncologist (mammologist) of the clinical diagnostic department for dynamic observation and decision on the verification of the identified pathology;

2) upon receipt of the result of a histological examination:

- benign education - refers the patient to an oncologist (mammologist) of the clinical diagnostic department for dynamic monitoring, followed by a screening mammography examination after 2 years;

- formation with an indeterminate malignant potential or carcinoma in situ - refers the patient to the Cancer Center for consultation and treatment, followed by dynamic observation by an oncologist (mammologist) of the clinical diagnostic department at the place of her attachment;

- malignant neoplasm - refers the patient to the Cancer Center for treatment and follow-up;

3) communicates the results of the screening examination to the patient in any available way (by telephone, in writing, through electronic means of communication);

4) enters the results of double reading, in-depth diagnostics, histological examination, recommendations of the radiologist of the Cancer Center mammography room into the information system.

Establishing the size of the primary tumor is especially important in screening. Tumor size is an important criterion for evaluating the quality of screening and determining the ability of X-ray mammography to detect non-palpable tumors. Therefore, it is extremely important that pathologists measure tumor diameter as accurately as possible. The smaller the size of the primary tumor, the greater the likelihood of error in determining its size.

In 2023, the number of patients identified during screening examinations increased by 22.5%, from 2,230 to 2,731 people, as a result, the detection rate during screenings increased from 5.9 to 6.8%. During mammographic screening for BC in 2023, 918,464 women of the target group aged 40 to 70 were examined (a year earlier - 808,503 women). During mammographic screening in 2023, 1,875 cases of BC were detected (2022 - 1,570 cases). The cancer detection rate increased from 1.94 to 2.04 per 1,000 examined. The best result is in the North Kazakhstan region - 3.11 per 1,000 examined women (2022 - 2.31). High detection rates of BC were observed in Aktobe, Almaty, Atyrau, West Kazakhstan, Karaganda, Kostanay regions and in two megacities - the cities of Astana and Almaty. Low detection rates per 1000 examined, compared with the national average, were observed in Abay, Akmola, East Kazakhstan, Zhambyl, Kyzylorda, Mangistau, Pavlodar, Turkestan, Ulytau regions and the city of Shymkent. The lowest result was in Zhambyl region - 0.96 per 1000 examined women (2022 - 0.58). Compared to 2022, an increase in the detection of BC was noted in all regions, with the exception of Akmola (from 2.42 to 1.99), East Kazakhstan (from 2.21 to 1.93), West Kazakhstan (from 2.29 to 2.28), Karaganda (from 2.63 to 2.15), Pavlodar (from 2.15 to 1.51) regions, where a deterioration in results was allowed [7].

Summarizing the above, we can conclude that BC, along with lung cancer, continues to firmly occupy a leading place from year to year among all existing malignant tumors of other localizations. At the same time, taking into account a number of factors, the indicators of early diagnostics do not allow oncologists to "sleep peacefully". Despite the attitude to visually accessible localizations, the percentage of locally advanced forms of this type of tumors still remains quite high. The variability and veiled nature of symptoms, their similarity with various non-core processes (for example, the mastitis-like form of BC, often imitating mastitis), leads to the neglect of the disease. All this requires oncologists, and first of all, primary health care workers and, of course, mammologists, obstetricians and gynecologists, as well as radiologists to increase the level of oncological alertness, inform the population about early symptoms that may indicate this pathology or the onset of proliferative changes and conduct high-tech diagnostic measures, including for the purpose of differential diagnosis and, as a result, timely treatment.

Patients registered with various forms of so-called mastopathy need to regularly visit specialized specialists and, if necessary, undergo examination.

An epidemiological assessment of the situation with BC in our country allows us to say that in the

regions there are sometimes significant differences not only in morbidity rates, but also in the parameters of early diagnosis and mortality from this pathology. In connection with the above, this pathology continues to be a serious problem of modern clinical oncology.

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Pedagogical sciences

THE ROLE OF A TEACHER IN A VOCATIONAL PRE-HIGHER EDUCATION INSTITUTION IN SHAPING THE CIVIC AND NATIONAL IDENTITY OF LEARNERS

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Abstract

The article examines the significance and peculiarities of forming the civic and national identity of learners in vocational pre-higher education under the current socio-political conditions in Ukraine. The key role of the educator in this process is substantiated—as a bearer of values, mentor, and active participant in the educational environment. The main theoretical and methodological approaches to identity formation are defined, and practical mechanisms for influencing learners' consciousness are analyzed through the content of the educational process, educational activities, partnerships with civil society organizations, and personal example. The main challenges and barriers are identified, and promising directions for improving pedagogical activity in this context are outlined. The results of the study can be used in the practice of vocational education teachers, in the development of educational programs, and in the professional development of teaching staff.

Keywords: civic identity, national identity, learner, educator, vocational pre-higher education, educational process, upbringing, patriotism, pedagogical interaction

Introduction

Problem Statement. In the current conditions of transformation in Ukrainian society, accompanied by profound political, social, and security challenges, the issue of shaping civic and national identity becomes especially significant. The full-scale aggression against Ukraine has intensified the awareness of national unity, the values of freedom, democracy, and responsibility for the future of the state [8]. Under such conditions, education, particularly vocational pre-higher education, must provide professional training for youth and play a key role in shaping a conscious, patriotically oriented citizen. Learners in vocational pre-higher education institutions are at the stage of active personal development, worldview formation, and development of civic position. It is during this period that it is important to lay the foundation for understanding one's role in society, responsibility for one's actions, respect for human rights, cultural heritage, and national symbols. However, this process requires targeted pedagogical support. Educators in vocational colleges not only fulfill the role of knowledge transmitters but also act as mentors, educators, and role models. Their personal stance, style of interaction with learners, choice of topics for discussion and extracurricular activities significantly influence the formation of national-patriotic orientations among young people.

The relevance of the study is also driven by the need to rethink approaches to education under martial law, to strengthen interdisciplinary integration, and to seek new forms of interaction with youth that would be effective in the context of today's challenges. Therefore, studying the role of the teacher in shaping the civic and national identity of learners is important both for pedagogical practice and for the development of the education system as a whole.

The formation of civic and national identity among learners in vocational pre-higher education institutions requires a clear understanding of the basic concepts that form the foundation of the study.

Civic identity encompasses the awareness of oneself as a full-fledged member of civil society, ready to participate responsibly in the social, political, and legal life of the country. It includes such components as legal awareness, a sense of duty to society, critical thinking, and respect for the rights of other citizens.

National identity, in turn, is associated with the awareness of one's belonging to the Ukrainian people, acceptance of its history, language, culture, traditions, and state-building values [7]. Its formation is especially important in the context of military conflict, when the need for unity, resilience to external informational influences, and the strengthening of patriotic feelings increases.

Scientific research in the field of education indicates that the identity of learners is formed not only under the influence of the family or social environment but also as a result of the purposeful activity of educators within the educational process. This is why the role of educators becomes especially significant. Their professional stance, pedagogical style, personal example, moral qualities, and ability to engage in open dialogue with learners directly influence the development of civic consciousness and national self-awareness.

The methodological foundation of the study is the synthesis of psychological-pedagogical, sociological, and cultural approaches to the study of the personality identification process. The application of the competency-based approach allows civic and national identity to be considered as integrated components of personal development, which are subject to formation within the system of vocational pre-higher education [1,4].

A teacher in an institution of professional pre-higher education performs educational functions and carries an important sociocultural mission. In modern society, where there is a growing demand for moral, active and responsible citizens, the teacher becomes a key figure who forms value orientations in students, models examples of socially responsible behavior and promotes the individual's awareness of their role in the state and society. The lecturer acts as a bearer of the nation's cultural code, a transmitter of national traditions, language, and historical memory. Through the content of academic disciplines, examples from personal life, interpersonal communication, and educational activities, they can foster in students a deep understanding of the importance of civic position, a sense of national dignity, and the need to serve the common good. Students are particularly sensitive to the sincerity and consistency of teachers. They perceive not so much declarative statements as specific actions, reactions to social events, attitudes towards symbols of statehood, communication in the classroom and beyond. The teacher's personality in such conditions transforms into a living model to emulate – a bearer of active civic position, a patriot, an intellectual. It is important that the teacher considers the formation of students' identity as an integral part of the educational process. This process must be systemic and combine both educational and upbringing components. While teaching even professional disciplines, the teacher can find ways to integrate elements of patriotic education, development of critical thinking regarding historical events, current social problems, ethical dilemmas, etc. The sociocultural mission of the teacher lies in the harmonious combination of professional training of students with the formation of values in them that will contribute to strengthening civil society and national unity. Practical aspects of forming civic and national identity of students of professional pre-higher education require detailed research [2]. After all, the formation of civic and national identity of students requires from teachers a conscious, systematic approach and the use of appropriate pedagogical strategies within the educational process. Practice proves that this is most effectively achieved through a combination of educational activities, upbringing work, and extracurricular initiatives aimed at forming worldview values and civic activity. One of the key directions is the integration of patriotic and civic components into the content of academic disciplines. Within professional disciplines, the lecturer can create situations for discussing moral, social, and nationally significant issues. For example, analyzing ethical aspects of professional activity, the contribution of Ukrainian specialists to the development of science or economics, historical examples of responsible citizenship.

A successful practice is the organization of thematic events—memorial lessons, statehood days, round tables, debates on socio-political topics. Such activities promote reflection on national history, understanding of current challenges, and the formation of a sense of involvement in social processes. A special role is played by engaging learners in volunteer work, social interaction initiatives, and participation in civic or charitable projects [12]. This fosters social responsibility in students and allows them to practically experience the significance of civic engagement. Project-based activities are also effective, during which learners independently explore important topics—from national symbols to human rights. These projects should culminate in the creation of presentations, brochures, videos, and installations, which are later presented at the college-wide level. Cooperation with local communities, museums, veterans' organizations, as well as participation in nationwide events—such as contests, flash mobs, and

memory marathons—also serves as a favorable factor. This expands the educational space and helps learners feel like part of the national community. In all these practices, the educator plays a leading role as organizer, moderator, and personal example. Their ability to create an environment of trust, open dialogue, and cooperation is crucial in the process of identity formation.

Despite the growing need to shape the civic and national identity of learners, the educational process in vocational pre-higher education institutions faces a number of significant challenges and barriers that complicate the effective implementation of this task. One of the most common barriers is the predominantly pragmatic motivation of learners, who often perceive the educational process only as a means of obtaining a professional qualification. In this context, the humanitarian and educational components, particularly identity-related issues, are often pushed into the background. This decreases interest in discussing topics related to civic responsibility, national memory, or state-building. A significant challenge remains the lack of a systematic approach to forming value orientations within educational programs. Often, the educational component is not integrated into academic disciplines but is implemented fragmentarily—mainly in the form of separate events or initiatives that lack continuity or depth. It is also worth noting the insufficient readiness of some educators to fulfill their sociocultural mission. This may be due to the lack of pedagogical education among teachers of specialized disciplines, as well as the absence of necessary knowledge and skills for implementing the educational component. Frequently, educators do not have sufficient methodological support or opportunities for professional development in the field of civic education.

Another important issue is the limitation of resources: lack of time in academic schedules, teacher overload, insufficient funding for the implementation of socio-patriotic initiatives, and the absence of material and technical resources for visualizing educational work. External informational influences should also be considered, in particular aggressive propaganda, disinformation, and internet content that can shape distorted perceptions of history, the nation, and the state among learners. In the context of hybrid warfare, the educational process often has to compete for the worldview of the learner with powerful media resources. Despite these difficulties, most of them are not insurmountable. They point to the need for a consistent state policy, administrative support at the level of educational institutions, and the enhancement of educators' professional competence.

In the context of contemporary societal challenges, the issue of shaping the civic and national identity of learners in vocational pre-higher education requires further development both at the level of state policy and directly within the activities of each educational institution. Understanding this process as a long-term and multi-component strategy outlines promising directions for improving the educational process.

First and foremost, it is necessary to institutionally strengthen the educational component of the learning process [5]. This involves including tasks related to the formation of civic and national identity in curricula, educational standards, and strategic documents of the institution. Education should not be considered a secondary task; it must be organically integrated into daily pedagogical practice. One of the promising steps is the systematic professional development of educators, particularly in the areas of civic education, educational methods, elements of emotional intelligence, conflict resolution, and tolerance [6, 9]. A teacher must not only possess modern teaching methodologies but also be prepared to engage in dialogue with learners, understand their needs and inquiries, and identify potential issues in identity formation.

Another promising approach is the implementation of an interdisciplinary strategy in the educational process, whereby topics related to citizenship, historical memory, human rights, and national values are integrated into the content of both humanities and professional disciplines. It is also advisable to develop partnerships between educational institutions and local communities, veterans' organizations, volunteer initiatives, museums, and cultural institutions. Such cooperation creates a holistic educational environment in which learners can practically realize their civic stance [8, 10]. It is essential to support student initiatives related to patriotic, social, and environmental activities, to foster student self-government and youth leadership programs. This contributes to the development of skills in responsible leadership, participation in decision-making, and self-organization [3].

Finally, it is important to ensure psychological support for the educational process by creating an environment of safety, support, openness, and respect for each individual. Only in such an environment can a deep and conscious identity—both civic and national—be effectively formed [11]. Accordingly, the prospects for improving work in this direction are based on systemic approaches, educator professionalism, integration with the social environment, and the recognition of education as an integral function of vocational pre-higher education.

Figure 1 illustrates the key dimensions of the teacher's influence in shaping the civic and national identity of learners within vocational pre-higher education.

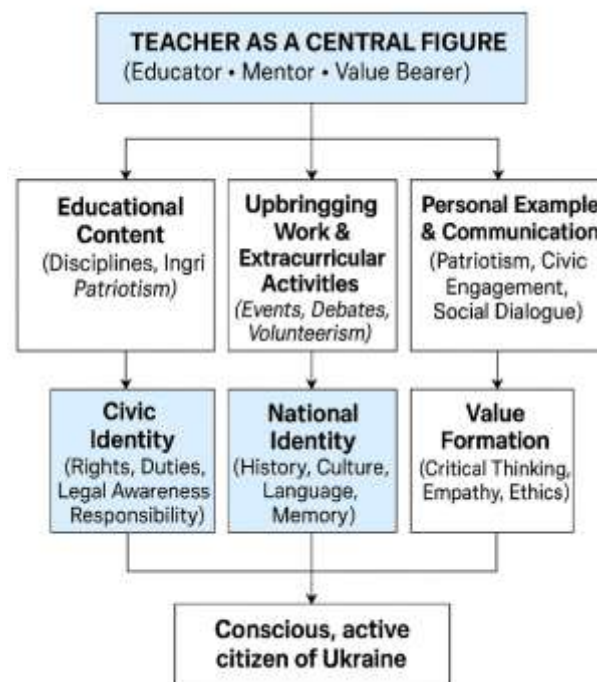


Figure 1. The teacher's role in shaping civic and national identity in vocational pre-higher education

The diagram highlights three core areas of pedagogical impact: educational content, upbringing activities, and personal example, which collectively contribute to the development of civic values, national awareness, and responsible citizenship. This integrative approach emphasizes the teacher's role not only as a knowledge provider but also as a mentor and moral guide.

Conclusions

In the current conditions of socio-political instability, war, and the transformation of Ukrainian statehood, the formation of civic and national identity among learners in vocational pre-higher education has become particularly relevant. The educational process must prepare professionals who are capable of realizing their potential in their careers and shaping responsible, conscious citizens who recognize their belonging to the Ukrainian nation and are ready to contribute to its development.

The key role in this process belongs to the educator—not only as a source of academic knowledge but also as a bearer of cultural, moral, and patriotic values. It is the teacher's personal example, pedagogical stance, ability to engage in dialogue, and capacity to create an educational environment that determine the effectiveness of identity formation in learners. The study revealed that the process of forming civic and national identity is multifaceted and requires a comprehensive approach: integrating relevant content into academic disciplines, organizing extracurricular activities, engaging in volunteer work, and building partnerships with community organizations.

At the same time, there are significant barriers: a pragmatic attitude toward education, insufficient training of some educators, the fragmented nature of educational work, and informational challenges. Overcoming these difficulties is possible with systematic support from the state, the administrations of educational institutions, and the enhancement of pedagogical expertise.

Thus, the formation of civic and national identity among learners in vocational pre-higher education is not an additional function but a strategic task of modern education, the implementation of which requires professional, ethical, and social responsibility on the part of educators.

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THE PECULIARITIES OF SOCIAL-PEDAGOGICAL WORK WITH TEENAGERS OF ADDICTIVE BEHAVIOR**Samedov Kamran Enver oglu***Doctor of Philosophy in Pedagogy, Associate Professor
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УДК 37.013.42

**ОСОБЕННОСТИ СОЦИАЛЬНО-ПЕДАГОГИЧЕСКОЙ РАБОТЫ С ПОДРОСТКАМИ
АДДИКТИВНОГО ПОВЕДЕНИЯ****Самедов Кямран Энвер оглы***доктор философии по педагогике, доцент
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The given article is dedicated to one of the actual problems of pedagogues – to organization of effective social-pedagogical work with teenagers of addictive behavior. In the article are analyzed reasons of appearance of such negative social phenomenon as teenagers of addictive behavior. In the article is affirmed that principal reasons of appearance of such negative social phenomenon were mistakes in process of family and school education of young people. An article emphasizes that in positive solution of such problem must take part all of social institutes of society. In the article are given necessary recommendations to improvement of the social-pedagogical work with teenagers of addictive behavior.

Аннотация

В статье рассматриваются вопросы организации социально-педагогической работы с подростками, проявляющими аддиктивное поведение. Анализируются причины возникновения данного негативного социального явления. Было выявлено, что ключевыми факторами, способствующими формированию аддиктивного поведения у подростков, являются ошибки, допущенные в процессе семейного и школьного воспитания. Отмечается, что эффективное решение проблемы требует участия всех без исключения социальных институтов общества. В статье приводятся примерные формы и методы социально-профилактической работы, направленные на повышение качества деятельности этих институтов в сфере предупреждения и коррекции аддиктивного поведения подростков.

Keywords: teenagers, addiction, social-pedagogical work, family, secondary school, social institutions of society

Ключевые слова: подростки, аддикция, социально-педагогическая работа, семья, средняя школа, социальные институты общества

Проблема, которую мы будем обсуждать на страницах нашей статьи, достаточно актуальна на современном этапе развития общества и является её первоочередной задачей с точки зрения формирования, развития и позитивной социализации подрастающего поколения страны, призванной в будущем выступать той мощной созидательно-конструктивной силой, с которой связано дальнейшее развитие общества по пути демократических преобразований. Для позитивного разрешения этой важной и злободневной задачи все социальные институты общества, систематически совершенствуя свой стиль работы, неизменно повышают уровень эффективности своих воспитательно-формирующих возможностей с молодыми людьми.

Опираясь на огромный потенциал двух самых мощных базовых социальных институтов общества – семьи и образовательного учреждения в области воспитательно-формирующей работы с молодёжью (в дальнейшем нас будут интересовать именно подростки), действуя с ними в органичном единстве, проблема, которую мы будем обсуждать в нашей статье, постепенно имеет видимую тенденцию своего позитивного разрешения. Речь идёт о подростках, склонных к аддиктивному (саморазрушающему) поведению. Подростки, находясь в

состоянии сильной социально-психологической дезадаптации, не находя своего места в реальной жизни, не видя эффективных путей своей дальнейшей личностно-социальной самореализации, выбирают (по их мнению) самый лёгкий путь избежать личностно-психологического напряжения и чувствовать себя на определённом этапе жизнедеятельности максимально комфортно. Сразу скажем, что это, в принципе, очень некорректная оценка влияния общества на личность и совершенно неверный подход с точки зрения того, что раз имеются какие-либо трудности в реальной жизни, то молодые люди подросткового возраста должны в целях своего личностно-психологического комфорта, опускать руки и не пытаться изменить ситуацию к лучшему.

«Аддитивное поведение подростков выражается в употреблении наркотических, психотропных веществ, употреблении спиртных напитков, посещение развлекательных учреждений, где можно попробовать покурить кальян, поиграть в азартные игры, расслабиться другими путями и тем самым сбросить личностно-психологическое напряжение» (1, 14). Конечно же, это не выход из положения, а, собственно говоря, одна из форм личностного самообладания, утверждающего подростков в мысли, что пусть сегодня будет так, но завтра всё автоматически изменится в явно лучшую сторону.

С одной стороны, вроде бы это уводит молодых людей подросткового возраста от реалий современной жизни, которая в дальнейшем (ввиду неподготовленности подростков) может столкнуть молодёжь с серьёзными жизненными трудностями, с другой, и это самый позитивный момент – использование наркотических, психотропных веществ, спиртосодержащих напитков имеет весьма кратковременный характер и не вызывает у подростков системного привыкания и физиологической, психологической зависимости. Хуже обстояло бы дело, если бы подростки попали бы под серьёзное физиологическое, психологическое влияние и зависимость от вышеназванных факторов. Конечно же, все социальные институты общества должны вести эффективную и действенную профилактическую работу с такими подростками, чтобы они, даже кратковременно, не использовали для своего внутреннего духовного комфорта таких путей ослабления своего личностно-психологического дискомфорта.

Ученые-исследователи и практические работники с высоким уровнем профессиональной подготовки (В.М. Астапов, Ф.М. Сушкова, Д.И. Фельдштейн, М.В. Шакурова, Т.А. Шишковец, Г.М. Бреслов, Л.И. Божович, М.Р. Битянова, Л.М. Аболин, И.В. Аугенберг и др.) в своих исследованиях и опубликованных книгах неоднократно повторяли и призывали работников психологических и социальных служб к тому, что к проблеме подростков, склонных к аддитивному поведению, надо относиться достаточно серьезно и ни в коем случае не воспринимать это как временный этап в их жизни, который по истечении определенного времени сам автоматически нивелируется без какого-либо вреда развивающейся личности подростка. Очень важно в работе с подростками, склонными к аддитивному поведению, проявить терпение, выдержку, высокий уровень профессиональной подготовки, максимальную заинтересованность в позитивизации жизненных перспектив и установок личности.

«Часто можно наблюдать, что причиной аддитивного поведения подростков выступает его низкий уровень развития социально-профессионального интеллекта» (7, 25). Такие молодые люди, как показывают наблюдения, ярко проявляют свою личностно-социальную и психологическую дезадаптированность, часто задаются весьма сложными вопросами: «Кто я?», «Что я хочу?», «Что мне интересно?», «Почему я не могу вести такой же образ жизни, как окружающие меня мои товарищи?», «Может быть, я какой-то особенный, или я чего-то очень серьёзно недопонимаю в жизни?». Такие вопросы, мучающие подростков, на первый взгляд кажущиеся элементарными, в действительности очень сложные и свидетельствуют о больших проблемах их внутреннего духовного состояния.

Специалисты, работающие в этой области, замечают, что, не найдя конкретных эффективных путей выхода из сложившейся ситуации, молодые люди подросткового возраста хаотически шарахаются из одной крайности в другую. Нам рассказывали историю, когда вот такой же подросток, сын весьма состоятельных родителей, думая, что он нашёл выход, освобождение от такого деструктивного личностно-психологического напряжения стал весьма активно покупать различную одежду и электронную аппаратуру. Забив этими вещами практически всю свою комнату и не получив никакого морального удовлетворения, он, без уведомления своих родителей, вместе с другими своими товарищами, находящими в таком же напряжённом состоянии, покинул свою семью и уехал в совершенно другой район страны. Пожив там некоторое время он вернулся домой и в беседе с правоохранительными органами признался,

что никакого удовольствия от ухода из дома он не нашел и проблемы, которые его мучали некоторое время назад, никуда не делись, а обострились ещё более серьезно.

С этим подростком работали психологи и было выявлено, что он по характеру своему весьма замкнутый человек, который очень нуждается в общении. Не умея наладить межличностные отношения с друзьями, которые заряжали бы его высоким чувством оптимизма и перспективы, этот молодой человек ушёл в себя, стал чаще курить, посещать увеселительные заведения и т.д. Причём, что очень интересно, в разговоре с психологом и со своими учителями он признавался, что его абсолютно не притягивает такая жизнь, что он так живёт, можно сказать, из чувства безысходности.

Специалисты также заметили, что обычно духовно-интеллектуальный потенциал таких подростков бывает на среднем уровне и, что очень прискорбно, ориентирован исключительно на потребительскую психологию личностно-социального самоутверждения. Сотрудники социальных институтов общества, понятно, ориентированы на массовый характер своей работы, охватывающий большое количество подростков, и что совершенно верно и понятно, однако, по нашему глубокому убеждению, за массовостью проводимой работы ни в коем случае нельзя забывать и о единичных сложных случаях, о которых, собственно, мы говорили выше. «Ведь массовость, по большому счёту, обеспечивается именно частностными и если их игнорировать, то ни о какой массовости говорить серьёзно не придётся» (2, 36).

Есть группа специалистов, которые подростков с аддитивным поведением рассматривают как первичную стадию формирования подростков с явно выраженным девиантным поведением. С этим утверждением не всегда можно согласиться, но надо признать, что определённая доля справедливости в таком утверждении, конечно же есть. Понятное дело, если с подростками аддитивного поведения проводить систематическую, целенаправленную работу по позитивизации их жизненных установок, заряжать их высокой энергией ожидания позитивной личностно-социальной самореализации, то, безусловно, перехода таких подростков в явно выраженное девиантное поведение, не будет. Однако, такая позитивная трансформация личности почти никогда не происходит автоматически – нужны кардинальные усилия семьи, средней школы, социального педагога и психолога, нужна, по большому счёту, консолидация усилий всех социальных институтов общества. Можно с большой уверенностью заметить, что аддитивное поведение подростков и модель поведения девиантно настроенных подростков, по сути, имеет общие корни – всяческим способом изолировать себя от общества, от решения ежедневных, саморазрушающих личностную психику проблем (не все подростки так думают, здесь очень важна самая серьёзная дифференциация).

Сюда также можно добавить состояние неуверенности в себе, постоянное беспокойство за своё будущее и т. д. Свою отрицательную лепту в жизнь подростков явным аддитивным поведением вносят СМИ со своей иногда очень агрессивно действующий на сознание и поведение молодых людей с системой подобранных материалов. Подросток, по сути, социально дезадаптированный и ищущий постоянно свою личностно-социальную нишу в социуме, становится своеобразным улавливателем агрессивного блока информации, преподносимой СМИ. Чего стоит, например, реклама разрушающих здоровье напитков «Пейте баночное пиво – это решение всех Ваших проблем», «Все зарабатывают, все живут в своё удовольствие, а почему бы и тебе не попробовать жить таким образом?», «Настоящий джентльмен при встрече с дамой не должен бояться огненных напитков, иначе он упадёт в глазах этой дамы». Вот такой, не совсем корректный посыл в массы молодых людей информации СМИ, способствует ещё большей степени личностно-социальной дезадаптации молодых людей. Они думают примерно так: «Если то, что преподносят СМИ, истинная правда (а почему, собственно, это должно быть неправдой, думают они), если жизнь вот так кардинально может измениться в лучшую сторону, почему бы и мне не зажечь красиво, в своё удовольствие, другие ведь поступают именно так и только выигрывают от этого?»

Многими практическими работниками такая ситуация оценивается очень неоднозначно и все принимается как программа деструктивных действий в жизни молодых людей (пить, курить, использовать все средства для поднятия состояния успешности, оптимизма, перспективы и т.д.). Используя такой путь личностно-социальной самореализации, подростки с аддитивным поведением постепенно втягиваются в такой алгоритм жизни проявляют в ней активность, достойную лучшего применения, и, соответственно, создают весьма фундаментальную базу для трансформации в число подростков с девиантным, делинквентным

поведением. «Социально-педагогическая работа с подростками аддиктивного поведения требует самого серьёзного внимания и отношения» (4, 51).

Такие виды аддиктивного поведения подростков как субстанциональная (алкоголизм, наркомания, употребление психотропных веществ) должна быть очень серьёзно воспринята родителями и педагогическим коллективом образовательного учреждения. Мы все прекрасно понимаем, что существуют определённые стадии вовлечения подростков в аддиктивное поведение. Выше мы заметили, что различные проблемы, возникающие в жизни подростков (личностно-социальная дезадаптация в социуме, буллинг в образовательных учреждениях, определённые гендерные проблемы, неумение наладить позитивные межличностные отношения и т.д.) способствуют тому, что подростки желая, максимально нивелировать их влияние на себя, бросаются в другую крайность, курят, пьют, употребляют наркотики, чтобы снять так пагубно действующий на них дискомфорт.

Это, фактически, начальная стадия аддиктивного поведения молодых людей и очень важно родителям, педагогическому коллективу средней школы, другим специалистам профильных учреждений вовремя заметить этот этап аддикции молодых людей и серьёзно заняться этой проблемой, не допуская её углубления и распространения на других подростков. Родители должны совместно с представителями педагогического коллектива средней школы с активным привлечением сюда специалистов высшей школы разработать основы системной деятельности по недопущению углубления состояния аддикции у своих детей. Есть очень серьёзное мнение, что часто состояние аддикции возникает у талантливых детей, детей интеллектуально развитых родителей. Такое состояние действительно есть, и такие талантливые дети бывают очень легко привлечены в компании пьющих людей. Это внутреннее психологическое напряжение буквально толкает таких талантливых молодых людей на поиск ситуаций и условий, где они могут успешно личностно и социально самореализоваться и продемонстрировать свой уникальный талант. Бывают ситуации, когда родители жалуются учителям средней школы, что их дети подросткового возраста практически не выполняют домашних заданий и всё время проводят за компьютером. «Родители, сами того не зная, воспринимают эту особенность своих детей как простую шалость и напрасную трату свободного времени» (6, 43).

Однако, проблема намного серьёзнее и информирует специалистов о возникновении определённой зависимости от социальных сайтов в интернете, которая, если вовремя не принять соответствующих серьёзных мер, может перерасти в откровенную игроманию, когда молодые люди, даже не принимая никаких мер не могут отойти от компьютера. Здесь можно наблюдать очень много факторов катастрофического упадка остроты зрения, эмоциональное опустошение, демонстрируемая агрессия или же глубокая личностная депрессия и т.д. Одни родители, к слову сказать, как показывает практика, с проблемой не справляется и очень часто пускают дело на самотек (ничего вырастет познаёт и перестанет заниматься этим делом). Другой полярный вариант работы родителей со своими детьми – строгое наказание, лишение пересмотра всех интернет-передач, что негативно сказывается на общем духовно-интеллектуальном развитии подростков. Родители должны, посоветовавшись с руководством школы, прибегнуть к профессиональной помощи школьного психолога, других психологических служб, чтобы вовремя захватить начальный этап аддикции в характере своих детей и максимально оградить их от его дальнейшего развития. Образовательные учреждения, придавая самое серьёзное внимание и значение вопросам аддикции у подростков могут организовать на базе средней школы семинары для родителей, молодых учителей, чтобы проблема не застала их врасплох, чтобы они были готовы к тому, что в жизнедеятельности подростков могут случаться факты неожиданной аддикции.

Считаем особенно важным заметить, что специалисты социальных институтов общества, непосредственно родители и представители педагогических коллективов образовательных учреждений, чтобы добиться позитивных результатов в работе с подростками аддиктивного поведения должны придерживаться нескольких очень важных условий:

- не критиковать механически подростков за их модель поведения, а глубоко разбираться в их причинах;
- подростки с аддиктивным поведением весьма чувствительные молодые люди, чтобы добиться их личностного расположения и принятия специалиста, работающего с ними, должен

очень выражено почувствовать, что работа с ними ведётся не чисто формального характера, а имеет цель оказать молодым людям серьёзную конструктивную помощь;

- необходимо в работе с подростками аддиктивного поведения заряжать их позитивным чувством оптимизма, высокой степенью личностно- социального самоутверждения, способствовать тому, чтобы молодые люди не на словах, а на деле почувствовали, что они являются активной созидательно-конструктивной движущей силой общества.

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Sociological sciences

THE NEW FORMS OF MIGRATION IN DIGITAL SOCIAL REALITY

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Abstract

The article devoted to analyze the expanding processes of digitalization of public life and an active development of artificial intelligence (AI). We are witnesses of creation a new social reality or a second reality, which the scientists sometimes call virtual reality or metasocium. Today we can see how an active human activity gradually transforming to the second reality or man-made environment. The problems of the increasingly complex dynamics of social development are discussed, in the context of modern trends in the nonlinearity of the new world order. Particular attention is paid to analyzing the impact of artificial intelligence that have become widespread, as well as the benefits and risks associated with the rapid entry of AI into our social life. The new social trends that have emerged after the COVID-19 Pandemic are considered, such as remote work, relocants, digital migration and the transfer of many forms of human activity to the second reality.

Keywords: second reality, metasocium, digital migration, artificial intelligence.

Introduction

Modern social challenges and processes of digitalization of reality are putting forward the need to develop a new concept of causality in sociological theory. Modern challenges existing within civilization have a non-linear impact on the all human life practices [Tiryakian, 2014, 91-112]. This requires the development of fundamentally new types of modernization. Subsequent processes of modernization led to the gradual transformation of technology into the relatively independent intellectual and technical substance. The expansion of digitalization processes and the active intervention of artificial intelligence (AI) have brought closer the possibility of step-by-step "humanization" of robots. Sociologists are concerned about such complicated dynamics of the social development. There is no longer a "pure" society, and that, in essence, this leads to the "end of the social" [Baudrillard, 1983]. Sociologists began to turn to interdisciplinary concepts that take into account modern trends in the nonlinearity and complexity of the new world order in the context of a growing digital format. In sociology, attempts are being made to comprehend some new nonlinear directions in the social developments. The hybridization of social and material worlds leads to their "complete intertwining", which contributes to the "alternativeness of future societies" and to the multiplicity of variations. [Urry, 2011, 8]. Sociologists began to interpret modernization as a "secondary axial revolution", coupled with the need to solve new ontological contradictions [Eisenstad, 1995]. In this context, new sociological theories are in demand, based on taking into account modern trends in the complexity and nonlinearity of the world order, the hybridization of socio-digital and natural reality. Serious developments are currently underway intensively and impressive results have already been achieved in the field of AI and digital transformation of society.

Problem of Digital Social Reality

Artificial modification of the human body in the future can replace its spontaneous evolution. In 5-10 years, AI will create such an extensive virtual reality that it will be difficult to distinguish it from the real one. For many years the interpenetration of two realities took place; a kind of interference of virtual and real reality. Similarly, AI plots are both real and far-fetched, artificial so much that it is difficult to distinguish. J. Baudrillard, describing the postmodern model of society, used the term "hyperreality". He describes a state in which a person cannot distinguish reality from simulation, since all objects of the

physical world are replaced by images and signs, which he called "simulacra". [Baudrillard, 1981]. The age of superintelligent people is coming: this opinion was recently expressed by Stephen Hsu, Professor of Michigan University and a founder of Cognitive Genomics Lab. [Hsu S., 2014]. Therefore, AI is unlikely to be able to replace humans in all areas of their activities. There is no doubt that it will find the widest application in almost all areas of human activity. Now AI is being trained to imitate people, make films, give interviews on behalf of another person and in his voice. New models of ChatGPT versions will have the opportunity to influence people, penetrate social networks and manipulate public opinion. AI will be able to create hundreds of thousands of humanoid bots that will have an impact on the mass consciousness. One of the creators of AI, Elon Musk recently responsibly stated that AI could become a threat to society and civilization¹. He called on humanity to start regulating this sphere as soon as possible and create a special agency for this.

Neural Network and Transition to the Metasocium

From the point of view of sociology, AI is interesting because it makes obvious the problems of the development of artificial sociality. Technologies such as ChatGPT open up new, previously unpredictable possibilities for transforming human dependence on algorithms. [Lindberg, 2023, 140]. Today upgraded and improved AI models appeared, which are 50 times smarter than the old versions. They perform natural language processing, search engine optimization, image and video processing, added reality and virtual reality. Researchers are now talking about creating the next generation of Internet platforms, which has been dubbed the "metauniverse." [Ball, 2020]. The founder of "Meta" Mark Zuckerberg described the metauniverse world as "the internet where you're on, not just looking at it."² The goal of the metauniverse is to create new ways of interacting between people and to digitalize real life. There is no single matrix in the world of the metauniverse, it is a reality in which the space is created by the users themselves. By February 2022, more than 10,000 virtual worlds had already been built. The number of monthly active users has already exceeded several hundred thousand people. By the 2026, one in four of us will spend at least an hour a day in the metauniverse: working, studying, communicating and making the necessary purchases [Ball, 2020]. However, recent sociological studies have shown that even today students have increased the amount of time spent on the Internet several times: in 2023, 83% of students spend more than 4 hours a day, and for some this figure reached up to 10 hours [Lesnoy, 2023, 62]. In fact, this is a new virtual reality, an artificially created space, in which real life is gradually being transferred to a digital platform. Thus, the metasocium is gradually beginning to displace real sociality, digitizing many forms of human activity.

Due to the COVID-19 pandemic in 2019-2020, many switched their work the remote format. This, of course, led to an even greater fragmentation of society, to a sharp reduction in real social contacts between people. However, the COVID is gone, but the remote work remains. And this will probably be even more in the future. A new so called "digital generation" of young people has appeared, for whom "remote" working has become a new way of life, the style of "digital nomad" [Makimoto, 1997]. According this, active digital travelers have replaced those who work on the remote from those who work at home.

Digital Migration and Nomadism

Digital relocants or digital autists of modern time prefer a kind of "escape from reality" into a second, parallel reality. We are witnesses of taking place an historical transition to metasocium. The second, parallel life creates the possibility of a double life in virtual reality on the World Network. Digital relocation allows people to escape "without loss" into another reality, into a new "other world." This is artificial parallel life in another reality. Each digital relocant will soon have its own artificial intelligence in digital reality or a kind of digital avatar in metasocium. This is an example of life in a parallel reality with own personal avatar. An avatar that could continue his life in matasocium, even after his actual death in the real life.

Now the big shopping malls and trade centers have begun to experience difficulties with customers, because of the young people are gradually moving to online platforms for purchases with home delivery. They order not only food, but clothes, shoes, equipment and anything else. Online trading is actively replacing trade in large stores and malls. In the near future, online trading platforms will dominate.

Visits to museums in other countries and cities are becoming available online. To do this, you don't need to travel to another country, buy a ticket, stand in a long line to get into the museum and theaters, etc. Digital tourism will become accessible to many people and for many will replace expensive trips

¹ BBC News. <https://www.bbc.com/news/uk-67302048> (accessed: 11.05.2024).

² Into the metaverse: What is it? <https://engati.medium.com/into-the-metaverse-what-is-it-960a22c6cea3> (accessed: 02.04.2024)

abroad. Online tourism can in many cases replace the real travels. The international scientific community is widely use opportunity to participate online at scientific conferences. Huge number of scientists have had the opportunity to make presentations and reports at the scientific events. Previously, such active and widespread participation was simply impossible due to high travel expenses. The same can be said about the new online learning opportunity. Many reputable universities have made themselves accessible to a huge number of students in online portals.

Conclusion

Remote working is becoming a part of our lives. We unexpectedly encountered this new social trend in Armenia when the Ukrainian war and Western sanctions forced many Russians to leave the country [Poghosyan, 2023, 52-61]. In the summer of 2022, about 150,000 Russians arrived in Armenia, moved their business, sometimes together with office workers. Most of them were young people, representatives of small businesses, IT companies and internet specialists, whom we have dubbed *relocanms* [Integration VS Repatriation, 2022, 193]. Many people, especially young generation, liked this so-called "digital nomadism". They travel around the world and work online with their employer. They are free from the need to visit the office every day. They are free to choose the place and time for their work. This makes them not only temporally independent, but also free from the fixed working place or local-free. If we consider that in the near future artificial intelligence will allow everyone to create a personal avatar in a digital format, then we can assume that this will allow one to become free from own physical body or body-free. Somebody will be able to send his avatar to the conference to present the scientific report. The avatar will even be able to answer on some questions from the participants or their avatars. Thus, this other reality - *metasociety*, gradually will begin to replace the people's stay in ordinary living space, filling most of his time. He will begin to live in double space-time, and will spend most of his life in a *metasociety*, or in a second parallel reality.

Currently, work is already underway in the field of digital sociology to study the social information on the worldwide network. For the such sociological studies Big Data processing methodology is used. In addition, with the development of quantum computer technology, statistical processing of Big Data will become more accessible and efficient. It is obvious that the capabilities of AI will again be used to analyze the results of digital sociology research in the space of *metasocium*. Thus, it can be assumed that in the near future sociologists will have to develop the new methodological foundations for the digital sociology to conduct survey on the behavior of virtual avatars in the *metasocial* space.

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Technical sciences

METHODS FOR AUTOMATIC DIAGNOSIS AND PREVENTION OF FAULTS IN CNC MACHINES

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Abstract

In modern industrial enterprises, CNC (Computer Numerical Control) machines play a key role in the automation of manufacturing processes. To ensure the precise and uninterrupted operation of these machines, continuous monitoring of their technical condition is essential. Therefore, the timely detection of faults and the implementation of preventive measures through automatic diagnostic systems have become increasingly important. This paper provides a comprehensive analysis of the methods applied for automatic fault detection in CNC machinery, examining the working principles of such systems as well as the role of artificial intelligence and sensor technologies. Through automatic diagnostic systems, indicators such as rotor imbalance, motor failures, gearbox vibrations, excessive vibration, and temperature rise are monitored and analyzed in real time. The collection and processing of this data enable the development of early warning mechanisms, which in turn help to effectively prevent unplanned downtimes and production losses.

The study also presents examples of the application of AI-based algorithms, machine learning models, and predictive analytics in industrial environments. Additionally, the role and effectiveness of advanced diagnostic tools such as vibration analysis, thermographic monitoring, and acoustic sensors are discussed in detail. The results of the research indicate that automatic diagnostic systems contribute significantly to extending the service life of CNC machines, reducing maintenance costs, and improving overall production efficiency. The paper also addresses current challenges in the field and highlights potential directions for future development.

Keywords: *CNC machines, automatic diagnostics, fault detection, maintenance optimization, artificial intelligence, machine learning, vibration analysis, thermographic monitoring, sensor technologies, real-time monitoring, predictive maintenance, automated production, production efficiency, equipment condition monitoring, prevention of unplanned downtimes.*

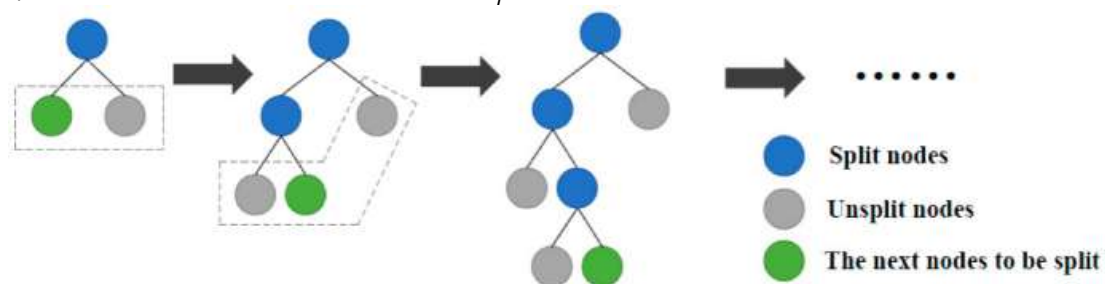
Methods for automatic diagnosis and prevention of malfunctions in CNC machines

The rapid development of technology and the widespread use of digitalization processes in modern industrial and manufacturing sectors have increased the demand for more efficient and accurate operation of production equipment. In particular, CNC (Computer Numerical Control) machines have become the main tool for automating production processes in complex and precision-demanding metalworking, mechanical engineering, automotive and other industries. As a result of the introduction of this equipment, the speed of production, product quality and technological accuracy have increased significantly. However, for the continuous and optimal operation of CNC machines, it is necessary to constantly monitor their technical condition and detect possible malfunctions in a timely manner. The occurrence of malfunctions in the production process not only leads to equipment failure, but also to production

downtime, loss of material and time, and additional financial costs. In this regard, the optimization of CNC machine tool diagnostics and repair services is an important factor in increasing the productivity of enterprises and maintaining their competitiveness. In the traditional approach, maintenance is carried out only after a malfunction occurs, which is considered a reactive type of service. This approach leads to loss of time, high repair and restoration costs, as well as unplanned production downtime. In recent years, industrial enterprises have been moving towards proactive and preventive maintenance. One of the most effective tools in this direction is automatic diagnostic systems.

These systems collect equipment operating parameters (vibration, temperature, sound, rotor balance, etc.) in real time through sensors, analyze data with the help of artificial intelligence and machine learning technologies, detect potential problems at an early stage and provide timely warnings for repairs. Automatic diagnostic and predictive service approaches extend the reliability and service life of CNC machine tools, reduce repair costs, minimize the number of interruptions in the production process, and increase the overall efficiency of production. In addition, this approach reduces the workload of technical personnel and allows for more systematic and accurate maintenance, reducing dependence on the human factor. In this article, methods for automatic diagnostics and prevention of malfunctions in CNC machine tools will be extensively analyzed based on modern technological approaches. The article will examine the structure of automatic diagnostic systems, used sensor technologies, artificial intelligence algorithms and real-time monitoring methods. Also, current challenges in this area, advanced technologies applied and future development prospects will be discussed. The goal is to expand knowledge in the direction of creating effective automatic diagnostics and prevention mechanisms to ensure reliable and uninterrupted operation of CNC equipment in industry. In the era of Industry 4.0 and digital transformation, the competitiveness of industrial enterprises and production efficiency depend to a large extent on the application of high technologies, including automated and digitally controlled equipment. In this context, CNC (Computer Numerical Control) machine tools - advanced technical means designed to perform complex machining processes with high accuracy and efficiency - have become the main element of modern production. CNC technology, while minimizing manual labor and reducing dependence on the human factor, ensures product quality and repeatability. This is highly demanded in various industries, especially in the automotive, aerospace, mechanical engineering and electronics industries.

However, CNC machines, like any technical system, experience various types of malfunctions and mechanical wear during their operation. Failure to detect these malfunctions in time leads to production downtime, serious equipment damage, reduced productivity and high repair costs. That is why continuous and accurate monitoring of the technical condition of CNC equipment, as well as early diagnostics of malfunctions, is of vital importance in terms of ensuring production continuity and economic efficiency in industry. Traditional maintenance methods have been more reactive in nature, that is, repairs are carried out after the equipment fails. This approach leads to production downtime, loss of resources and an increase in unplanned costs. In recent years, industrial enterprises have been switching to proactive and preventive maintenance models. These models allow you to monitor the condition of equipment in real time, detect potential failures at an early stage, and plan necessary technical interventions in a timely manner. Proactive technical services can be implemented



Şekil 1. *A Fault Diagnosis Method for Key Components of the CNC Machine Feed System Based*

NC machines are complex systems with various functions. Therefore, it is impossible to find a universal diagnostic method for all CNC machines and types of faults. Various methods are used together for effective fault detection and elimination.

1. Self-Diagnostic Function

Modern CNC systems have a powerful self-diagnostic function that continuously monitors the status of the hardware and software. When a fault is detected, a warning is displayed on the CRT screen or via an LED indicator. This function also displays the status of the interface signals between the system

and the host computer, helping to determine whether the fault is in the mechanical part or in the CNC system. This method is currently one of the most effective repair methods.

2. Functional Program Test Method

In this method, the main functions of the CNC system (such as linear positioning, arc interpolation, spiral cutting, fixed cycles, user macro programs, etc.) are programmed and entered into the CNC. Then this program is run to check whether the machine performs these functions correctly. This method is useful for determining the cause when starting machines that have not been running for a long time or when the product comes out of poor quality without warning.

3. Isolation Method

In this method, some control cycles are cut off to narrow the fault area. For example, if the movement of the machine center is stable in JOG mode, but there is a fault in automatic mode, it is first determined whether the NC system or the servo system is at fault. The servo speed signal is cut off and the battery voltage is supplied instead. If the fault persists, there is no problem in the NC system; then the clamping mechanism on the Y axis is checked.

4. Local Heating Method

After long-term operation, components wear out and their performance deteriorates. In this case, the fault becomes intermittent. Local heat is applied to the suspected part with a hot iron or soldering iron to accelerate the weakening of the component and fully detect the fault. At this time, the temperature must be adjusted properly to avoid damage to healthy components.

5. Tapping Method

This method is suitable for intermittent faults. The CNC system consists of multiple boards and each board has many solder points. Poor solder or poor contact can cause problems. If the fault is repeated by lightly tapping the suspect parts with an insulator, that place is identified as the source of the fault.

6. Comparison Method

Manufacturers have measurement terminals on the boards that are used during repairs. The voltage and signal shapes measured at these terminals on healthy and faulty boards are compared. These differences indicate the fault. Sometimes, the cause of the problem is clarified by creating artificial faults on a healthy board. Repairers should record the correct signals of healthy boards, as manufacturers do not often provide this information.

7. Diagnostics with Alarm Numbers

When a fault occurs in the CNC system, an alarm number is displayed on the screen. This number is the main diagnostic tool. Based on the alarm codes, the fault area is determined and the repairer narrows down the inspection area. Alarm numbers can indicate problems such as programming or operational errors, memory problems, servo system failures, programmable controls, communication failures, temperature, pressure, liquid level anomalies, and incorrect status of motion or proximity switches.

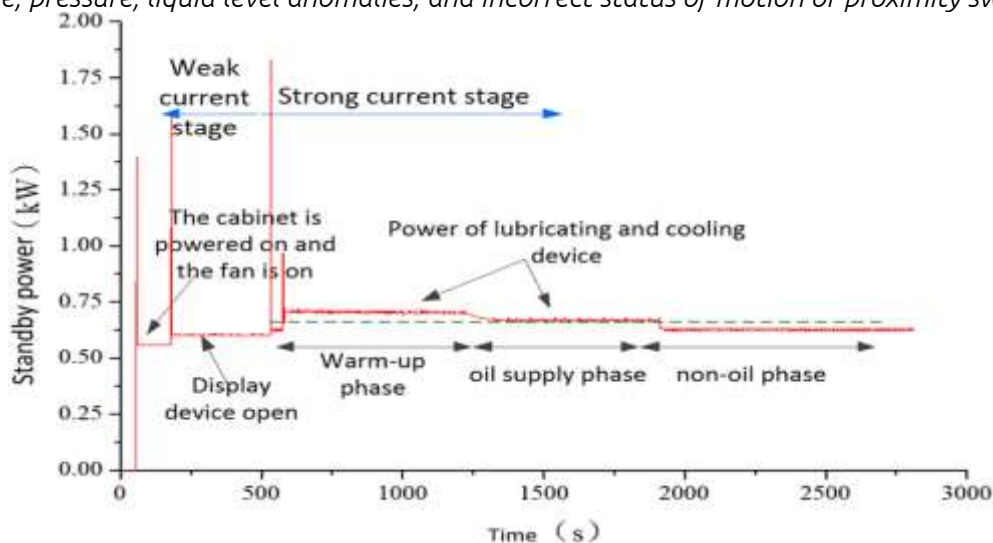


Figure 2. Standby power variation of a CNC machine during initialization and auxiliary system operation phases

In this graph, "Standby power (kW)" changes over time and shows a constant or variable value in several stages. We can use a piecewise function to express this type of function.

The stages and their approximate levels in the graph are as follows:

□ 0 to about 150 seconds: low current phase, standby power increases from about 0.5 kW to 0.6 kW.

□ About 150-300 seconds: cabinet opens, fan starts, standby power jumps from 0.6 kW to 1.75 kW.

□ 300-900 seconds: "Warm-up phase", constant at about 0.7 kW.

□ 900-1800 seconds: "oil supply phase", power at about 0.7 kW, with small variations.

□ 1800-3000 seconds: "non-oil phase", power constant at about 0.65 kW.

We can write the following piecewise function to express these stages:

$$P(t) \Leftrightarrow \begin{cases} 0.5 + \alpha t & 0 \leq t < 150 \\ 0.6 + \alpha_2(t - 150), & 150 \leq t < 300 \\ 0.65, & 1800 \leq t \leq 3000 \\ 0.7, & 300 \leq t < 900 \\ 0.7 + \delta(t), & 900 \leq t < 1800 \end{cases} \quad (1)$$

Burada:

• α_1 və α_2 - həmin intervallarda gücün artım sürətini göstərən kiçik sabitlərdir.

• $\delta(t)$ - 900-1800 saniyə arasında yağ təchizatı mərhələsində kiçik dalğalanmaları ifadə edir (məsələn, sönümlənən sinusoidə və ya səs-küy).

Conclusion

The role of CNC machines in modern industrial production is increasing, and the reliability, accuracy and durability of these systems have become one of the main factors of productivity. Timely detection and prevention of malfunctions ensures both production quality and financial efficiency. Automatic diagnostic methods allow for the early detection of malfunctions in CNC systems, ensuring the continuity and safety of operations. Through these methods, errors caused by the human factor are reduced, the diagnostic process is accelerated, and repair costs are minimized. Various automatic diagnostic methods analyzed in the study — including the use of sensors, real-time data monitoring, advanced technologies such as artificial intelligence and machine learning — help to timely identify various types of malfunctions of CNC machines, such as wear of mechanical parts, software errors, electrical problems, etc. In addition, thanks to predictive technologies, the probability of possible malfunctions is assessed in advance and appropriate preventive measures are taken.

At the same time, the introduction of automatic diagnostic systems increases the flexibility in the management of the production process, reduces the workload of operators and increases the overall production efficiency. In the future, with the wider use of artificial intelligence and big data in the diagnostics of CNC machines, the accuracy and speed of diagnostic processes will increase further, and the development of fully autonomous control systems will also be possible. As a result, the introduction of automatic fault diagnosis and prevention methods in CNC machines acts as an important factor ensuring the competitiveness and sustainability of industrial production. Research and technological innovations in this area will remain one of the main directions for increasing the reliability and productivity of CNC systems in the future.

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