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CONTENT

AGRICULTURAL SCIENCES

- Mammadova S., Mammadova N., Jafarova E., Bakhshieva N., Akhmedova V.*
DIFFERENT WAYS TO STIMULATE GERMINATION OF COTTON SEEDS STORED FOR A LONG TIME IN GENBANK CONDITIONS..... 4
- Nguyen Tuan Khoi*
THE EFFECTS OF PLANTING DENSITY AND FERTILIZER RATES ON THE GROWTH, DEVELOPMENT, AND YIELD OF NK6101 MAIZE VARIETY.....9

CHEMICAL SCIENCES

- Vasilkevich O., Klimko Yu., Levandovskii S.*
2- NITROGEN-CONTAINING DERIVATIVES OF TETRAHYDRODICYCLOPENTADIENE. SYNTHESIS AND ANTIVIRAL ACTIVITY 15
- Hasanaliev A., Israilov M., Gasanalieva P.*
STUDY OF THE TRIPLE SYSTEM AND ITS TRIANGULATIONCs₂MoO₄-MoV₂O₂-MoO₃.....18

ECONOMIC SCIENCES

- Verigo A., Wu Yizhe, Shparun D.*
PROBLEMS AND DIRECTIONS OF CLASSIFICATION OF ECONOMIC SYSTEMS 22

HISTORICAL SCIENCES

- Mammadov A.*
HISTORICAL DEMOGRAPHIC ISSUES IN THE STUDIES ON PRIMITIVE SOCIETY OF AZERBAIJANI HISTORIANS IN THE SECOND HALF OF THE XX CENTURY 37

MEDICAL SCIENCES

- Bukach O., Vikovan N., Domchuk V., Maslienkova K., Kaitanyuk A., Kaitanyuk O.*
CLINICAL AND BIOCHEMICAL FEATURES OF RHEUMATOID ARTHRITIS IN COMBINATION WITH ARTERIAL HYPERTENSION, TYPE 2 AND ABDOMINAL DIABETES OBESITY.....43

PEDAGOGICAL SCIENCES

- Yusupov F., Khujaniyazov M.*
LOGICAL STRUCTURING TRAINING CONTENT TOPICS METHODS OF NUMERICAL INTEGRATION OF DETERMINED INTEGRALS 46

PHILOLOGICAL SCIENCES

- Rohalska-Yakubova I., Chepelyuk N.*
NEOLOGISMS OF THE RUSSIAN-UKRAINIAN WAR PERIOD 49

PHYSICAL SCIENCES

- Khalilov S.*
STUDY OF SPATIALLY LIMITED CURRENTS CHARGE IN THE POLYMER POLYCONDUCTOR POLYHYDROQUINONE.....59

POLITICAL SCIENCES

Pérez Gamón Carolina Margarita

THE REFORM OF 1918 AND ITS IMPACT ON POLITICAL SCIENCES: LATIN AMERICAN IDENTITY, HIGHER EDUCATION AND THE FIGHT FOR SOCIAL JUSTICE ...62

Yatsenko V.

PENTABASIS AND AGE-RELATED PENTAPSYCHOLOGY67

SOCIAL SCIENCES

Petrov K., Tsonkov N.

SPATIAL PATTERNS AND OPPORTUNITIES FOR IMPROVING LOCAL GOVERNANCE IN BULGARIA..... 75

Sultanov O.

EXAMINING THE IMPACT OF FOOD SERVICE BUSINESS JOB DEMANDS ON MENTAL HEALTH (JDR MODEL): CASE OF FOREIGN WORKERS IN NORTH CYPRUS.....83

TECHNICAL SCIENCES

Moiseienko O.

RESEARCH ON MACHINE LEARNING-BASED RECOMMENDER SYSTEMS87

AGRICULTURAL SCIENCES

DIFFERENT WAYS TO STIMULATE GERMINATION OF COTTON SEEDS STORED FOR A LONG TIME IN GENBANK CONDITIONS

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Abstract

The article reflects the results of studying the effect of electromagnetic radiation of millimeter range on seeds of different samples of cotton, stored for a long time in the National Genebank of Azerbaijan and determining the optimal dose and method of exposure for the most effective stimulation of germination. The treatment was carried out on both dry and soaked seeds, as well as distilled water intended for irrigation of experimental seeds. Evaluation of germination energy and seed viability was carried out by laboratory germination test. Analysis of the obtained data revealed the germination stimulating effect of certain doses and exposures. The greatest increase in germination was observed at the dose of 180 Vt/dm³/120 seconds in all samples involved in the study. The pattern of suppressive effect of 900 Vt/dm³/120 seconds dose at direct exposure of seeds was also revealed, although the indirect effect of 900 Vt/dm³ dose through water stimulated seed germination.

Keywords: cotton, seeds, storage, germination, electromagnetic radiation

The cotton collection of the National Genebank of Azerbaijan has more than a thousand samples. Maintaining the viability of germplasm of plant genetic resources in an active state is one of the main tasks of Genebanks. Since the aging process of seeds is inevitable even under optimal conditions of long-term storage, the search for new ways and methods to increase the safety of seed material is relevant. The analysis of literature data has shown that the effect of electromagnetic radiation of millimeter range on living objects has a non-thermal, regulatory character and favorably affects their viability [1; 2; 3]. The work of S.M. Orekhova points to the acceleration of seed germination processes and the beneficial effect on seeds of pretreatment for 9 minutes of a magnetic field with an induction of 8 mTl and a frequency of 16 Hz [4]. I.I. Shamgunov notes that when wheat seeds are treated in the microwave oven mode of operation at low and medium power consumption, a significant increase in the biomass of seed germination is observed within 60 seconds [5]. In the work of Z.H.-M. Khashayev it is shown that distilled water irradiated with electromagnetic radiation is able to transfer the effect of exposure to biological systems, i.e., seeds involved in germination [6]. Therefore, we have attempted to use electromagnetic radiation to test the possibility of stimulating the germination of seeds whose viability has decreased due to prolonged storage

in cold storage [7]. In addition, the use of radiation of the millimeter range is more promising and effective than the use of other physical factors. Unlike chemical methods, electromagnetic radiation of the millimeter range when applied affects the vitality of plants and at the same time does not have any ecologically harmful effect on the environment.

The aim of the research was to study the effect of electromagnetic radiation of millimeter range on seeds of different cotton samples stored for a long time in the National Genebank of Azerbaijan and to determine the optimal dose and method of exposure to stimulate germination.

Materials and methods

During the search for ways to preserve the quality of seeds stored in the refrigerated chamber of National Genebank, experiments were conducted to study the effect of electromagnetic radiation of millimeter range on the example of seeds of a number of cotton samples - Agdash-6, Agdash-3, AP-331, AP-154, AP-157, Ganja-158, AG 2153.

Viability (G) was assessed in two repetitions by laboratory seed germination test expressed as a percentage of the total number of seeds planted (n):

$$G = \frac{A \times 100\%}{n}$$
, where A is the number of germinated seeds

The relative change in germination (V) was calculated using the formula:

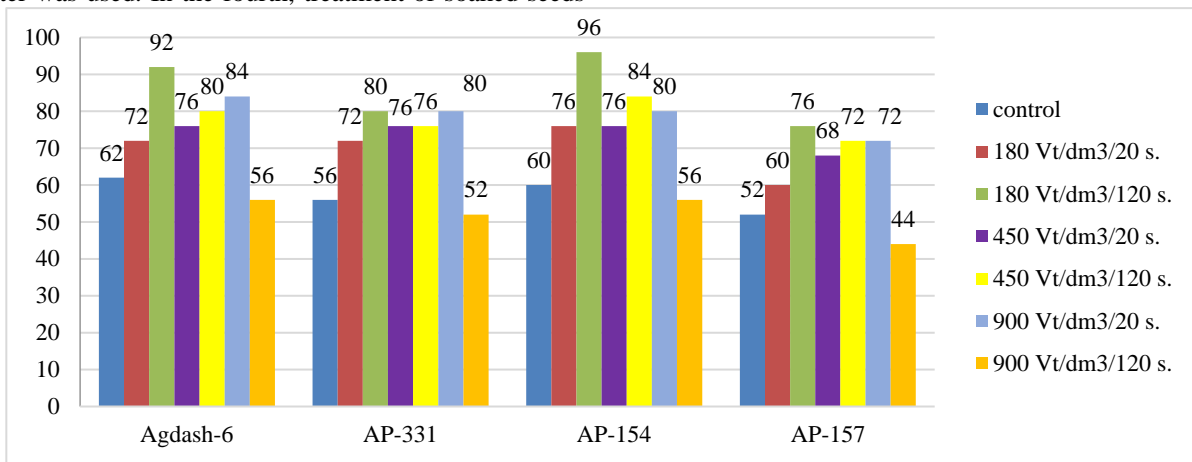
$V = \frac{M - M_0}{M_0}$, where M - % of experimental germinated seeds, M_0 - % of control germinated seeds.

At the initial stage of the study, the duration and strength of exposure to microwave radiation for seeds of each plant were selected in such a combination that the stimulation of seed germination was achieved. The equipment used was a Samsung C105AR/C105ABR microwave oven (230Vt/50Hz, 100Vt/900Vt power output unit, EC-705 standard, operating frequency 2450MHz, chamber volume - 28L). In the first experiment, 3 power units (180 Vt/dm³, 450 Vt/dm³, 900Vt/dm³) and 2 exposures (20 and 120 sec.) were used for seed treatment. In the second, doses - 450 Vt/dm³ and 600Vt/dm³ and 2 exposures (40 and 80 sec.) were used to treat the seeds. In the third experiment, electromagnetic ray treatment at a dose of 900 Vt/dm³ was used for 5, 10 and 15 seconds distilled water was used. In the fourth, treatment of soaked seeds

with doses of 300Vt/dm³ and 450 Vt/dm³ for 40 seconds and irrigation of seeds with distilled water treated with the same doses were used. Each series of experiments was accompanied by creation of equal conditions for germination of seeds of all tested plants.

Results and discussion

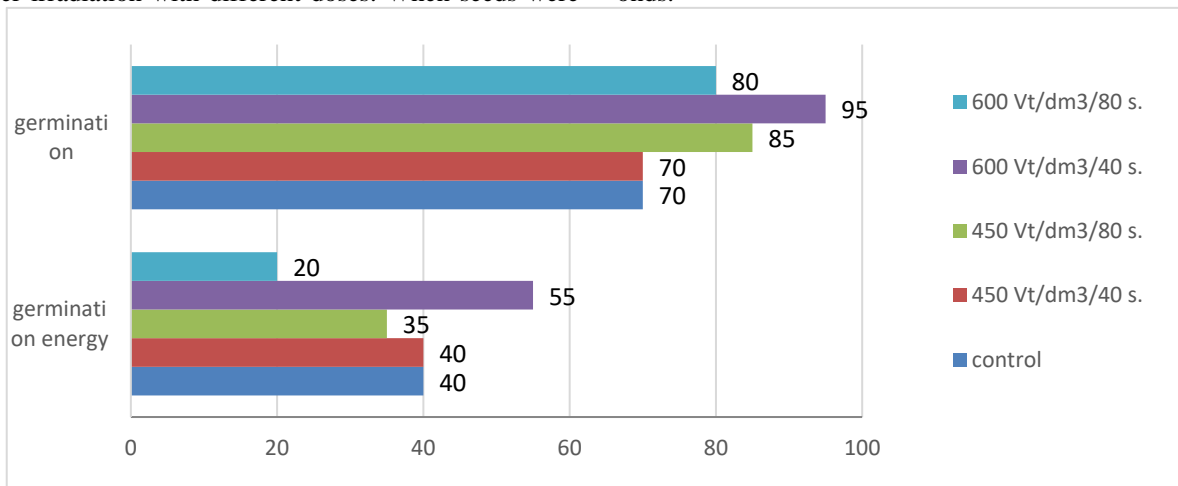
Seed germination and germination energy are the main indicators of seed quality. To determine the optimal dose and exposure of electromagnetic radiation stimulating germination of seeds of technical crops, 3 power units (180 Vt/dm³, 450 Vt/dm³, 900Vt/dm³) and 2 exposures (20 and 120 sec.) were used for 4 samples of cotton (*Gossypium* L. - Agdash-6, AP-331, AP-154, AP-157) stored in Genebank. As can be seen from Picture 1, for seeds of all cotton samples the applied combinations of dose and exposure time except for the highest one (900 Vt/dm³/120 sec.), at which seed germination decreased by 4.0-8.0%, turned out to be stimulating. The most effective dose was 180 Vt/dm³/120 sec.



Pic. 1. Effect of electromagnetic radiation on seed germination of 4 cotton samples

In the second experiment on the example of Agdash-3 variety, the combination of 2 units of radiation power (450 V/dm³ and 600 V/dm³) and 2 exposures (40 and 80 sec) was chosen. As can be seen from Picture 2 cotton seeds stored for a long time in the cold chamber had low (70.0%) germination in the control. Differences in germination of cotton seeds were observed after irradiation with different doses. When seeds were

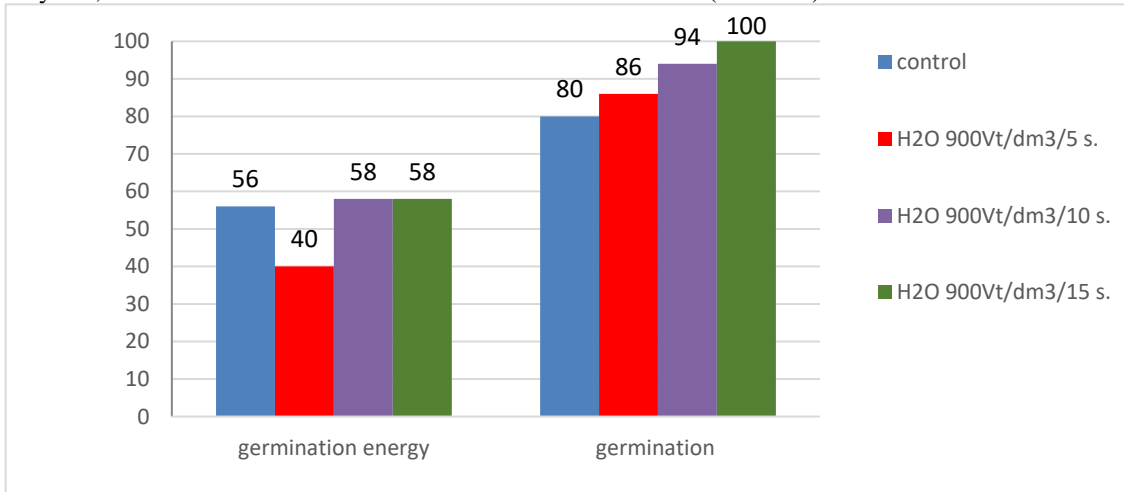
treated with a dose of 600 W/dm³ for 80 seconds, stimulation of seed germination was observed. Decreasing the duration of this dose resulted in even greater stimulation of seed germination. As a result of exposure to rays of such power, seed germination increased by 25.0% and amounted to 95.0%. Thus, the most optimal dose was 600 W/dm³ with duration of action - 40 seconds.



Pic.2 Effect of short-wave radiation on germination of cotton seeds (Agdash -3)

In further studies on the example of Ganja - 158 variety, the seeds of which were stored in the cold room for 11 years, it was revealed that treatment of soaked

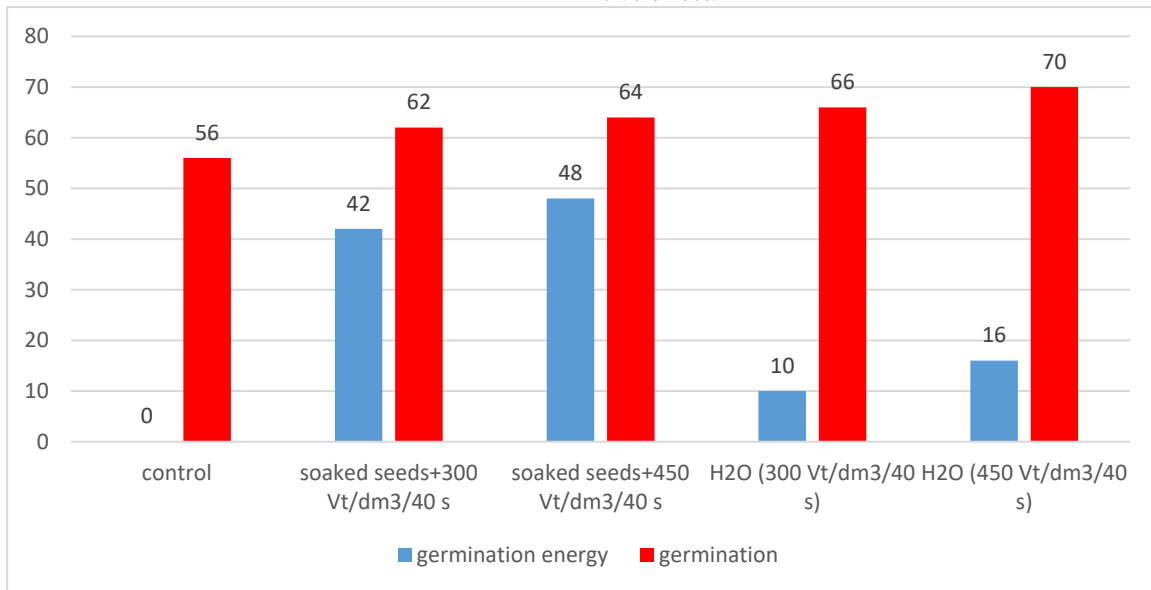
seeds with 900Vt/dm³ dose for 5, 10 and 15 seconds increased the number of germinated seeds by 6.0, 14.0 and 20.0% (Picture 3).



Pic.3 Germination of cotton seeds (Ganja - 158) treated with irradiated water

Further, it was of interest to identify the differences in the response of cotton seeds to the treatment of soaked seeds with doses of 300Vt/dm³ and 450 Vt/dm³ for 40 seconds and irrigation of seeds with distilled wa-

ter treated with the same doses. An increase in germination of 6.0 - 8.0% was observed in the former case and 10.0 - 14.0% in the latter. Thus, it can be concluded that treatment with irradiated water had a more effective effect.



Pic. 4. Effect of microwave radiation on germination energy and germination of soaked cotton seeds (AG-2153)

Analyzing the data on the effect of electromagnetic irradiation on germination of seeds of different cotton samples presented in summary Table 1 revealed stimulating germination combinations of doses and exposures. The greatest increase in germination was observed at the dose of 180 Vt/dm³/120 seconds in all

samples involved in the study. The pattern of suppressive effect of 900 Vt/dm³/120 sec. dose at direct exposure of seeds was also revealed, although the indirect effect of 900 Vt/dm³ dose through water stimulated seed germination.

Table 1

Results of analysis of the obtained data on the effect of electromagnetic irradiation on seed germination of different cotton samples

| Sample | Dose/exposure | EMI treatment | | | Relative change in germination, $\frac{M-M_0}{M_0}$ |
|------------|---------------------------------|----------------------------|-------|--------------|---|
| | | seeds | water | soaked seeds | |
| | | Increase in germination, % | | | |
| Agdash-6 | 180 Vt/dm ³ /20 s. | 10,0 | | | 0,16 |
| | 180 Vt/dm ³ /120 s. | 30,0 | | | 0,48 |
| | 450 Vt/dm ³ /20 s. | 14,0 | | | 0,22 |
| | 450 Vt/dm ³ /120 s. | 18,0 | | | 0,29 |
| | 900 Vt/dm ³ /20 s. | 22,0 | | | 0,35 |
| | 900 Vt/dm ³ /120 s. | -6,0 | | | -0,09 |
| AP-331 | 180 Vt/dm ³ /20 s. | 16,0 | | | 0,28 |
| | 180 Vt/dm ³ /120 s. | 24,0 | | | 0,42 |
| | 450 Vt/dm ³ /20 s. | 20,0 | | | 0,35 |
| | 450 Vt/dm ³ /120 s. | 20,0 | | | 0,35 |
| | 900 Vt/dm ³ /20 s. | 24,0 | | | 0,42 |
| | 900 Vt/dm ³ /120 s. | -4,0 | | | -0,07 |
| AP-154 | 180 Vt/dm ³ /20 s. | 16,0 | | | 0,26 |
| | 180 Vt/dm ³ /120 s. | 36,0 | | | 0,6 |
| | 450 Vt/dm ³ /20 s. | 16,0 | | | 0,26 |
| | 450 Vt/dm ³ /120 s. | 24,0 | | | 0,4 |
| | 900 Vt/dm ³ /20 s. | 20,0 | | | 0,33 |
| | 900 Vt/dm ³ /120 s. | -4,0 | | | -0,06 |
| AP-157 | 180 Vt/dm ³ /20 s. | 8,0 | | | 0,15 |
| | 180 Vt/dm ³ /120 s.. | 24,0 | | | 0,46 |
| | 450 Vt/dm ³ /20 s.. | 16,0 | | | 0,3 |
| | 450 Vt/dm ³ /120 s. | 20,0 | | | 0,38 |
| | 900 Vt/dm ³ /20 s. | 20,0 | | | 0,38 |
| | 900 Vt/dm ³ /120 s. | -8,0 | | | -0,15 |
| Agdash-3 | 450 Vt/dm ³ /40 s. | 0 | | | - |
| | 450 Vt/dm ³ /80 s. | 15,0 | | | 0,21 |
| | 600 Vt/dm ³ /40 s. | 25,0 | | | 0,35 |
| | 600 Vt/dm ³ /80 s. | 10,0 | | | 0,14 |
| Ganja-158 | 900 Vt/dm ³ /5 s. | | 6,0 | | 0,07 |
| | 900 Vt/dm ³ /10 s. | | 14,0 | | 0,17 |
| | 900 Vt/dm ³ /15 s. | | 20,0 | | 0,25 |
| AzGR 10240 | 300 Vt/dm ³ /40 s. | | 10,0 | | 0,17 |
| | 450 Vt/dm ³ /40 s. | | 14,0 | | 0,25 |
| | 300 Vt/dm ³ /40 s. | | | 6,0 | 0,1 |
| | 450 Vt/dm ³ /40 s. | | | 8,0 | 0,14 |

Conclusion

Thus, the analysis of the obtained data on the effect of electromagnetic radiation on germination of cotton seeds stored for a long time in a refrigerated chamber revealed the effect of stimulating seed germination by certain doses and exposures. Early germination of seeds was characteristic for all experimental variants in comparison with control variants. The most effective was the treatment of seeds of different cotton samples with the dose of 180 Vt/dm³ for 120 seconds.

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THE EFFECTS OF PLANTING DENSITY AND FERTILIZER RATES ON THE GROWTH, DEVELOPMENT, AND YIELD OF NK6101 MAIZE VARIETY

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Abstract

This study investigates the impact of varying planting densities and fertilizer application rates on the growth, development, and yield of the NK6101 maize variety. Different planting densities and fertilizer rates were tested to determine their influence on key growth parameters, including plant height, leaf area index, and biomass accumulation. Additionally, grain yield, ear characteristics, and harvest index were measured to assess the productivity outcomes. Results indicate that optimal planting density and appropriate fertilizer rates significantly enhance growth performance and yield. These findings provide valuable insights for optimizing maize cultivation practices to achieve higher productivity and sustainable agricultural development.

Keyword: Maize planting density, Fertilizer application rates, Crop growth parameters, Yield performance, NK6101 variety

INTRODUCTION

Maize (*Zea mays* L.) is a vital cereal crop globally, serving as a staple food, livestock feed, and a key raw material for various industrial products. With the increasing demand for maize due to population growth and expanding agricultural industries, enhancing its productivity is crucial. Achieving higher yields while maintaining sustainability requires the optimization of agronomic practices, particularly planting density and fertilizer application rates.

Planting density, defined as the number of plants per unit area, significantly influences maize growth and yield. It affects light interception, plant competition, and resource utilization, ultimately impacting biomass accumulation and grain production. Optimal planting density varies with genotype, environmental conditions, and management practices, necessitating region-specific studies.

Fertilizer application, particularly nitrogen, is another critical factor affecting maize productivity. Nitrogen is essential for plant growth, influencing processes such as photosynthesis, protein synthesis, and overall plant vigor. However, excessive or insufficient nitrogen can lead to suboptimal yields and environmental concerns. Therefore, determining the appropriate fertilizer rate is essential for maximizing maize yield while minimizing negative environmental impacts.

The NK6101 maize variety is known for its high yield potential and adaptability to diverse growing conditions. However, limited information is available regarding the optimal planting density and fertilizer rates for this specific variety. Understanding these factors can provide valuable insights for farmers and agronomists to enhance maize production efficiency.

This study aims to investigate the effects of different planting densities and fertilizer rates on the growth, development, and yield of the NK6101 maize variety. By analyzing key growth parameters and yield components, we seek to identify the optimal agronomic practices for maximizing the productivity of this maize variety. The findings from this research will contribute to

the development of sustainable maize cultivation practices, addressing both yield improvement and environmental sustainability.

MATERIALS AND METHODS OF RESEARCH

The NK6101 maize variety, developed and distributed by Syngenta Vietnam.

The study encompasses three main objectives:

1. To examine the effects of planting density and fertilizer rates on the growth and development of the NK6101 maize variety.
2. To evaluate the impact of planting density and fertilizer rates on the lodging resistance and pest and disease resistance of the NK6101 maize variety.
3. To investigate the influence of planting density and fertilizer rates on yield components and overall yield of the NK6101 maize variety.

The experiment was arranged in a Split Plot design with three replications, involving two factors: fertilizer and planting density. Fertilizer was designated as the main plot and planting density as the sub-plot. The experiment included five fertilizer levels and four planting densities, detailed as follows:

Fertilizer Levels: Five formulations (P1, P2, P3, P4, P5)

- P1: 150N + 80P₂O₅ + 80K₂O
- P2: 150N + 80P₂O₅ + 100 K₂O
- P3: 180N + 80P₂O₅ + 80 K₂O
- P4: 180N + 80P₂O₅ + 100 K₂O
- P5: 150N + 80P₂O₅ + 60 K₂O (control)

Planting Densities: Four levels (M1, M2, M3, M4)

- M1: 56,000 plants/ha with a planting distance of 60 x 30 cm (control)
- M2: 66,000 plants/ha with a planting distance of 60 x 25 cm
- M3: 76,000 plants/ha with a planting distance of 60 x 22 cm
- M4: 83,000 plants/ha with a planting distance of 60 x 20 cm

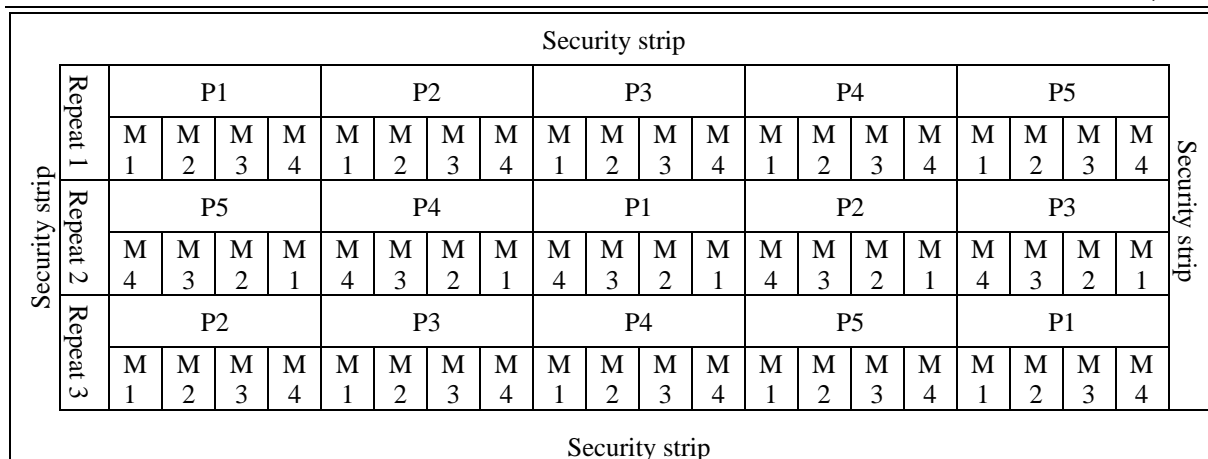


Fig 1: Experimental design

RESEARCH RESULTS AND DISCUSSION

Table 1

The effect of the interaction between planting density and fertilizer dosage on the growth and development stages of NK6101 maize variety

| Formula | From sowing to | | | | |
|---------|------------------|----------------|------------------|--------------|-----------------------|
| | Germination date | Tasseling date | Pollination date | Silking date | Total growth duration |
| M1P1 | 5 | 57 | 59 | 61 | 107 |
| M2P1 | 5 | 57 | 59 | 61 | 107 |
| M3P1 | 5 | 57 | 59 | 61 | 107 |
| M4P1 | 5 | 57 | 59 | 62 | 107 |
| M1P2 | 5 | 57 | 59 | 61 | 107 |
| M2P2 | 5 | 57 | 59 | 61 | 107 |
| M3P2 | 5 | 57 | 59 | 61 | 107 |
| M4P2 | 5 | 57 | 59 | 62 | 107 |
| M1P3 | 5 | 57 | 59 | 61 | 107 |
| M2P3 | 5 | 57 | 59 | 61 | 107 |
| M3P3 | 5 | 57 | 59 | 61 | 107 |
| M4P3 | 5 | 57 | 59 | 62 | 107 |
| M1P4 | 5 | 57 | 59 | 61 | 107 |
| M2P4 | 5 | 57 | 59 | 61 | 107 |
| M3P4 | 5 | 57 | 59 | 61 | 107 |
| M4P4 | 5 | 57 | 59 | 62 | 107 |
| M1P5 | 5 | 57 | 59 | 61 | 107 |
| M2P5 | 5 | 57 | 59 | 61 | 107 |
| M3P5 | 5 | 57 | 59 | 61 | 108 |
| M4P5 | 5 | 57 | 59 | 61 | 108 |

Unit: Days

Growth duration is defined as the period from sowing to physiological maturity. For the NK6101 maize variety, the growth duration across all experimental treatments was 107 days. According to Hoang Manh Cuong (2017), when NK6101 was cultivated on sloped land in Ha Giang, its total growth duration ranged from 104 to 106 days. These findings indicate that variations in fertilizer application rates and planting densities have minimal impact on the growth stages

of the NK6101 variety. The consistency in growth duration despite different agronomic practices underscores the adaptability and robustness of NK6101, making it a reliable variety for different environmental conditions and management practices.

The findings regarding the differential period between tasseling and silking, as well as the growth duration, provide valuable insights into the management of NK6101 maize variety. The minimal variation in these parameters suggests that NK6101 can maintain stable

growth and reproductive phases under varying agronomic inputs. This stability is beneficial for farmers, as it reduces the risk associated with variations in environmental conditions and management practices. By ensuring consistent growth and reproductive phases,

NK6101 can achieve optimal yield potential, thereby contributing to increased productivity and food security.

Table 2

The influence of planting density and fertilizer dosage on the leaf area index of NK6101 maize variety.

| Formula | Duration | | |
|------------------------------------|----------------|---------------|-----------------|
| | 7-9 leaf stage | Silking stage | Milk ripe stage |
| M1P1 | 0,48 | 1,93 | 2,51 |
| M2P1 | 0,58 | 2,56 | 3,00 |
| M3P1 | 0,68 | 2,72 | 3,50 |
| M4P1 | 0,78 | 3,02 | 3,86 |
| M1P2 | 0,49 | 1,93 | 2,54 |
| M2P2 | 0,59 | 2,34 | 3,02 |
| M3P2 | 0,72 | 2,73 | 3,56 |
| M4P2 | 0,84 | 3,09 | 3,95 |
| M1P3 | 0,51 | 1,92 | 2,56 |
| M2P3 | 0,61 | 2,32 | 3,05 |
| M3P3 | 0,74 | 2,79 | 3,59 |
| M4P3 | 0,92 | 3,06 | 3,94 |
| M1P4 | 0,53 | 1,93 | 2,57 |
| M2P4 | 0,65 | 2,34 | 3,14 |
| M3P4 | 0,84 | 2,82 | 3,65 |
| M4P4 | 1,02 | 3,09 | 4,01 |
| M1P5 | 0,50 | 1,89 | 2,51 |
| M2P5 | 0,57 | 2,26 | 2,97 |
| M3P5 | 0,67 | 2,63 | 3,44 |
| M4P5 | 0,74 | 2,92 | 3,83 |
| CV% | 5,7 | 3,2 | 2,9 |
| <i>LSD_(0,05)(PB)</i> | <i>0,086</i> | <i>0,57</i> | <i>0,55</i> |
| <i>LSD_(0,05)(MĐ)</i> | <i>0,028</i> | <i>0,059</i> | <i>0,071</i> |
| <i>LSD_(0,05)(PB*MĐ)</i> | <i>0,064</i> | <i>0,13</i> | <i>0,16</i> |

Unit: m² leaf area / m² land

7-9 leaf stage:

During this stage, leaf area index fluctuated between approximately 0.48 to 1.02 m² leaf/m² soil. In the study conducted by the author, the leaf area index ranged from 0.52 to 1.05 m² leaf/m² soil. These results indicate minimal differences in leaf area index across different fertilizer treatments, suggesting that the amount of fertilizer applied did not significantly influence leaf development, likely due to roots not fully utilizing the applied nutrients. Leaf area showed a proportional relationship with planting density, and the differences observed were statistically significant at a 95% confidence level.

Silking stage:

The leaf area index increased significantly from the 7-9 leaf stage to the tasseling stage, ranging from approximately 1.4 to 2.4 m² leaf/m² soil. Formula

M4P4 consistently exhibited the largest leaf area. The formula with the least increase was M1P3, with differences not statistically significant at a 95% confidence level.

Milk ripe stage:

During this period, the leaf area index ranged from 2.51 to 4.01, averaging 3.26 m² leaf/m² soil. According to Nguyen Bich Thuy's (2016) study on some domestically introduced hybrid maize varieties, the average leaf area index of NK6101 was 3.7 m² leaf/m² soil. Both studies indicate that from the tasseling to the milk ripe stage, the leaf area index increases slowly. This can be attributed to ongoing leaf development and senescence, where some leaves continue to grow while others begin to wither, resulting in a slight increase in leaf area index during this stage.

The impact of planting density and fertilizer dosage on some morphological characteristics of NK6101 maize variety.

| Formula | Height (cm) | | Ratio of corn ear height (%) |
|-------------------------------------|--------------|-----------------|------------------------------|
| | Plant height | Corn ear height | |
| M1P1 | 193,6 | 94,1 | 48,6 |
| M2P1 | 197,3 | 95,2 | 48,3 |
| M3P1 | 198,9 | 99,5 | 50,0 |
| M4P1 | 203,9 | 102,8 | 50,4 |
| M1P2 | 196,0 | 96,8 | 49,4 |
| M2P2 | 198,6 | 96,9 | 48,8 |
| M3P2 | 200,9 | 99,3 | 49,4 |
| M4P2 | 204,2 | 103,6 | 50,7 |
| M1P3 | 196,9 | 96,9 | 49,2 |
| M2P3 | 198,4 | 97,9 | 49,3 |
| M3P3 | 203,1 | 98,9 | 48,7 |
| M4P3 | 206,2 | 102,9 | 49,9 |
| M1P4 | 197,6 | 97,5 | 49,3 |
| M2P4 | 199,8 | 99,7 | 49,9 |
| M3P4 | 204,2 | 100,5 | 49,2 |
| M4P4 | 208,1 | 106,1 | 51,0 |
| M1P5 | 191,9 | 93,5 | 48,7 |
| M2P5 | 194,3 | 95,1 | 48,9 |
| M3P5 | 197,0 | 96,1 | 48,8 |
| M4P5 | 197,8 | 96,8 | 48,9 |
| CV% | 1,6 | 2,4 | - |
| <i>LSD</i> _{(0,05)(PB)} | 19,07 | 15,23 | - |
| <i>LSD</i> _{(0,05)(MD)} | 2,4 | 1,7 | - |
| <i>LSD</i> _{(0,05)(PB*MD)} | 5,37 | 3,93 | - |

Plant height is a critical parameter in maize breeding, closely related to growth, development, and lodging resistance. It is measured from the ground level to the point of the first tassel branch emergence. Throughout the growth and development stages, plant height gradually increases, peaking notably from the 9-leaf stage to tasseling, and stabilizing after pollination.

The plant height of the NK6101 maize variety in the experiment ranged from 193.6 to 208.1 cm. According to Ha Thi Thanh Binh, plant height of NK6101 on sloped terrain was significantly taller (ranging from 234.2 to 250.3 cm). This variation is attributed to differing fertilizer regimes and planting densities. Both authors, however, note a general trend of increasing plant height with higher planting density and fertilizer application. Formula M1P1 exhibited the shortest plant height (193.6 cm), with differences not statistically significant at a 95% confidence level.

Ear height, along with plant height, is crucial for assessing maize growth status. The data indicate that

ear height of the maize variety ranged from 94.07 to 106.13 cm. Formula M4P4 recorded the tallest ear height (106.13 cm), with differences not statistically significant at a 95% confidence level.

The ear height to plant height ratio reflects lodging resistance and pollination efficiency of maize plants. Optimal ear height facilitates easier pollen reception and pollination. Conversely, excessive ear height increases the risk of plant lodging. Generally, an optimal ear height is about half the plant height.

From the data, the ear height to plant height ratio ranged from 48% to 51% across different formulas. According to Ha Thi Thanh Binh (2011), the ear height to plant height ratio typically ranges from 46% to 50%, which is suitable for maize pollen reception. According to studies by Nguyen Thi Lan (2017), Tran Trung Kien (2013), and Tran Thi Thiem (2010), it is observed that both plant height and ear height of the NK6101 variety correlate positively with planting density and fertilizer levels, although variations are not significant.

Table 4

The influence of the interaction between planting density and fertilizer dosage on yield components and yield of NK6101 maize variety.

| Formula | Length of corn ear | Diameter of corn ear | Number of rows | Number of kernels per row | Kernel-to-ear ratio | Weight of 1000 kernels | Theoretical yield | Actual yield |
|-----------------------|--------------------|----------------------|----------------|---------------------------|---------------------|------------------------|-----------------------|------------------------|
| | (cm) | (cm) | (row) | (kernel) | (%) | (gr) | (metric tons/hectare) | ((metric tons/hectare) |
| M1P1 | 14,1 | 4,4 | 14,2 | 30,47 | 68,41 | 315 | 77,41 | 60,37 |
| M2P1 | 14,4 | 4,2 | 13,8 | 30,87 | 67,25 | 310 | 82,31 | 67,27 |
| M3P1 | 14,7 | 4,1 | 13,5 | 31,20 | 60,22 | 305 | 87,79 | 53,87 |
| M4P1 | 13,4 | 4,2 | 13,0 | 31,40 | 54,37 | 290 | 86,57 | 45,27 |
| M1P2 | 14,3 | 4,5 | 14,5 | 30,73 | 68,63 | 315 | 79,36 | 62,63 |
| M2P2 | 14,5 | 4,3 | 14,2 | 31,73 | 68,26 | 308 | 87,04 | 64,53 |
| M3P2 | 14,8 | 4,2 | 13,8 | 31,67 | 59,90 | 304 | 90,95 | 50,97 |
| M4P2 | 13,5 | 4,3 | 13,4 | 31,80 | 54,07 | 291 | 90,57 | 45,60 |
| M1P3 | 14,4 | 4,7 | 14,6 | 31,27 | 69,42 | 313 | 80,74 | 65,60 |
| M2P3 | 14,8 | 4,5 | 13,8 | 31,40 | 67,78 | 308 | 83,7 | 68,01 |
| M3P3 | 15,1 | 4,4 | 13,6 | 31,53 | 62,91 | 305 | 89,27 | 54,27 |
| M4P3 | 14,0 | 4,5 | 13,4 | 31,27 | 55,09 | 294 | 81,94 | 47,90 |
| M1P4 | 14,4 | 4,8 | 14,4 | 31,67 | 67,78 | 316 | 82,97 | 70,63 |
| M2P4 | 14,7 | 4,6 | 13,8 | 31,27 | 66,31 | 309 | 89,45 | 73,46 |
| M3P4 | 15,2 | 4,5 | 13,6 | 31,53 | 62,28 | 305 | 84,15 | 51,63 |
| M4P4 | 14,2 | 4,6 | 13,0 | 31,27 | 58,24 | 285 | 81,58 | 48,63 |
| M1P5 | 13,5 | 3,8 | 13,7 | 29,80 | 67,65 | 309 | 71,58 | 52,30 |
| M2P5 | 13,8 | 3,6 | 13,8 | 30,00 | 63,69 | 306 | 78,94 | 49,27 |
| M3P5 | 14,2 | 3,5 | 13,6 | 29,93 | 58,9 | 301 | 83,76 | 43,97 |
| M4P5 | 12,9 | 3,6 | 13,1 | 29,73 | 54,45 | 280 | 78,84 | 40,27 |
| CV% | 1,7 | 2,8 | 2,0 | 2,3 | - | - | - | 5,1 |
| LSD _(0,05) | 0,34 | 0,17 | 0,4 | 1,01 | - | - | - | 4,7 |

Table 4 data shows a trend of increasing planting density from low to high density levels. At density level M4 across different fertilizer regimes, the shortest ear lengths were observed (12.9 cm – 14.2 cm), with the longest in M3 (14.2 cm – 15.2 cm), variations not significant at a 95% confidence level.

Fertilizer dosages and different planting densities influence cob diameter differently. At density level M1 across various fertilizer formulas, the largest cob diameters were observed (3.8 cm – 4.8 cm). As fertilizer levels increased, cob diameters also increased, variations significant at a 95% confidence level.

The number of rows per ear varied slightly across different planting densities and fertilizer regimes, ranging from 13 rows to 14.6 rows. The number of rows per ear showed an inverse relationship with planting density across fertilizer regimes. The highest number of rows per ear was observed at density level P3 (13.4 – 13.8 rows), differences not significant at a 95% confidence level.

There was no significant difference in the number of seeds per row among different formulas, with the smallest number of seeds per row observed at density level P5 (29.73 seeds – 30 seeds/row), differences not significant at a 95% confidence level.

Across different fertilizer regimes, increasing planting density led to a gradual decrease in the seed to cob ratio. On fertilizer regime P4, different planting

densities resulted in the highest seed to cob ratio (58.24% - 67.78%). There was a large percentage difference among different planting densities.

The 1000 seed weight varied inversely with planting density across different fertilizer regimes. Fertilizer regime P5 across different planting densities yielded the smallest 1000 seed weight (280 g – 309 g). The differences in 1000 seed weight among planting densities within fertilizer regimes were not substantial.

In most fertilizer regimes with varying planting densities, theoretical yield tended to increase with higher planting densities. Fertilizer regime P2 at planting density M3 exhibited the highest theoretical yield (90.95 tons/ha), with P2 having the highest observed yield (79 tons/ha – 90.95 tons/ha).

Across most fertilizer regimes with different planting densities, the highest actual yield was consistently observed at density level M2 (6.6 thousand maize plants/ha). There was a significant yield difference among experimental formulas ranging from 40.27 tons/ha to 73.46 tons/ha, with formula M2P4 achieving the highest yield, differences significant at a 95% confidence level. According to authors Luong Van Huan (2017) and Vu Thi Hai Yen (2017), different maize varieties exhibit varying actual yields, typically fluctuating between 50.24 tons/ha and 66.23 tons/ha.

According to authors Luong Van Huan (2017) and Vu Thi Hai Yen (2017), when surveying some hybrid

maize varieties, NK6101 maize variety demonstrated relatively high yields and suitability for northern midland and mountainous provinces

CONCLUSION

One notable finding is the absence of significant lodging, both in terms of stalks and roots. This attribute is crucial as lodging can severely affect maize yields by reducing standability and complicating harvest operations. The minimal incidence of lodging in NK6101 underscores its strong stalk and root architecture, which supports the plant even under increased nutrient and density stress.

The consistent growth and reproductive phases observed in NK6101 across different agronomic treatments highlight its adaptability and stability. This consistency is crucial for farmers, as it mitigates risks associated with varying environmental conditions and management practices. By maintaining stable growth durations, leaf area indices, and plant heights, NK6101 ensures reliable performance in terms of yield potential.

Moreover, the findings suggest that while there are slight fluctuations in parameters such as ear length, cob diameter, and seed characteristics across different experimental conditions, these variations are not statistically significant at a 95% confidence level. This indicates that NK6101 maintains uniformity in key agronomic traits, regardless of varying inputs.

In conclusion, NK6101 emerges as a robust maize variety suitable for diverse farming environments, particularly in northern midland and mountainous provinces. Its ability to withstand moderate increases in planting density and fertilizer levels while maintaining minimal disease incidence and lodging underscores its resilience and potential for ensuring sustainable maize production and food security.

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CHEMICAL SCIENCES

2- NITROGEN-CONTAINING DERIVATIVES OF TETRAHYDRODICYCLOPENTADIENE. SYNTHESIS AND ANTIVIRAL ACTIVITY

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Abstract

The modified Koch-Haaf method was used to synthesize 2-carboxylic acid from tetrahydrodicyclopentadiene. Exo- and endo-isomers were separated. The simplest nitrogen-containing derivatives were obtained and tested for antiviral activity: amides, amines, amidoximes.

Keywords: tetrahydrodicyclopentadiene, amidoxime, antiviral effect, exo-tricyclo[5.2.1.0^{2,6}]deca-endo-2-carboxylic acid, exo-tricyclo[5.2.1.0^{2,6}]deca-endo-2-carboxamide.

Introduction

The insecticidal activity of tricyclo[5.2.1.0^{2,6}]deca derivatives is widely known [1]. However, their antiviral activity has not yet been studied.

This prompted us to obtain and test in this regard some of its nitrogen-containing derivatives. Direct functionalization of tricyclo[5.2.1.0^{2,6}]deca (tetrahydrodicyclopentadiene) (1) would be a convenient method for the preparation of such compounds.

Materials and methods.

IR spectra were recorded on a UR-10 spectrophotometer in KBr pellets in the range 450-3700 cm⁻¹. GLC analysis was performed on a Tsvet-102 chromatograph, glass column 1 m, diameter 3 mm, inerton AW HMDS with 5% apieson L, carrier gas helium, 40 ml/min.

Exo-tricyclo[5.2.1.0^{2,6}]deca-endo-2-carboxylic acid (2). A mixture of 40 ml of formic acid, 21 g of tricyclo[5.2.1.0^{2,6}]deca (1) and 200 ml of dichloroethane is added dropwise to 420 ml of 20% oleum, cooled to 13 °C with stirring, over an hour at such a rate that the temperature does not rise above 16 °C. The mixture is poured onto the lud. The dichloroethane layer is separated and extracted with 250 ml of 10% potassium hydroxide solution. The alkaline extract is acidified. The precipitated precipitate is filtered off, washed with water and dried in air. Yield 14.2.g (50%). GC: (2), 27%, 116 s; (3), 73%, 149 s.

Exo-tricyclo[5.2.1.0^{2,6}]deca-endo-2-carboxamide (4). To 13 g of a mixture of acids (2) and (3) obtained by the previous method, add 10 ml of thionyl chloride and heat on a water bath for 1 hour. Excess thionyl chloride is distilled off in vacuo with dry benzene. A solution of acid chloride in dry tetrahydrofuran is added dropwise with ice-cooling and stirring to 60 ml of 25% ammonia solution. The precipitate formed is filtered

off, washed and dried in air. To the product is added 20 ml of hexane, brought to a boil and the hot hexane solution is decanted. The operation is repeated 2 more times. Amide crystals (4) precipitated from hexane are dried in air. Yield 2.7 g (21%). M.p. 127-129 °C.

Endo-tricyclo[5.2.1.0^{2,6}]deca-exo-2-carboxamide (5). The mother liquor obtained by isolating the amide (4) is evaporated. To 10 g of a mixture of amides add 100 ml of 74% sulfuric acid and heat to 80 °C with stirring. Within 50 min. sprinkle with portions of 30 g of sodium nitrite. Stir for another 10 minutes. The reaction mass is diluted with water. The precipitate that forms is filtered off, washed and air dried. Yield 7 g (70%). The resulting mixture of acids (2) and (3) is subjected to repeated recrystallization from ethyl acetate, monitoring the purity of the precipitated acid by GLC for the residual content of acid (2). As a result of 24-fold recrystallization, 1.5 g of acid (3) with 98% content of the main substance was isolated. Amide (5) was obtained from 0.5 g of acid (3) according to the method described above. Yield 90%. M.p. 159-160 °C.

Tricyclo[5.2.1.0^{2,6}]deca-2-(N-methyl)carboxamide (6). Obtained by a method similar to obtaining amide (4). Yield 66%. M. p. 105-107 °C. IR spectrum, cm⁻¹: 1650, 3470.

Tricyclo[5.2.1.0^{2,6}]deca-2-(N-dimethyl)carboxamide (7). Obtained according to the method for amide (4). Yield 21%. M. p. 81-83 °C. IR spectrum, cm⁻¹: 1650, 3470.

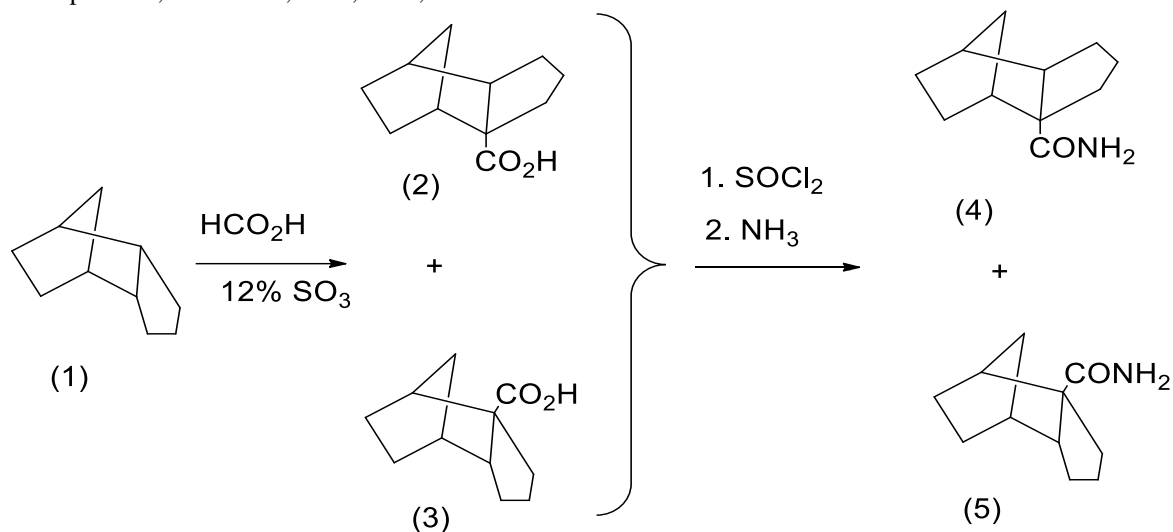
Tricyclo[5.2.1.0^{2,6}]deca-2-(N-ureido)carboxamide (8). Obtained according to the method for amide (4). Yield 28%. M. p. 189-190 °C. IR spectrum, cm⁻¹: 1670, 1510, 3430.

Tricyclo[5.2.1.0^{2,6}]deca-2-(N-thioureido)carboxamide (9). Obtained according to method (4). Yield

22%. M. p. 197-199 °C. IR spectrum, cm^{-1} : 1680, 1620, 1250, 3190.

2-Aminomethyltricyclo[5.2.1.0^{2,6}]decane (13). To 15 g of amides (3) and (4) add 20 ml of thionyl chloride and boil for 30 hours. Excess thionyl chloride is distilled off with dry benzene. The residue is dissolved in 30 ml of dry ether and poured over 30 minutes into an ice-cooled suspension of lithium aluminum hydride (10 g) in 200 ml of dry ether. Stir for another 10 minutes. Lithium aluminum hydride is neutralized with water and then with alkali. The ethereal solution is separated and passed through hydrogen chloride. The precipitated amine hydrochloride is filtered off. Yield 15 g (80%). Decomposes without melting above 300 °C. IR spectrum, cm^{-1} : 1580, 3150.

2-Amidoxime-tricyclo[5.2.1.0^{2,6}]decane (14). To 2 g of nitrile (12), obtained according to the previous method, add 12 g of hydroxylamine sulfate, 10.4 g of potassium carbonate in 80 ml of water. Boil 24 hours. Pour into water, filter. The filtrate is extracted with ether. After drying, the solvent is evaporated. Dry benzene is added to the residue and hydrogen chloride is passed through until the resulting precipitate dissolves. Benzene is evaporated. Yield 1 g (35%). M. p. 185-187 °C. IR spectrum, cm^{-1} : 1600, 1640, 3160, 3440.



From a mixture of acids (2) and (3) without separation of exo- and endo-isomers, the ratio of which after synthesis was 25% and 73%, respectively, a number of N-substituted derivatives were synthesized: tricyclo[5.2.1.0^{2,6}]deca-2-(N-methyl)carboxamide (6), tricyclo[5.2.1.0^{2,6}]deca-2-(N-dimethyl)carboxamide (7), tricyclo[5.2.1.0^{2,6}]deca-2-(N-ureido)carboxamide (8), tricyclo[5.2.1.0^{2,6}]deca-2-(N-thioureido)carboxamide (9).

The action of a mixture of amides (4) and (5), in the presence of sodium methoxide, with bromine syn-

Results and discussion

Considering the foregoing, we developed a procedure for carboxylation (1) with formic acid in oleum, which led to the formation of a mixture of exo- and endo-isomers of tricyclo[5.2.1.0^{2,6}]deca-2-carboxylic acid (2) and (3), respectively [2]. It has been established by GLC that the percentage of isomeric acids varies greatly (from 30% to 70% for each isomer) depending on the temperature and reaction time.

Amides of isomeric carboxylic acids (4) and (5) were obtained by converting a mixture of acids (2) and (3) into a mixture of the corresponding acid chlorides, followed by treatment with ammonia. Exo-tricyclo[5.2.1.0^{2,6}]deca-endo-2-carboxamide (4) was isolated by crystallization and saponified to acid (2). The mixture of amides remaining in the mother liquor, enriched in the endo-isomer, was also subjected to saponification. From the resulting mixture of acids, endo-tricyclo[5.2.1.0^{2,6}]deca-exo-2-carboxylic acid (3) was isolated by crystallization and converted into the corresponding amide (5). The structure of carboxylic acids (2) and (3) was confirmed by X-ray diffraction analysis.

thesized urethane (10), which was hydrolyzed with water without isolation to 2-amino-tricyclo[5.2.1.0^{2,6}]decane (11) [3].

From the same mixture of amides, nitrile (12) was obtained by boiling for many hours in thionyl chloride, which was then reduced to 2-aminomethyltricyclo[5.2.1.0^{2,6}]decane (13) with lithium aluminum hydride. Amidoxime (14) was obtained from nitrile (12) by reaction with a large excess of hydroxylamine in an alkaline medium.

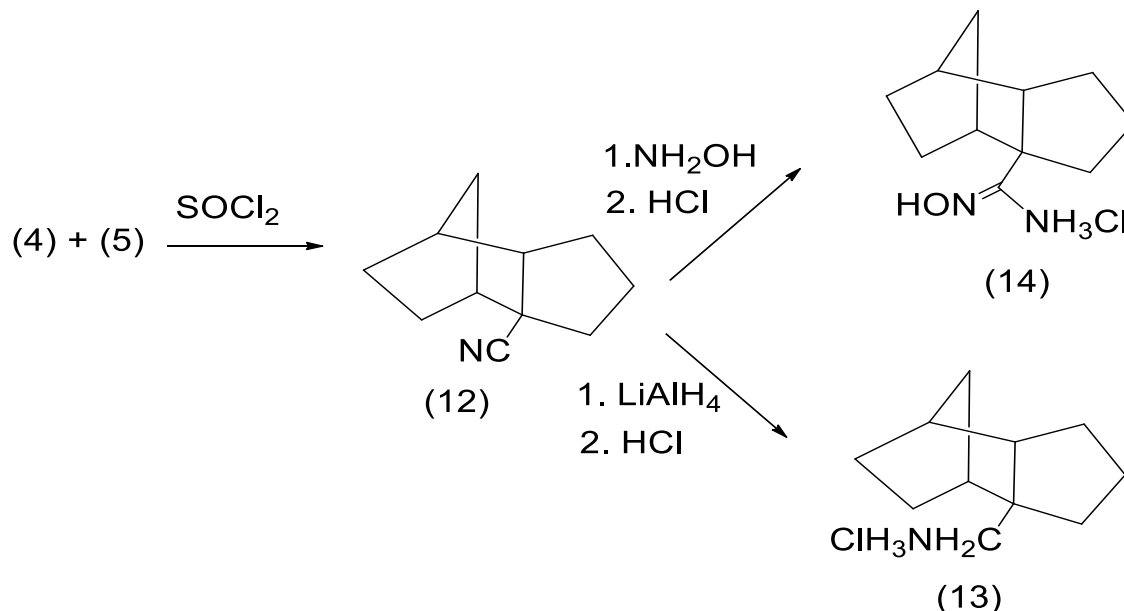


Table 1.

Results of testing the synthesized compounds for antiviral activity.

| # Sabs. | Yield, % | Melting point, °C | Testing facts | |
|---------|----------|-------------------|--|---|
| | | | The size of the zone of cytotoxicity, mm | The size of the plaque suppression zone, mm |
| 4 | 21 | 127-129 | 6 | 0 |
| 5 | 57 | 159-160 | 16 | 0 |
| 6 | 66 | 105-107 | 0 | 15 |
| 7 | 21 | 81-83 | 26 | 0 |
| 8 | 28 | 187-190 | 0 | 0 |
| 9 | 22 | 197-199 | 0 | 18 |
| 11 | 17 | >290 dest. | 30 | 0 |
| 13 | 80 | >300 dest. | 50 | 0 |
| 14 | 35 | 185-187 | 10 | 0 |

Conclusions.

The antiviral activity of the synthesized compounds was studied according to the method described in [4]. As can be seen from Table 1, only two compounds (6) and (9) exhibit moderate activity with low toxicity. Most of the other compounds have areas of cytotoxic action that do not allow one to notice the antiviral effect, if any.

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UDC 541. 123 3 543.49

STUDY OF THE TRIPLE SYSTEM AND ITS TRIANGULATION $Cs_2MoO_4 - MoV_2O_8 - MoO_3$ **Hasanaliev A.,***Doctor of Chemical Sciences, Professor of the Department of Chemistry of Dagestan State Pedagogical University named after Rasul Gamzatov***Israilov M.,***Candidate of Chemical Sciences, Associate Professor of the Department of Chemistry of Chechen State Pedagogical University***Gasanalieva P.***Candidate of Chemical Sciences, Associate Professor of the Department of Chemistry of Dagestan State Pedagogical University named after Rasul Gamzatov**Dagestan State Pedagogical University named after Rasul Gamzatov
Chechen State Pedagogical University**Research Institute of General and Inorganic Chemistry, DSPU*<https://doi.org/10.5281/zenodo.12580533>**Abstract**

The main task of physicochemical analysis is the study of multicomponent systems. Knowledge of phase levels and their regularities in multicomponent systems is necessary for the development of optimal conditions for the search for compositions with given conditions. $Cs_2MoO_4 - MoV_2O_8 - MoO_3$ Based on the results of experimental studies, the first promising areas of the phase diagram for the synthesis of vanadium-molybdenum bronzes of cesium were obtained. Compositions obtained on the basis of the system are promising in the development of new materials, in particular: anti-corrosion coatings, ion-electronic conductors with high activity.

Theoretically, according to the results of the data obtained, it has been proved that the synthesis of new materials from complex oxide phases by crystallization from the melt by solid-phase synthesis can be used to break down a three-component oxide system. $Cs_2O - V_2O_5 - MoO_3$.

Keywords: compound, congruent, incongruent, diagram, phase complex, projection, liquidus, model, peritectics, segment, complex, system, prognosis, polytherm, stable complex, solid solutions, subsystem, bronzes, crystallization, quasibinary.

Using a set of methods of physical and chemical analysis, in particular, differential polythermal (DTA) [1], visual polythermal VPD [2] using the projection thermographic method (PTGM) [3] and platinum crucibles, Pt-Pt/Rh thermocouples served as a temperature meter. To record DTA curves, a device based on an electronic automatic potentiometer KSP-4 with an F-116 voltage amplifier was used. The calibration of the facility was carried out according to the temperatures of phase transitions of individual salts and their eutectic mixtures [4]. On the installation of a synchronous thermal analyzer, STA 409 PC (Luxx) from Netsch, a derivatographic analysis was performed, designed for simultaneous temperature measurement, as well as registration of changes in the weight of weights in a wide temperature range (25-1500 C). Control over the measurement progress was carried out by built-in processors connected to a personal computer.

According to the literature [6-8], 14 new phases (13 polyoxosols and 1 bronze) are formed in the double systems of the oxide system under study, which cut the concentration triangle. Among them, 9 compounds are congruent and 5 are incongruent in nature. In this system, 14 HTCs are implemented, including 10 eutectic and 4 peritectic types.

Using the results of the study, we have constructed a topological image of the phase diagram of this system (Fig. 1). Only congruent-melting compounds are included here, they are just needed for triangulation.

Results and discussion. The most interesting, in our opinion, variants of triangulation are presented in Fig. 1. Here we have identified 9 triangulating sections. They divide it into 10 subsystems, which are quasi-three-component. Therefore, triple systems can be studied independently. To perform experimental work in the synthesis of individual compounds (D1 – D9) and thermal analysis of systems, modern methods of thermal analysis, in particular, the polythermal method, were also used. Modern methods of thermal analysis, in particular, visual-polythermic, differential-thermal, synchronous-thermal (STA) analysis by Netsch [9-12]. Of these options, we have chosen (Fig. 1). Based on the results, 4 main subsystems are identified, which combine the rest: **I-II** - $CsVO_3 - M_0V_2O_8 - V_2O_5$; **III** - $CsVO_3 - Cs_2M_0O_4 - M_0V_2O_8$; **IV-VI** - $CsVO_3 - Cs_2M_0O_4 - Cs_2O$; **VII-X** - $Cs_2M_0O_4 - M_0V_2O_8 - M_0O_3$.

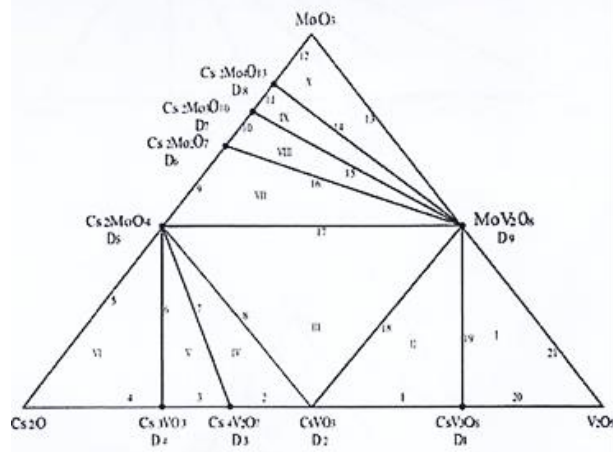


Рис. 1

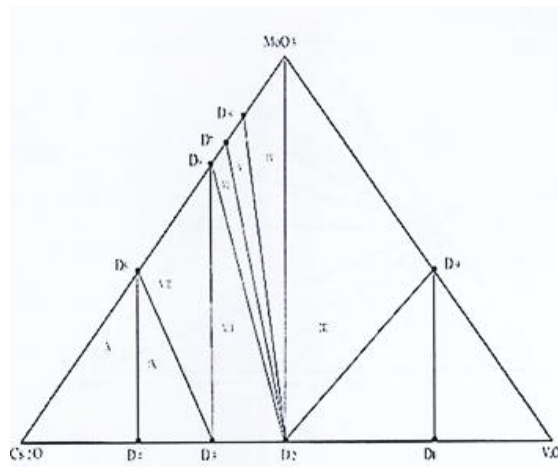


Рис. 2

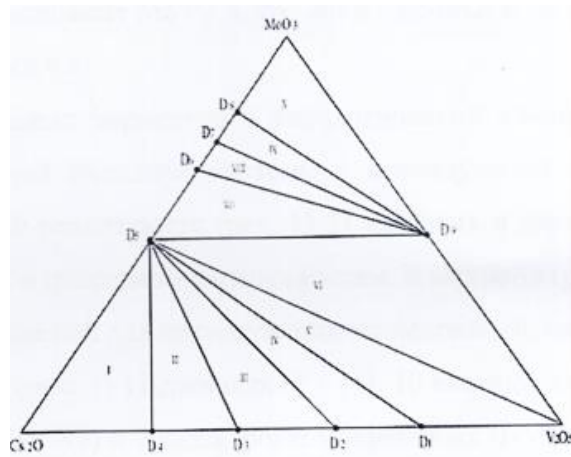


Рис. 3

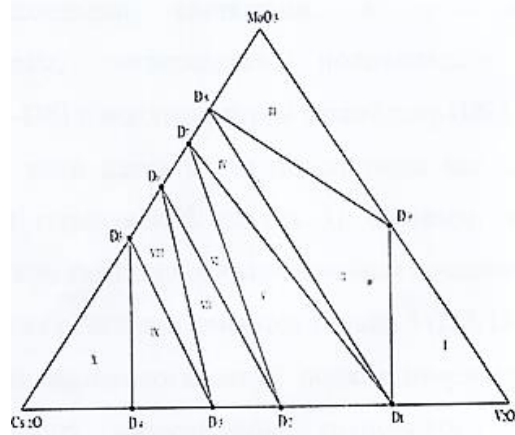


Рис. 4

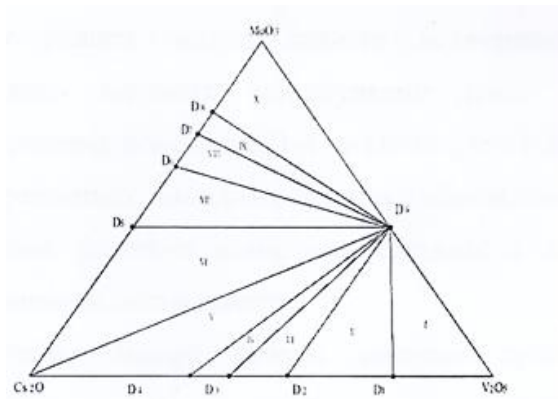


Рис. 5

For one compound ratio and brand of h.p. solid-phase synthesis, in which molecules are covalently bonded on a solid carrier and synthesized step by step in a single reaction vessel using silicate chemistry of protection groups. $[13]M_0V_2O_8Cs_2M_0O_4CsVO_3$

Topological analysis and review of the facet elements of the ternary oxide system with its subsequent triangulation revealed that it implements (Fig. 1) 21 double and two-component and 10 ternary and three-component systems.

In the system chosen by us (Fig. 1), it $Cs_2O - V_2O_5 - M_0O_3$ includes 11 binary (1-11), 10 quasi-two-component (12-21), 3 ternary (IV-VI), 7 quasi-three-component (I-VI, VIII-X) systems, of which 5 quasi-binary (5,12,13,20,21) of the quasibar (1,VI,X) are oxide-salt systems, the rest are included in the complex oxide phases, which are polyvanates (D5 – D8) and polyvanadate molybdenum (D9). A three-component oxide system was split. $Cs_2O - V_2O_5 - M_0O_3$

The regularities of topology and phase formation in them were revealed, and the scientific basis of chemical technology was created on their basis. As part of the general study of multicomponent systems using the developed methods, a topological analysis of the system itself was carried out. [14-15]

The chosen methodological approach to the secondary unification of subsystems on the principle of minimizing a laborious experiment and achieving maximum information on the processes of phase formation in the system made it possible to solve the problems.

Another variant of triangulation (Fig. 5) is the maximum set of salt subsystems (1-4, 6-11; VI, III, V-IX), taking into account the facing oxide systems, provides forecasting and planning of the experiment.

The purpose of this work is to predict, simulate and experimentally confirm phase formation in the system of $Cs_2O - V_2O_5 - M_0O_3$ its stable and metastable processes. We have revealed the mechanisms, nature, conditions of formation and decay, qualitative and quantitative composition of new phases as much as possible. Triangulation (Fig. 1) The preliminary forecast was made by us on the basis of the analysis of diagrams of the state of triangulating sections (Fig. 3) and (Fig. 2) and (Fig. 2) compositions, which were confirmed by thermal analysis with subsequent confirmation by thermogravimetric and X-ray phase analysis. [15-16] Partitioning of the first 2 of them has complete phase diagrams, 7 new phases are formed in them, with the incongruent nature of melting by persthetic reactions. (Transformation – persthetic process – transformation occurs at a constant temperature) This indicates their metastability. A stable picture is observed in the D9 metastation $D_5(Cs_2M_0O_4 - V_2O_5)D_2(CsVCO_3)D_5(M_0V_2O_8) - Cs_2OCs_2O$, since eutectic processes predominate.

Conclusion.

On the basis of theoretical analysis and experimental data, the division of a three-component oxide system was carried out. The $Cs_2O - V_2O_5 - MoO_3$ regularities of topology and phase formation in them were revealed, the system was triangulated for the first

time within the framework of the general algorithm for studying multicomponent systems using the results. Ten triangulation sections were identified, which are divided into 10 subsystems. Various oxide-salt compositions system-based promising in the development of new materials. In particular, anti-corrosion coatings, ion-electronic conductors, with high activity catalysts, reference electrodes for potentiometric redox and acid-base titrations, electro-optical materials. It should be noted in the synthesis of vanadium-molybdenum and mixed bronzes and polyvanadates-molybdates of cesium, which will find their application. $Cs_2O - V_2O_5 - MoO_3$

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ECONOMIC SCIENCES

PROBLEMS AND DIRECTIONS OF CLASSIFICATION OF ECONOMIC SYSTEMS

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ПРОБЛЕМЫ И НАПРАВЛЕНИЯ КЛАССИФИКАЦИИ ЭКОНОМИЧЕСКИХ СИСТЕМ

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Abstract

The article studies the problems of classification of economic systems. The essence of economic system, its classification features and main characteristics have been studied. The complexity and functions of economic system have been determined, the problems and existing directions of classification of economic systems have been investigated.

Аннотация

В статье проведено исследование проблем классификации экономических систем. Были изучены сущность экономической системы, ее классификационные признаки и основные характеристики. Определены сложность и функции экономической системы, исследованы проблемы и существующие направления классификации экономических систем.

Keywords: system, economic system, economic system, classification of economic systems, national economic system.

Ключевые слова: система, экономическая система, классификация экономических систем, национальная экономическая система.

Введение. В современной науке наличие всего имеющегося классификационного многообразия подходов к рассмотрению экономических систем позволяет сделать вывод о высокой степени проработанности вопросов их исследования. Необходимо отметить, что исследованию экономических систем и проблемам их классификации в рамках,

прежде всего, макроэкономического анализа посвящено множество работ, авторы которых выделяют различные типологии основных подходов к их рассмотрению. Так, ряд авторов, таких как Нуреев Р.М., Колганов А.И., Бузгалин А.В. и др., в историческом аспекте существующие подходы к анализу экономических систем с определенной долей условности дифференцирует на формационные и

цивилизационные. С точки зрения сравнение экономических систем во времени (формационные подходы), историческая типологизация экономических систем включает современные системы, системы прошлого и будущего, в результате чего в рамках проводимой представителями теории постиндустриального общества классификации, выделяют доиндустриальные, индустриальные и постиндустриальные экономические системы. В разработку цивилизационного подхода, предполагающего анализ экономических особенностей каждой нации, которые отражаются в экономической ментальности, внесли большой вклад труды М. Вебера, О. Шпенглера, А. Дж. Тойнби, Н. Я. Данилевского, Л. Н. Гумилева и др. Методологии и практике исследования вопросов функционирования экономических систем и организации взаимодействия субъектов экономических отношений, посвящены также труды таких белорусских ученых и практиков, как Шимов В. Н., Короткевич А. И., Лапко Б. В. и др.

Однако, необходимо отметить, что сегодня по-прежнему актуальной является проблема отбора тех подходов к классификации и анализу экономических систем, которые позволяют проводить их практические исследования с точки зрения формирования макроэкономической политики государства, обеспечения государственных органов управления инструментарием анализа, планирования и прогнозирования социально-экономического развития страны.

Основная часть.

Термин «система» широко используется во всех сферах жизни, когда говорят о совокупности взаимосвязанных объектов, рассматриваемых как единое целое: система предприятия, система управления, система математических уравнений и т. п. Система является одним из основных понятий в современной научной методологии и широко используется во всех сферах и областях знаний, научных дисциплинах. При этом в систему объединяют материальные (экономические, технологические, биологические) и нематериальные, абстрактные (например, математические) объекты. Являясь объектом исследования для системного подхода, общей теории систем, системного анализа, кибернетики, система как понятие не имеет достаточно строгого и общего определения, пригодного для соответствующей характеристики многообразных и частных случаев. В связи с этим, в качестве определения приводится заведомо нестрогая и неполная формулировка, либо принимаются те или иные уточнения, снижающие уровень общности определения, или соглашения о классах рассматриваемых систем [1, с. 479].

Необходимо отметить, что выделение системы требует, как минимум, наличия [1, с. 479; 2, с. 22–26]:

1) объекта, состоящего из множества элементов, связанных в некоторую совокупность. Этими элементами могут быть люди, природные объекты, машины и их части, знаки символы и др. Обычно, объект, выполняющий определенные функции и не

подлежащий дальнейшему разбиению в рамках поставленной задачи, принимается в качестве «первичного» элемента системы.

2) субъекта исследования – «наблюдателя»;

3) задачи, характеризующей отношение наблюдателя к объекту и определяющей отбор рассматриваемых элементов и их существенных свойств.

Определяя систему как совокупность взаимосвязанных, взаимодействующих элементов, различные авторы изначально ограничивались исключительно ее содержательным описанием. В дальнейшем исследователи начали отмечать определенные отношения между объектами в виде набора соответствующих связей между ними и существенные свойства (атрибуты) объектов переменных. И если связи между элементами системы обеспечивают ее функционирование как единого целого, то состав элементов и способ их объединения определяют структуру системы, представляемую обычно в виде графа, вершина которого соответствует элементам системы, а дуги – их связям. Наличие частей системы, являющихся частью этой системы и реализующих цели, согласованные с целями системы, предполагает выделение подсистем, которые могут быть разделены на более мелкие элементы [3, с. 37; 4, с. 53].

В настоящее время существует множество определений понятия «система», которые с некоторыми допущениями можно дифференцировать на три основные группы [5–12].

Так, к первой группе можно отнести определения, которые рассматривают систему как совокупность процессов и явлений, а также связей между ними, существующую объективно, независимо от наблюдателя. Задача последнего состоит в том, чтобы, прежде всего, выделить эту систему из окружающей среды и определить ее входы и выходы. На следующих этапах выявляется структура системы и определяется механизм ее функционирования. После этого наблюдатель переходит от пассивного анализа к анализу возможностей воздействия на систему и затем определяет желательный для него путь развития системы, необходимые для этого механизмы воздействия на систему как на объект управления. К данной группе систем относятся и национальная экономическая система.

Ко второй группе относятся определения, рассматривающие систему как инструмент исследования процессов и явлений. В этом случае наблюдатель строит модель, которая является абстрактное отображение реальных объектов. При этом отождествляется понятие системы с понятием модели. Например, такой системой может быть система таблиц «Затраты–Выпуск», позволяющая решать задачи экономического характера.

И наконец, к третьей группе относятся определения, рассматривающие систему как совокупность реальных объектов и отношений между ними и модель, описывающую эти объекты и взаимодействия как абстрактное отображение связей действительности, предполагая, что наблюдатель не только выделяет из среды систему и ее отдельные части, но и

создает, синтезирует ее. Такая система представляет собой комплекс реальных элементов, технических средств, научных теорий, призванных решать сложные организационные, экономические, технические и другие задачи.

В качестве важнейшей общей характеристики системы является ее разнообразие, которое определяется числом различных состояний системы. При этом если разнообразие исследуемой наблюдателем системы превосходит возможности анализа и синтеза всех ее элементов и связей между ними, то такую систему принято называть для данного наблюдателя «большой системой». В случае если при выделении системы задается не одно, а множество отношений между элементами и соответственно образуется не одна, а множество структур, то такая система называется сложной, характеризу-

ясь неоднородностью, разнокачественностью выделенных элементов и связей, структурным разнообразием.

При этом экономическая система может рассматриваться в рамках каждой из вышеописанных трех групп определений в зависимости от целей ее анализа.

Из всего многообразия существующих трактовок понятия системы наиболее универсальной, хотя нестрогой и неполной, представляется определение системы как «множество элементов, находящихся во взаимодействиях, в отношениях и связях друг с другом, которое образует определенную целостность, единство» [2; 13]. При этом существуют различные признаки и основания, используемые для классификации систем на различные их виды (таблица 1).

Таблица 1

Классификация систем по различным признакам и основаниям

| Признаки и основания для классификации систем | Виды систем | Содержание и характеристика |
|--|---|--|
| По степени абстракции | Материальные | Системы состоят из природных объектов и/или продуктов человеческой деятельности, но также материальных |
| | Абстрактные | Системы как продукты сознания; могут быть зафиксированы только с помощью знаков, символов |
| | Комбинированные (материально-абстрактные) | Системы, в которых присутствуют как материальные, так и знаковые подсистемы |
| В зависимости от своего происхождения | Естественные | Системы, объективно существующие в действительности, в живой и неживой природе и обществе, возникли в природе без участия человека |
| | Искусственные (создаваемые, антропогенные). | Системы, созданные человеком |
| | Смешанные | Эргономические (машина – человек-оператор), автоматизированные, биотехнические, организационные и другие системы |
| По характеру целей при формировании систем с точки зрения возможности изменения их состояния | Статические | Системы, состояние которых устойчиво, не подвергается изменениям с течением времени |
| | Динамические | Системы, изменяющиеся с течением времени |
| По числу различных состояний системы, разнообразию | Большие | Разнообразие исследуемой наблюдателем системы превосходит возможности анализа и синтеза всех ее элементов и связей между ними |
| | Малые | Разнообразие исследуемой наблюдателем системы не превосходит возможности анализа и синтеза всех ее элементов и связей между ними |
| По характеру описания изменений | Детерминированные | Состояние системы в любой момент времени однозначно определено совокупностью ее предшествующих состояний |
| | Вероятностные (стохастические) | Состояние системы является случайной функцией предшествующих ее состояний |
| По количеству отношений между элементами системы | Простые | При выделении системы задается ограниченное количество отношений между элементами и соответственно образуется, как правило, одна структура. Система характеризуется однородностью выделенных элементов и связей. |
| | Сложные | При выделении системы задается не одно, а множество отношений между элементами и соответственно образуется не одна, а множество структур. Система |

| Признаки и основания для классификации систем | Виды систем | Содержание и характеристика |
|--|-------------|---|
| | | характеризуется неоднородностью, разнокачественностью выделенных элементов и связей, структурным разнообразием |
| По степени абстрагированности во взаимодействия с внешней средой | Замкнутая | Если допустимо абстрагироваться от неизбежных в действительности ее взаимодействий с внешней средой |
| | Открытая | Когда учет обмена системы веществом, энергией и/или информацией с окружением необходим для достижения целей наблюдателя |

Источник: авторская разработка на основе [8; 14]

Из всех перечисленных видов систем, классифицированных по различным признакам и основаниям, отдельного пояснения требуют комбинированные (материально-абстрактные) системы, в которых присутствуют как материальные, так и знаковые подсистемы. В качестве таковых можно привести пример систем целенаправленного управления, управляемой подсистемой в которых служит материальный объект, а управляющая подсистема, если ее работа не полностью формализована, обязательно включает человека, продуцирующего информацию – результат деятельности его сознания (в отличие от информации, считываемой с приборов или генерируемой иными техническими устройствами). Данная информация, в частности при реализации адаптивного управления, может стать элементом управляющей подсистемы [15, с. 480].

В научной и учебной экономической литературе существуют также различные подходы и к определению категории «экономическая система», обобщив которые можно выделить следующие основные группы. Так под экономической системой понимают [4; 16; 17]:

- 1) взаимосвязанную совокупность хозяйствующих субъектов;
- 2) совокупность связей между производителями материальных и нематериальных благ;
- 3) систему производства, распределения, обмена и потребления, отождествляя экономику и процесс воспроизводства в единстве четырех его фаз;
- 4) совокупность экономических процессов, которые связаны с распределением ограниченных ресурсов;
- 5) совокупность ресурсов и экономических субъектов, взаимосвязанных и взаимодействующих между собой в сфере производства, распределения, обмена и потребления, образующих единое целое.

Обобщая существующие определения экономической системы, можно выделить основные ее характеристики. Так, экономическая система охватывает, во-первых, элементы хозяйствования, т.е. природные и вещественные ресурсы, а также людей, выступающих как в роли производителей, так и в роли потребителей созданных благ; во-вторых, экономические отношения, возникающие в процессе производства, распределения, обмена и потребления; в-третьих, экономические условия

функционирования, которые определяются обязательными для хозяйствования правовых норм и институциональных правил, накладывающим на способы экономического поведения субъектов экономики.

Необходимо отметить, что исследование экономических систем происходят на различных уровнях взаимодействия субъектов экономических отношений и соответствующим им масштабам деятельности. В связи с этим можно выделить следующие основные уровни:

- международный (наднациональный) уровень – мировая экономическая система, характеризующаяся взаимодействием национальных экономик различных стран мира. В узком смысле – это совокупность только тех частей национальных экономик, которые взаимодействуют с внешним миром.
- макроуровень – уровень национальных экономических систем со своими типами и спецификой взаимодействия субъектов экономики (домашних хозяйств, организаций и государства);
- мезоуровень – уровень взаимодействия видов экономической деятельности (отраслей экономики), различных типов домашних хозяйств, территориально-отраслевых комплексов, региональных систем;
- микроуровень – уровень взаимодействия отдельных субъектов хозяйствования (организаций) между собой и домашними хозяйствами.

Масштабы деятельности рассматриваемой экономической системы обуславливают специфику инструментов и методов, используемых для ее исследования, и которые определяются функцией системы, совокупностью целей и задач ее развития. В настоящем работе исследование экономических систем будет проводиться, прежде всего, на макро- и мезоуровне, в связи с чем в дальнейшем будем ориентироваться на раскрытие вопросов, связанных с исследованием экономических систем именно указанного масштаба деятельности.

Исходя из определения экономики (от др.-греч. οἶκος – дом, хозяйство, хозяйствование и νόμος – ном, территория управления хозяйствованием и правило, закон, буквально «правила ведения домашнего хозяйства») как «хозяйственной деятельности общества, а также совокупности отношений, складывающихся в системе производства, распределения, обмена и потребления» [18], можно

утверждать, что экономика как система, непосредственно связана с жизнедеятельностью людей, а по особенностям возникновения, функционирования и развития относится к искусственным системам. При этом различные взаимосвязанные виды деятельности человека, согласованно осуществляемые и изменяемые в процессе ее реализации, являются важнейшей движущей силой общественного развития и основным условием существования отдельных личностей, социальных групп и общества в целом. Экономические цели и интересы человека, удовлетворение его разнообразных и постоянно меняющихся потребностей, являются целевыми ориентирами всех видов экономической деятельности. Исходя из этого, можно сделать вывод о том, что удовлетворение физиологических, духовных и иных потребностей людей является первопричиной формирования и развития экономики как системы, лежит в основе выполняемых ее функций, обеспечивающих достижение стратегической цели развития – повышение уровня и качества жизни народа.

Таким образом, являясь первопричиной формирования и развития экономики как системы, основой выполняемых ею функций, потребности населения, прежде всего, материальные, оказывают самое непосредственное влияние на социально-экономическое развитие страны, определяют сложность экономики как системы с огромным ее количеством складывающихся отношений, взаимосвязей и взаимодействий.

Как уже отмечалось выше, если при выделении системы задается не одно, а множество отношений между элементами и соответственно образуется не одна, а множество структур, то такая система называется сложной. В свою очередь сложность экономической системы предопределяет ее познание через привлечение многих моделей, многих теорий, а в ряде случаев и многих научных дисциплин. Так в своей работе [17, с.26] Кушилин В.И. и Фоломьев А.Н. различают несколько видов сложности экономических систем:

– **структурная сложность**, характеризующаяся большим числом многообразных компонентов (подсистем) и элементов, разнообразием связей между ними, реализуемых, прежде всего через процессы, количеством иерархических уровней;

– **функциональная сложность**, определяемая сложностью реализации функций, множеством состояний, сложностью перехода из одного качества в другое, большой степенью неопределенности достижения целей и решения задач, характеристиками воздействия среды на систему и воздействия системы на среду;

– **сложность выбора поведения в многоальтернативных ситуациях**, характеризующая направленность экономической системы, гибкость ее реакции на воздействия внешней среды;

– **сложность развития, целенаправленность, закономерность и необратимость изменений**, характеризующаяся разнообразием сочетаний эволюционных и скачкообразных видов процессов, всего развития системы в целом;

– **управленческая сложность**, связанная с многообразием совокупностей используемых механизмов, форм и методов воздействия на систему и ее компоненты и многообразием возможных вариантов набора результирующих эффектов управленческих воздействий.

С учетом выделенных видов сложности экономических систем для более полного понимания их сущности необходимо определить направление и способ активности экономической системы, ее функции (*functio* – «исполнение, совершение»), т.е. ту работу, которую экономическая система совершает в соответствии с поставленными целями и задачами развития. Также, знание функций экономической системы чрезвычайно важно для правильного определения целей и получаемых в результате ее декомпозиции задач стратегического развития.

Цель – это конкретное количественное и качественное значение реализации функций в определенный промежуток времени. В общем случае *целью системы* будем называть определенное, «желаемое» (заданное извне или установленное самой системой) состояние ее выходов, т.е. некоторое значение или подмножество значений функций системы [19, с.165]. Так, например, стратегической целью развития экономической системы может выступать достижение определенных социальных результатов, представляющихся желательными для текущего состояния понимания обществом своих будущих потребностей.

Экономическая система не является замкнутой системой и тесно связана с другими экономическими системами в условиях международной и межрегиональной интеграции и обмена. Являясь системой с собственными интересами и целями, как правило, любая экономическая система является подсистемой экономической системы более высокого уровня, что накладывает соответствующий отпечаток на механизмы ее управления, на управление всеми элементами хозяйства экономической системы: материального производства, природно-ресурсных потенциалов, инфраструктуры, трудовых ресурсов, а также многообразии связей – торговых, финансовых, социальных, экологических, производственных, которые обладают определенной пространственной и временной устойчивостью.

Экономическая система как сложное образование в отличие от простых явлений, обладающих чаще одной функцией, многофункциональна. В связи с этим необходимо из всех имеющихся функций определить наиболее важную, целевую функцию экономической системы, реализация которой является смыслом ее существования. Остальные функции являются производными от целевой функции, получаемые в результате декомпозиции последней.

Так, целевую функцию экономической системы можно определить, как создание экономических условий, необходимых для обеспечения жизнеспособности и жизнедеятельности общества и его членов, повышения уровня и качества жизни людей. При этом данная функция может логично

дополняться рядом других общих функций экономической системы, по сути дела, являющихся средствами для успешной реализации целевой функции. Например, такими как:

- создание и развитие сферы производства и сферы услуг, обеспечивающих жизнеспособность и жизнедеятельность общества;
- обеспечение более полной занятости населения;
- согласование интересов и целей субъектов экономики;
- повышение инновационности и эффективности экономической деятельности и др.

Кроме того, функции различаются как *общесистемные*, т.е. присущие всей экономической системе, а также *подсистемные*, характерные для составных частей данной системы.

Разные экономические системы, а тем более разные исторические эпохи функционируют в разных природных, исторических, этнических и прочих условиях. Тем не менее, выделяются два условия, общие для любых экономических систем:

- 1) неограниченность развития потребностей;
- 2) ограниченность ресурсов для реального удовлетворения потребностей.

Функции любой системы и образующих ее подсистем взаимосвязаны, автономны. Но при этом функции системы приоритетны. Зато функции подсистем разнообразнее, конкретнее. Все они определяют структуру, смысл функционирования и развития систем.

Многочисленные исследования сущности, природы национальной экономики, ее связей с жизнедеятельностью человека дают основание выделить основные блоки ее функций. Так, например, в работе [17, с.28] выделяют следующие основные блоки функций национальной экономической системы:

1. Основополагающие функции связаны с удовлетворением многообразных, постоянно изменяющихся, порой противоречивых потребностей человека и общества, в котором протекает его жизнедеятельность. В числе потребностей человека выделяют: самовыражение, реализацию потенциала, творчество, уважение и престиж, безопасность, гарантию удовлетворения физиологических потребностей, сами физиологические потребности в пище, жилье, отдыхе, физическом развитии, одежде, чистом воздухе и воде, благоприятной экологической среде.

2. Функции воспроизводства различных благ в виде продуктов, услуг, а также условий полноценной жизнедеятельности с учетом дифференциации по различным социальным группам.

3. Функции самосохранения и обновления экономической системы.

Если функции полноценно не реализуются, то, следовательно, система «больна», она деградирует и может разрушиться.

В экономике нарушения в выполнении функций системы, как правило, связаны с тремя причинами: нарушением эколого-экономической устойчивости, истощением ресурсов, нарушениями обращения материального носителя по каналам связи между компонентами системы (продуктов, энергии, информации) из-за деформации этих каналов, их закупорки и пр.

Цель развития экономической системы не может быть не связанной с ее функциями, в противном случае это может привести к стагнации и кризису.

Но не только соответствие функциям служит критерием правильности выбранных стратегических целей и задач. Они могут быть достигнуты не при любом состоянии системы, не при любых начальных факторах и условиях и не в любой промежуток времени. *Чтобы достичь целей развития, экономическая система должна находиться в «области достижимости».* Это означает, что основные параметры данной системы и ее среды должны достичь определенных количественных и качественных значений. Их определение – задача аналитиков, прогнозистов, политиков и управленцев. Определение этих параметров требует высокой квалификации, комплексных знаний в области динамики, закономерностей развития экономических систем от всех, кто подготавливает и принимает соответствующие решения.

Необходимо отметить, что исследованию экономических систем и проблемам их классификации в рамках, прежде всего, макроэкономического анализа посвящено множество работ, авторы которых выделяют различные типологии основных подходов к их рассмотрению. Так, ряд авторов, таких как Нуреев Р.М., Колганов А.И., Бузгалин А.В. и др. [20–22], в историческом аспекте существующие подходы к анализу экономических систем с определенной долей условности дифференцирует на формационные и цивилизационные. При этом авторы отмечают наличие двух точек зрения различных исследователей на развитие человечества: одни считают, «что человечество проходит прогрессивные ступени, другие считают, что это развитие совершает цикл» (рис. 1).



Рис. 1. Типология информационных подходов к анализу всемирной истории
Источник: [21; 22].

С точки зрения сравнение экономических систем во времени (формационные подходы), историческая типологизация экономических систем включает современные системы, системы прошлого и будущего, в результате чего в рамках проводимой

представителями теории постиндустриального общества классификации, выделяют доиндустриальные, индустриальные и постиндустриальные экономические системы (рис. 2).

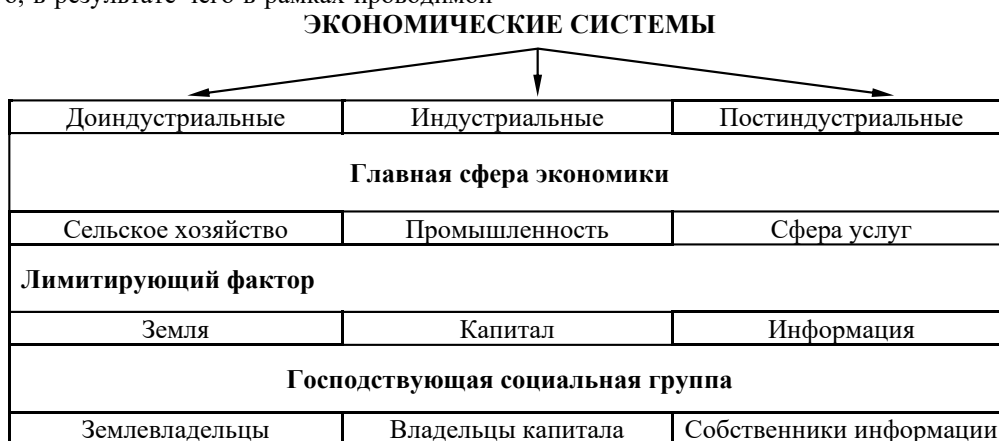


Рис. 2. Историческое развитие экономических систем и их классификация в постиндустриальной парадигме

Источник: [21; 22].

Как видно из представленной на рисунке 2 схемы, границами, позволяющими дифференцировать экономические системы, являются промышленная и научно-техническая революции, позволившие изменить структуру экономики, определив в качестве главной сферы в постиндустриальной экономике сферу услуг, в качестве лимитирующего фактора информацию и выделив собственников информации в качестве главенствующей социальной группы. Внутри каждой из этих систем возможна более детализированная типология, что позволяет наметить пути для синтеза формационного и цивилизационного подходов [21; 22].

В разработку цивилизационного подхода, предполагающего анализ экономических особенностей каждой нации, которые отражаются в экономической ментальности, внесли большой вклад труды М. Вебера, О. Шпенглера, А.Дж. Тойнби, Н.Я. Данилевского, Л.Н. Гумилева и др. [23–28]. В рамках цивилизационного подхода считается, что экономическая ментальность формируется веками и характеризует специфику сознания населения,

складывающуюся исторически и проявляющуюся в единстве сознательных и бессознательных ценностей, норм и установок, отражающихся в поведении населения. Соответственно, исходя из разделяемых ими ценностей люди либо принимают, либо отвергают новые социальные нормы.

Особого внимания заслуживают также труды Вальтера Ойкена, заложившего основы *ордолиберального подхода* в (1891–1950), в рамках которого он пытается найти компромисс между экономическим эмпиризмом исторической школы, не замечающей национальных особенностей, и абстрактной теории австрийской школы, настаивающей на уникальности происходящих событий. Пытаясь найти общие элементы в неповторяющихся исторических событиях, Вальтер Ойкен стремится выделить основные типы хозяйственных систем, каковыми он считает централизованно управляемое хозяйство, характеризующееся тем, что вся повседневная экономическая жизнь общества регулируется планами, исходящими из одного центра, и меновое хозяйство, определяемое тем, что экономика общества

состоит из двух и более отдельных хозяйств, каждое из которых составляет и проводит в жизнь свои планы [29].

Кроме этого, Вальтер Ойкен выделяет различные рыночные структуры для спроса и предложе-

ния: конкуренцию, частичную олигополию, частичную монополию и чистую монополию, – что позволяет ему составить представленную в таблице 2 матрицу 25 различных форм рынка [29, с. 145].

Таблица 2

Рыночные структуры по Вальтеру Ойкену

| Форма спроса | Форма предложения | | | | |
|--|--|--|---|--|--|
| | Конкуренция | Частичная олигополия | Олигополия | Частичная монополия | Монополия (частичная или коллективная) |
| Конкуренция | Полная конкуренция | Частичная олигополия со стороны предложения | Олигополия со стороны предложения | Частичная монополия со стороны предложения | Монополия со стороны предложения |
| Частичная олигополия | Частичная олигополия со стороны спроса | Двусторонняя частичная олигополия | Олигополия со стороны предложения, ограниченная частичной олигополией со стороны спроса | Частичная монополия со стороны предложения, ограниченная частичной олигополией со стороны спроса | Монополия со стороны предложения, ограниченная частичной олигополией со стороны спроса |
| Олигополия | Олигополия со стороны спроса | Олигополия со стороны спроса, ограниченная частичной олигополией со стороны предложения | Двусторонняя олигополия | Частичная монополия со стороны предложения, ограниченная олигополией со стороны спроса | Монополия со стороны предложения, ограниченная олигополией со стороны спроса |
| Частичная монополия | Частичная монополия со стороны спроса | Частичная монополия со стороны спроса, ограниченная частичной олигополией со стороны предложения | Частичная монополия со стороны спроса, ограниченная олигополией со стороны предложения | Двусторонняя частичная монополия | Монополия со стороны предложения, ограниченная частичной монополией со стороны спроса |
| Монополия (частичная или коллективная) | Монополия со стороны спроса | Монополия со стороны спроса, ограниченная со стороны предложения | Монополия со стороны спроса, ограниченная со стороны предложения | Монополия со стороны спроса, ограниченная со стороны предложения | Двусторонняя монополия |

Источник: [29, с. 145]

Эти формы усложняются с учетом различных денежных систем [29, с. 146–164]. Такая система была составлена для критики исторической школы, господствовавшей в это время в Германии, которая в каждом событии или явлении видела только уникальные, неповторяющиеся черты. Подход В. Ойкена показал, что в различных обществах имеются общие черты, которые можно свести либо к централизованному, либо к меновому хозяйству. Однако, как это часто бывает, наши достоинства являются причиной наших недостатков. Как отмечает в своей работе Р. Нуреев, достоинством подхода В. Ойкена является довольно четкая классификация, а недо-

статком – ее статический характер. Функция анализа (сведение различных форм хозяйства к основным типам) удалась ему гораздо лучше, чем функция синтеза (вывод из этих форм основных этапов и ступеней развития), что резко ограничило возможности ее применения на практике.

Нельзя не отметить важный вклад российского историка Льва Николаевича Гумилева [24; 25], который он внес в теорию этноса. Последний определяется им как группа людей, выступающая в истории как большая замкнутая система, с определенным динамическим стереотипом поведения и оригинальной внутренней структурой, меняющийся в зависимости от фаз этногенеза. Связывая

развитие с большими природными циклическими колебаниями, Л.Н. Гумилев определил, что энергия этноса зависит от окружающей среды, в которой он добывает средства к существованию. По мере расширения социального пространства, этнос начинает испытывать сопротивление окружающей среды, с которой связаны растраты жизненных, энергетических сил, данных ему в период первоначального толчка. Растрата биосферных запасов происходит не плавно, а скачкообразно, она подчиняется определенным ритмам. Согласно его концепции, каждый этнос проходит следующие фазы: подъем (скрытый и явный), акматическую фазу, надлом, инерционную фазу, обскурацию, мемориальную фазу. Подъем этноса связан с тем, что появляются пассионарии, которых не удовлетворяет жизнь тихого обывателя, занятого благоустройством своей жизни, и которые стремятся к идеалу успеха и победы. Они увлекают за собой широкие

массы, способствуя консолидации этноса. Однако, с течением времени выполнив свою задачу, уровень пассионарности понижается, что приводит к надлому, переходящему в инерционную фазу и обскурацию [24; 25].

Особого внимания с точки зрения формирования экономических систем, выделения их по различным классификационным признакам, специфики их развития заслуживает то, что существующие цивилизации, такие как африканская, дальневосточная, исламская, китайская, европейская, индийская и др., довольно долго зарождались, расширялись и развиваются, оказав существенное влияние на формирование экономических систем государств. В качестве примера можно привести основные модели современной рыночной экономики, классифицированные по определенным цивилизационным признакам (рис. 3).



Рис. 3. Основные модели современной рыночной экономики, классифицированные по определенным цивилизационным признакам

Источник: [22; 29].

Таким образом, можно утверждать, что экономические системы принято классифицировать по различным признакам. В качестве классификационных признаков можно выделить существующую

в той или иной стране общественно-экономическую систему, в соответствии с которой принято выделять такие виды экономических систем, как традиционная, командная, рыночная и смешанная экономические системы (рис. 4).



Рис. 4. Классификация экономических систем в соответствии с общественно-экономической системой
 Источник: [22; 29].

Необходимо отметить, что классификация экономических систем по типу общественно-экономической системы государства, основана на двух основных признаках (таблица 3):

- 1) методе управления и способе координации экономической деятельности;
- 2) форме собственности на экономические ресурсы.

Таблица 3

Классификация экономических систем по типу общественно-экономической системы государства

| Вид экономических систем | Методы управления хозяйственной деятельностью (централизованный или децентрализованный) | Формы собственности на экономические ресурсы |
|--|---|--|
| 1. Традиционная экономика <i>Например: территория центральной Африки и Амазонки</i> | По старинке, традициям, обычаям | Общинная |
| 2. Рыночная экономика <i>(идеальная модель экономики)</i> | Децентрализованный: а) хозяйствующие экономические субъекты самостоятельно решают вопросы экономики (<i>что и как производить, для кого и сколько производить</i>) б) государственное вмешательство в экономику ограничено | Право частной собственности |
| 3. Командная экономика <i>Например: Северная Корея</i> | Централизованный: а) государство вместо субъектов хозяйствования решает главные вопросы экономики (<i>что, как, для кого и сколько производить</i>) посредством централизованного планирования; б) экономические решения принимаются коллективно. | Общественная (государственная) собственность на средства производства; б) колхозно-кооперативная. |
| 4. Смешанная экономика <i>Например: экономика России</i> | Децентрализованный: а) каждый хозяйствующий экономический субъект самостоятельно решает вопросы экономики; | а) частная форма собственности: индивидуальная, товарищеская или |

| Вид экономических систем | Методы управления хозяйственной деятельностью (централизованный или децентрализованный) | Формы собственности на экономические ресурсы |
|--|---|---|
| <i>США, Япония, Корея, Швеция и т.д.</i> | б) государство вмешивается в экономику, чтобы компенсировать некоторые слабости рыночных механизмов (<i>прямое и косвенное вмешательство</i>); в) все формы собственности работают на равных конкурентных началах. | партнерская (<i>например: полные товарищества, коммандиты, ООО и т.д.</i>), корпоративная (АО); б) государственная форма собственности (<i>например: унитарные предприятия</i>) |

Источник: Источник: [22; 29]

Как видно из представленных выше видов экономических систем, в основе их классификации лежит тип общественно-экономической системы государства с соответствующим хозяйственным порядком, представляющим собой «...комбинацию различных форм, которые устанавливают рамки возможностей использования людьми ограниченных благ. Он взаимосвязан с людьми, их интересами, предпочтениями, способностями и ресурсами, а также с политическим устройством и в этом качестве рассматривается как фундамент для определения ключевых свойств и характера экономической системы» [16, с. 13]. Так, в указанной работе, выделяются различные типы хозяйственного порядка в зависимости от установленных прав планирования или собственности (централизованный или децентрализованный) и способа экономического расчета (регулируемого рыночными ценами или плановыми сальдо), которые, в свою очередь, «...в зависимости от своего проявления определяют возможности хозяйственного поведения и хозяйственных решений людей, решающих первую основную проблему способом, в котором выражается характер экономической системы» [16, с. 22]:

1) частнохозяйственная (капиталистическая) рыночная экономика как решение первой основной проблемы на основе децентрализованной структуры прав планирования и деятельности и регулируемого рыночными ценами экономического расчета;

2) государственная (социалистическая) централизованно-административная экономика как решение первой основной проблемы на основе централизованной структуры прав планирования и деятельности и регулируемого плановыми сальдо экономического расчета;

3) социалистическая рыночная экономика как решение первой основной проблемы на основе децентрализованной структуры прав планирования и деятельности:

а) при государственном распоряжении важнейшими средствами производства в сочетании с масштабным государственным регулированием цен (социалистическая рыночная экономика государственно-социалистического типа);

б) при общественной собственности на средства производства, находящейся в распоряжении и пользовании трудовых коллективов, в сочетании с экономическим расчетом на основе рыночных цен, который образуется преимущественно спонтанно

на принципиально свободных рынках труда и капитала (социалистическая рыночная экономика коллективистского типа).

В работе [16] представлены основные типы хозяйственного порядка, определяющего права планирования, деятельности и собственности, а также экономический расчет, и представляющие собой системопологающие элементы, которые создают основу для формирования дополнительных форм порядка в сфере предпринимательства, денежного, финансового, социального и внешнеэкономического устройства. Особо необходимо отметить, что при рассмотрении конформности порядка речь идет о возможности комбинировать формы порядка с точки зрения реализации определенного основного типа хозяйственного порядка, так как неконформные комбинации негативно воздействуют на дееспособность совокупного порядка и могут вызвать постоянную потребность в реформах, а в крайнем случае даже тенденцию к трансформации основного типа. Поэтому необходимо, чтобы дополнительные формы порядка не противоречили бы обуславливающим систему формам порядка, порядку планирования и собственности, а также экономическому расчету. В связи с этим появляются как минимум две проблемы взаимозависимости, вытекающих соответственно из следующих источников их возникновения [2, с. 25]:

1. Первая проблема появляется с нормативной точки зрения: решение (выбор) относительно определенного основного типа хозяйственного порядка требует общего политического решения и относительно дополнительных форм порядка, ограничивая тем самым пространство выбора для политики порядка, если существует стремление к эффективной экономической системе.

2. Вторая проблема вытекает из переплетения хозяйственного порядка с государственным и духовно-культурными порядками в рамках совокупной социальной жизни. Направленность такого совокупного порядка на определенные концепции, понимаемые как ориентиры общественной и экономической политики, требует формирования частичных порядков на основе согласующихся и дополняющих друг друга принципов. Эта задача представляет собой постоянный вызов для любого сообщества. Так, рыночная экономика и политическая демократия с концептуальной точки зрения могли бы идеально дополнять друг друга, однако реальные отношения между ними зачастую характеризуются как напряженные и находятся под угрозой

На основе вышеизложенного также можно утверждать, что основные принципы функционирования современной экономики определяются многообразием экономических теорий и сводятся к следующим положениям.

Каждая экономика должна решать три коренные экономические проблемы: какие именно товары и услуги должны производиться, и в каком количестве; как должны использоваться экономические ресурсы при производстве товаров; для кого должны производиться товары, каким при этом должно быть распределение дохода между различными индивидуумами и классами.

В соответствии с представленными выше видами экономических систем, в основе классификации которых, как правило, лежит тип общественно-экономической системы государства с соответствующим хозяйственным порядком, эти проблемы можно решать по-разному – с помощью обычаев, инстинктов, указов и декретов или через механизм цен и рынков.

При этом, ограниченность ресурсов и технологий предопределяет ограниченность жизненного уровня. Экономические блага не даются бесплатно, за них надо бороться теми или иными способами в зависимости от сложившихся обстоятельств. Экономические блага являются редкостью. Общество должно остановить свой выбор на определенных товарах, так как не все потребности и желания могут быть удовлетворены.

При данных ресурсах и технологии существует множество способов их распределения по выпуску тех или иных товаров и услуг. Эти решения определяются на основе предельной полезности, когда каждый вид товаров или услуг своей последней единицей приносит одинаковое с другими удовольствие или наслаждение.

В смешанной частнопредпринимательской системе механизм цен, действуя через предложение и спрос на конкурентных рынках, должен давать ответ на три основные проблемы экономической организации: Что, Как и Для кого производить. Это должно достигаться максимизацией наслаждения со стороны потребления и максимизацией прибыли со стороны предложения.

Таким образом, наличие всего классификационного многообразия подходов к рассмотрению экономических систем позволяет сделать вывод о высокой степени проработанности вопросов их исследования. Однако, как уже отмечалось выше, сегодня актуальной является проблема отбора тех подходов к анализу экономических систем, которые позволяют проводить их практические исследования с точки зрения формирования макроэкономической политики государства, обеспечения государственных органов управления инструментарием анализа, планирования и прогнозирования социально-экономического развития страны. В связи с этим особого внимания заслуживают различные подходы к рассмотрению национальной экономической системы, которая может быть определена как большой, искусственный, сложный, вероят-

ностный, динамический и многоуровневый комплекс целенаправленно функционирующих в рамках определенного хозяйственного порядка институциональных единиц, взаимосвязанных и взаимодействующих между собой в системе экономических отношений по поводу обеспечения кругооборота продуктов и доходов между домашними хозяйствами, государством, организациями различных видов экономической деятельности и внешним миром (иностранными экономическими системами) в процессе производства, распределения, обмена, промежуточного использования и конечного потребления товаров и услуг [30, с. 52].

Категория «национальная экономическая система» тесно связана с понятием «экономическая система», так как по сути конкретизирует экономическую систему, отражая ее специфические особенности и черты, обусловленные географическим положением страны, существующим хозяйственным порядком, ее участием в международном разделении труда, культурно-историческими традициями, менталитетом проживающего в стране народа и рядом других факторов. При этом, национальная экономическая система как любая социально-экономическая система представляет собой сложный и многоуровневый комплекс, состоящий из множества взаимодействующих, взаимодополняющих и взаимообуславливающих свое функционирование элементов; с институциональной точки зрения – это совокупность институтов экономической деятельности, взаимоотношений, возникающих в процессе этой деятельности, средств и форм производства и распределения материальных благ и услуг, которые, в свою очередь, базируются на социальной и экономической инфраструктуре, определяемой уровнем развития производительных сил и производственных отношений, присущих конкретному национальному хозяйству.

Национальная экономическая система как сложная, вероятностная, динамическая система, включающая совокупность экономических отношений между институциональными единицами по поводу кругооборота продуктов и доходов и охватывающая определяемые уровнем развития производительных сил и производственных отношений, процессы производства, обмена, распределения, промежуточного и конечного потребления материальных и нематериальных благ [30], может быть рассмотрена как [30; 31]:

- структура;
- процесс;
- взаимодействие;
- объект математического моделирования.

В соответствии с представленными вариантами рассмотрения НЭС может быть исследована как:

- система, имеющая территориально-отраслевую структуру;
- система, на вход которой поступают экономические ресурсы, которые преобразуются в системе, что позволяет получить на выходе необходимые результаты;

– система, включающая институциональные единицы (субъект экономики), обеспечивающие кругооборот доходов и продуктов, и механизмы, реализующие эти отношения;

– система как объект, замещающий оригинал, отражающая при помощи соответствующих математических соотношений наиболее важные для целей исследования черты и свойства оригинала.

Так, *рассмотрение НЭС как системы, имеющей территориально-отраслевую структуру*, позволяет обоснованно подходить к разработке стратегии трансформации НЭС для различных территориально-отраслевых, кластерных и прочих образований, имеющих, как правило, различный научно-технологический, инновационный, инвестиционный, кадровый, инфраструктурный, финансово-кредитный и иной потенциал.

Структуру НЭС, исходя из ее рассмотрения с позиций системного подхода, можно представить в виде трех блоков народнохозяйственных комплексов (НХК) (рис. 5) [30; 31]:

– исходной зоны, в которой сгруппированы НХК, обеспечивающие снабжение необходимыми для жизнедеятельности ресурсами;

– промежуточной зоны, комплексы которой объединяют НХК, преобразующие поступающие ресурсы в полезные результаты, удовлетворяющие потребности населения;

– замыкающей зоны, комплексы которой объединяют НХК, удовлетворяющие общественные потребности.

Представленный подход к рассмотрению национальной экономической системы позволяет в рамках теории хозяйственных систем обоснованно разрабатывать критерии оценки эффективности ее развития. При этом методика построения критерия эффективности развития национальной экономической системы на основе рассмотренного подхода, следующая [30; 31]:

– выделении целевой функции национальной экономической системы;

– определение состава показателей, которые в наибольшей степени отображают эффективность выполнения выделенной целевой функции национальной экономической системы;

– закрепление за каждым показателем нормативного порядка, в соответствии с которым должно изменяться его значения;

– оценка с использованием ранговых статистик эффективности национальной экономической системы на основе измерения динамики изменения значений показателей.

С использованием представленного подхода можно оценивать эффективность развития и управления трансформацией НЭС.

Рассмотрение *национальной экономической системы как системы, включающей совокупность субъектов экономических отношений*, позволяет «...выработать согласованное видение различных участников реализации стратегии трансформации национальной экономической системы – органов власти, крупных компаний, среднего и малого бизнеса, домашних хозяйств, научных, образовательных организаций, организаций инфраструктуры государственного и частного секторов и других участников на среднесрочное и долгосрочное развитие. При этом для обеспечения развития необходимы партнерские отношения между государством, частным сектором, гражданским обществом и международным сообществом» [32].

Представленный подход к рассмотрению национальной экономической системы предполагает выделение четырех групп субъектов экономических отношений, обеспечивающих кругооборот движения продуктов и доходов:

- домашние хозяйства;
- организации (предприятия);
- государство;
- иностранные экономические системы.

Три первых из вышеперечисленных субъектов экономических отношений или институциональных единиц представляют собой национальную экономическую систему (рис. 5). Экономические цели и поведение рассматриваемых субъектов экономических отношений различны. В процессе осуществления хозяйственной деятельности происходит взаимодействие и согласование разнонаправленных интересов выделенных их групп. В зависимости от степени преобладания интересов и потребностей тех или иных институциональных единиц можно дифференцировать социально-экономические системы на различные их типы, определить общую направленность развития НЭС страны. Так, например, в случае если интересы и цели государства довлеют над интересами и целями домашних хозяйств и предприятий, это, как правило, выражается в слабой ориентированности экономики на человека и отрицательно сказывается на уровне и качестве его жизни. Общей же целью развития субъектов экономических отношений является синхронизация и гармонизация процесса взаимодействия мировой экономической системы, государства, предприятия и домашнего хозяйства.

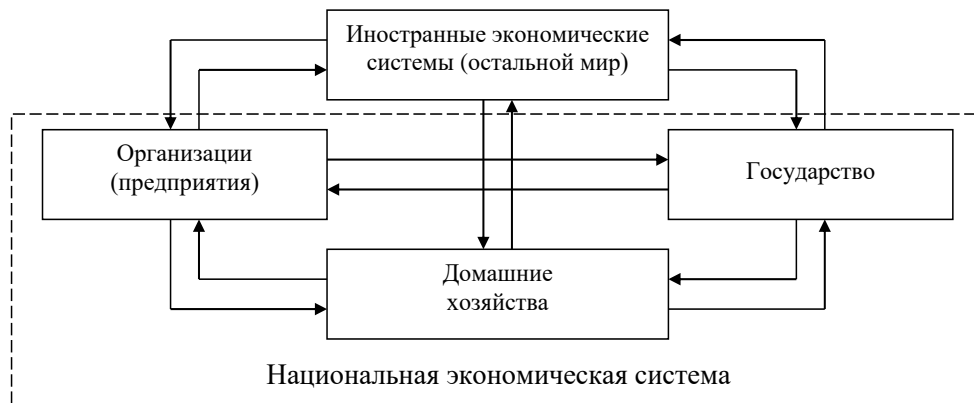


Рис. 5. Обобщенная схема взаимодействия различных типов субъектов экономических отношений (институциональных единиц)

Источник: [30; 31].

И наконец, *национальную экономическую систему можно рассматривать как замещающий оригинал объект, который отражает при помощи совокупности математических соотношений наиболее важные для целей исследования черты и свойства оригинала*. Рассмотрение национальной экономической системы как объекта математического моделирования позволяет обеспечить разработку методического инструментария исследования и моделирования ее развития, количественную оценку последствий реализации выбранных направлений ее трансформации.

Заключение. Таким образом, на основе проведенного в статье исследования было выявлено, что в современной науке имеется большое многообразие классификационных подходов к рассмотрению экономических систем, что позволяет сделать вывод о высокой степени проработанности вопросов их исследования. Необходимо также отметить, что изучению экономических систем и проблемам их классификации в рамках, прежде всего, макроэкономического анализа посвящено множество работ, авторы которых выделяют различные типологии основных подходов к их рассмотрению. Исследование экономических систем происходит на различных уровнях взаимодействия субъектов экономических отношений и соответствующим им масштабам деятельности: международном (наднациональном) уровне, макро-, мезо- и микроуровне. При этом, сегодня по-прежнему актуальной является проблема отбора тех подходов к классификации и анализу экономических систем, которые позволяют проводить их практические исследования с точки зрения формирования макроэкономической политики государства, обеспечения государственных органов управления инструментарием анализа, планирования и прогнозирования социально-экономического развития страны.

Наличие представленных вариантов рассмотрения национальной экономической системы позволяет выделить различные подходы к планированию ее развития, разработке стратегии и направлений трансформации национальной экономической системы. Выявив совокупность свойств, обнаружив комплекс внутренних и внешних факторов, под воз-

действием которых система формируется, функционирует и изменяется, можно понять ее существенные характеристики, определить оптимальные инструменты и рычаги воздействия на ее состояние и обеспечить целенаправленное развитие. Важно при этом знание экономических законов и закономерностей данных изменений, чтобы отличать объективно предопределенные трансформации от субъективных искажений.

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HISTORICAL SCIENCES

HISTORICAL DEMOGRAPHIC ISSUES IN THE STUDIES ON PRIMITIVE SOCIETY OF AZERBAIJANI HISTORIANS IN THE SECOND HALF OF THE XX CENTURY

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Abstract

The deepest roots of the history of Azerbaijan go back to the primitive society, the stone age. Azerbaijan, which has a favorable climate, colorful terrain, and natural-geographical factors, had all conditions for the settlement of our great ancestors since the Lower Paleolithic period. The period of primitive community is the longest phase of human history. It is for this reason that this period and its characteristics have been studied with great interest by many historians of the world, including Azerbaijan, for many years. In the mentioned period, population settlement, natural and mechanical growth, objective and subjective factors affecting population growth in general have always attracted the attention of scientists studying historical demography.

Keywords: Azerbaijani historiography, population settlement, population growth, primitive society, historical demography.

Human, being the greatest miracle of nature, was formed in its environment over millions of years, lived at the expense of its resources, raising generations, and at the same time, influencing it, has reached the present day. According to the latest scientific research of scientists, the age of the Earth is 5 billion years. The age of the human who was born and walked on it is 2-3 million years. The difficult and dangerous daily lifestyle that existed in primitive society, especially at the initial stage of this period, seriously affected the demographic situation of the population, sharply limiting its numerical dynamics. Since, during this period, women with two or more young children become low-skilled workers with limited physical capabilities, unable to feed and carry their children with their own milk during subsequent movements of the community to settle in more favorable areas. According to some researchers, primitive society should have had the required number of mature men. Because men were engaged in hunting, which was important for the physical existence of the tribe members, provided them with food, and also protected their compatriots from attacks by predators. According to the findings of researchers of primitive society, including some historians and demographers, the average number of tribe members in this period was 25-30 people. The small number of communities was maintained both by the spontaneous action of natural factors and as a result of certain sociocultural mechanisms. The harsh realities of the time, including many years of famine, dictated important demographic processes such as rising deaths and declining birth rates, especially among women, children and the elderly, and set the general background for many issues related to population development, reproduction and settlement. On the other hand, favorable natural conditions were necessary for the existence of the community. As early as 1.5 million years ago, the valleys of Guruchay and Kondalanchay, located in the southeastern foothills of the Karabakh range, were already inhabited by our ancestors. So,

these places had extremely great opportunities in terms of settlement, generation growth, and the acquisition of materials necessary for the preparation of labor tools. It should be noted that primitive people perceived the world completely differently than we do; they uniquely perceived objects and events in the environment. So, since they could not understand its essence, they were careful and avoided everything, and at the same time tried to find out the reasons for the occurrence of each event. On the other hand, they preferred the natural-geographically favorable areas for settlement and chose those places as a place of residence: *"Human settlement in primitive society continued for thousands of years as a manifestation of the desire to seek more favorable living space from already populated territories to new ones. For them, everything in the world around them was as complex and mysterious as it was simple. ...Of course, primitive people preferred to settle in areas with the same or similar climate as the areas where they lived before. The similarity of climate made it much easier for primitive people to adapt to the environment in new territories. Because in each geographical zone, the formation of flora and fauna necessary for the survival of primitive people is primarily influenced by climate and geographic latitude, which creates the climate. At that time, the movement of primitive people to higher latitudes, that is, to the north, and their attempts to populate such territories can only be explained by one thing - the achievements and experiences acquired by people in their encounters with nature over thousands of years"* [12, p.38-39].

From this point of view, the scientific creativity of Mammadali Huseynov, a world-famous historian and archaeologist of Azerbaijan, attracts special attention. It should be noted that the fundamental study of the ancient Stone Age in Azerbaijan began in 1953. Even for this purpose S.N.Zamyatin, a prominent researcher of the Stone Age, was invited to Azerbaijan, and under his leadership, research work began in the Damjili cave.

The second Paleolithic expedition was organized in 1956 and discovered numerous sites of primitive society. All these or other problems received wide coverage in the work of M.Huseynov, who discovered in 1968 the bone of the lower jaw belonging to an 18-year-old girl, and published in 1973 under the title "Far Stone Age". [11, p.14]. It is interesting that M.Huseynov, speaking about the first "Homo habilis", writes: "From the tools and primitive technology for their manufacture discovered as a result of excavations, it is clear that the level of productive forces was still very low during the Shell-Acheulean period. In addition, the groups of people living in the camp were small. The area of the camp we excavated is no more than 200 m². The population living in such a small territory could not be more than 40-50 people. They did things like collect edible insects, plants and raw materials for joint production". According to the author, Azikh man is one of the oldest finds in the world: "Finds from the time of Azikh man have been found in three or four places around the world. ...Stone utensils discovered in one of the lower layers of the Azykh cave are one of the finds that characterize the Shell-Acheulean period in terms of manufacturing technology and form" [11, p.20-23]. M.Huseynov rightly concludes that our great ancestors settled in our homeland during the Shell-Acheulean period: "All these factors indicate the spread of the first people on the territory of Azerbaijan back in the Shell-Acheulean period" [11, p.23].

The concept of human settlement on the territory of Azerbaijan in the most ancient periods of human history was published by M.Huseynov in the 1970-80s. In this sense, his scientific works, such as "Archaeology of Azerbaijan (Stone Age)", "Ancient Paleolithic of Azerbaijan", "Paleolithic in Azerbaijan", etc., attract attention (Гусейнов М.М. Археология Азербайджана (каменный век). Баку, АГУ, 1975, 162 с; Гусейнов М.М. Древний палеолит Азербайджана: культура Куручай и этапы её развития: 1,500,000-70 тысяч лет назад. Баку, Элм, 1985, 71 с; Гусейнов М.М. Палеолит Азербайджана (в соавторстве с А.К. Джафаровым). Баку, Элм, 1986, 17 с). According to researchers, biological patterns played a significant role in the demographic growth of our ancient ancestors, who lived in the form of primitive human herds or large communities during the Lower Paleolithic period. One of the serious reasons for the decline in the birth rate during the period of the primitive society was that young girls who had not reached puberty entered into relationships with older men much earlier than their time. It is this factor that leads to premature aging of girls, and their ability to bear children drops to a low level. Typically, female fertility refers to the growth rate of children born naturally. On the other hand, women's ability to give birth also refers to the potential they have to bear children. Approaching this problem from the point of view of the characteristics of the period of the primitive society, we see that women who were engaged in gathering, hunting and farming since Neolithic times had very little energy to conceive and give birth to children. due to the fact that they expended a lot of

energy like men. It should be noted that the widespread use of meat by primitive people in the process of population growth was of great importance. A prominent archaeologist of Azerbaijan, M. Huseynov, speaking about the consumption of meat by primitive people, wrote: "In the lower layers of the Azykh cave, along with stone tools from the same place. The bones mainly belong to cave bears, giant deer, etc. belongs. Hunting such huge animals shows that the inhabitants of the cave ate a lot of meat" [12, p.30-31].

It was the consumption of meat that helped primitive people restore some of the energy lost in the exhausting labor process. It was a successful hunt and the acquisition of a sufficient supply of food that created the basis of marital relations (where marriage as a condition of marriage presupposes the intimacy of two opposite sexes). However, during the period of the primitive communal system, when the tools of labor were at a low level of development, people could not always easily and conveniently obtain a successful hunt or this or that food product. Exactly because of this reason; 1) in the great community, and later in the clan community, everyone had to work, no one could live at the expense of another. 2) There could be no talk of a possible norm or necessary population growth in society. Of course, when we talk here about the necessary limit, we primarily mean the possibilities created by food supplies for human growth. [12, p.33].

From this point of view, the works of the Azerbaijani historian-archaeologist Asadulla Jafarov on the history of the primitive society are also of great interest and significance from this point of view. According to the author: "Already ancient man found a permanent place of residence, developed tools and mastered hunting" [4, p.37]. In the article "Azerbaijan is an ancient abode of man", published by A. Jafarov in 1989 in the collection of scientific articles "Monuments of Azerbaijan", he was able to substantiate the fact that our homeland has been populated since ancient times with specific scientific materials. According to the author, there is still no settlement in the world where the cultural layers would be as rich as in the Azykh cave and could be preserved for a long time. In the mentioned article by A. Jafarov we read: "Scientific research shows that primitive people settled here 1.2 million years ago and left the cave 120 thousand years ago". Here, the wealth of materials necessary for settlement, the growth of generations and the manufacture of labor tools did not escape the attention of our great ancestors. According to the author: "After 20,000 years, primitive people returned to the cave and lived here for another 50,000 years" [3, p.21-29]. A. Jafarov, in his monograph "In the Guruchay Valley," published in 1990, based solely on factual material, fundamentally studied the socio-economic situation of our compatriots living in a primitive society. [5, p.64]. In other studies of primitive society, A. Jafarov was able to substantiate the idea that the process of settlement on the territory of Azerbaijan continues without interruption. Since, the author writes in his work entitled "At the Dawn of Humanity," published in 1994: "During the archaeological research carried out on the territory of Azerbaijan, cave sites of Azykh,

Taglar, Dashsalakhli, Gazma and Buzeir, belonging to the Mousterian culture, were discovered" [4, p.43]. The author concluded that the settlement process was widespread in Azerbaijan during the Bronze Age, as well as in later periods: "As a result of the research, it turned out that the territory of Karabakh is also rich in Bronze Age settlements" [4, p.25].

In the studies of Azerbaijani historians of the second half of the twentieth century, devoted to primitive society, one can find rich information on the mentioned problems. Among the studies of Azerbaijani historians on primitive society, the works of the outstanding scientist Teymur Bunyadov attract attention. In his book "Essays on Azerbaijani Archeology," published in 1960, he paid great attention to issues of settlement, generational growth and other historical demographics that existed during the times of the primitive community. According to the author, thanks to favorable conditions for the settlement of the population in Azerbaijan, people lived here already at the beginning of the Paleolithic. The author rightly highlights favorable natural and geographical factors for settlement in primitive society: "Primitive people were very dependent on natural conditions. Therefore, they settled in places convenient for them. This is due to the fact that the tools and weapons of primitive people were very simple, and their struggle with nature was much weaker than in later times" [1, p.28]. Continuing his opinion, the author writes: "Primitive people, living in favorable conditions, collected the fruits and roots of various wild plants. During this period, they made a living by hunting animals living in warm climates. ...Because of the hot climate, people went without clothes and lived in small groups wherever they wanted" [1, p.28].

The author considers the presence of a large number of natural caves on the territory of Azerbaijan to be one of the important factors of settlement. The author rightly considers the abundance of natural caves in Azerbaijan to be an indisputable fact confirming the widespread distribution of settlement in our homeland: "Undoubtedly, primitive people live in many natural caves of Azerbaijan. ...We have these natural caves that were inhabited during the metal age and even later" [1, p.30].

When talking about the peculiarities of population growth under the primitive communal system, scientists first of all think about this question. It is interesting that what forms of settlement of primitive people existed during this period? We find the answer to this question in the mentioned book by Teymur Bunyadov. The author writes that in the later stages of the primitive society period, accompanied by a softening of the climate and population growth, especially during the Chalcolithic period, the population of Transcaucasia led a sedentary lifestyle. To substantiate his opinion, the author cites interesting arguments: "In the monuments of the Chalcolithic era there are many bones of both large and small-horned animals. However, in percentage terms, cattle bones make up the majority. Based on this, we can say that during the Chalcolithic period the population of Transcaucasia led a sedentary lifestyle" [1, p.57]. To

substantiate his opinion, the author also refers to ethnographic materials: "Ethnographic data show that keeping cattle has always been beneficial to settled cattle breeding. Due to migration, the population kept small-horned animals" [1, p.57]. We see this concept of T. Bunyadov in another valuable scientific work entitled "From the history of cattle breeding in Azerbaijan": "The topographic structure and climatic conditions of Azerbaijan created a special basis for the emergence of nomadic cattle breeding" [2, p.12]. The author here explains the emergence of a semi-nomadic way of life, which is a type of settlement, apparently, by natural-geographical factors. Another factor, the reason for the development of this form and its widespread appearance, was undoubtedly the rapid and rapid increase in the number of animal herds, especially small-horned ones. [2, p.12]. Of course, the increase in the number of small-horned animals made it necessary to provide them with food: "Therefore, the local population grazed herds of animals not around the place of residence, but on pastures that were a little away, and returned them in the evening" [2, s.12]. But over time, as cattle breeding developed, "the herders did not return to their homes in the evening and chose camps with a favorable climate and pastures for a certain period of time, about 15 km from there" [2, p.12]. Only after the cold weather set in and the protected pastures around their settlements became an important food source did people return their herds to their places of permanent residence. According to the author, this form of settlement already BC. It received further development during the Kura-Araxes culture in the 3rd millennium. [2, p.13]. On the other hand, the formation of ethnically close tribes and tribal unions in the Bronze Age created a solid basis for people to live in those territories where they settled for a long time: "As a result of long residence here... there were buildings that differed from each other in design, era and building materials. Ethnographic evidence that buildings belonged to large families is of great scientific importance" [1, p.77]. Of course, in large and stable settlements, large families were formed mainly as a result of several marriages based on consanguineous roots. According to Azerbaijani ethnographer Havil Havilov, large families in Azerbaijan are known under the names kulfat, kala-kulfat, veyakhuzin and other names. Despite the fact that the patriarchal family originated during the collapse of the clan system, large families went through a long historical development and existed even until the beginning of the XX century. [10, p.200].

According to Hidayat Jafarov, the creation of small families in the settlement territories of large families was associated, first of all, with the division of labor and the accumulation of additional income as a result in the hands of individual tribal leaders [15, p.19-20]. From the text of the mentioned work it is clear that in the Late Bronze Age, Early Iron Age, the cities formed in Azerbaijan in the Middle Bronze Age, towards the end of primitive communal society, received further development and were able to create extensive trade and economic ties with the largest and most developed countries of the Middle East.

According to the author, clear evidence of this is the beads and cylinder seals found in Khojaly of the mentioned period, on which the name of the Assyrian ruler Adad-nirari is written [15, p.40-47].

During this period, Azerbaijan's extensive ties with powerful countries of the Middle East can be traced in the research works of Veli Aliyev. The author's 1975 book "With Traces of History" emphasizes the idea that the territory of Azerbaijan already functioned as a stable and comfortable place of residence, where people settled for a long time – for thousands of years during the primitive communal society. The clearest example of this is the settlement of Kultapa, dating back to the Middle Bronze Age in Nakhchivan. The author's opinion about the monument in question is interesting: "...*The ancient settlement of Kultapa attracted the attention of many prominent researchers with its splendor*" [7, p.30-31]. The author rightly comes to the conclusion that this multi-layered settlement, studied on a large scale for the first time in Transcaucasia, provides a wealth of material for the study of residential buildings, outbuildings, occupations, cultural and social life, customs and traditions of the ancient generations [7, p.31]. It is noteworthy that research work on this settlement, located at an altitude of 22 meters above the ground and extremely important from a historical and demographic point of view, was carried out for the first time in 1951-1964 by Osman Habibullayev, an outstanding Azerbaijani archaeologist. In general, the results of the study of the Kultapa monuments of material culture and settlements of this period for the first time found their brilliant scientific generalization in a number of valuable scientific works published by O. Habibullaev in the 50-60s of the XX century. (Абибуллаев О.А. Археологические раскопки холма Кюльтепе. (Поселение конца неолита — начала железа). Автореф. канд. дисс. (АГУ им. С.М. Кирова). Баку, АН АЗССР, 1959, 17 с; Абибуллаев О.А. К изучению холма Кюльтепе // Труды Института истории и философии. Баку, АН АЗССР, 1956, Т. IX, с. 5-25; Абибуллаев О.А. Некоторые итоги изучения холма Кюль-Тепе в Азербайджане // Советская археология, № 3, 1963, с. 157-168; Абибуллаев О.А. Раскопки холма Кюль-тапа // Краткие сообщения ИИМК, Вып. 51, 1953. с. 36-45). These works provide extremely valuable information about the growth of generations, settlement, socio-economic life and cultural progress of our ancestors who lived on the territory of Azerbaijan during the times of primitive society. He managed to prove that Kultapa is one of the oldest settlements in Azerbaijan, and the process of population settlement existed here already in the 5th-1st millennia BC. Kultapa, a unique archaeological site, allows demographers to consistently trace the features of life and culture of the period of primitive communal society. Samples of material culture found in this area prove that our great ancestors lived in this place for thousands of years: "*5000-7000 years ago, the inhabitants of Kultapa widely used various types of wheat and barley in agriculture, and also grew legumes and fruit trees*" [7, p.31].

It is known that agriculture is directly related to a sedentary lifestyle. In particular, if our great-grandfathers, according to V. Aliyev, in the indicated place of residence widely used various types of wheat and barley in agriculture, then for thousands of years they continuously studied the natural and geographical features of the area and managed to select the most productive types of cereals suitable for local conditions. From stone and bone (although these tools belong to the Neolithic, Eneolithic and Bronze Age – A.M.) to finds of tools made of bronze alloy from the indicated place of residence, in our opinion, mentioned, i.e. from the most ancient times of primitive communal the building of our great ancestors in the said place of residence clearly indicates its occupation since then. Because here we really see the dynamics of the development of tools, an evolutionary process that has continued continuously for thousands of years. On the other hand, staying in the same area for a long time gave people the opportunity to learn and experience the natural resources of the place where they live. Of course, the process of searching for and finding tin, antimony, amethyst, nickel, lead and other components necessary to add to the composition of copper, the process of researching and applying their physical and chemical properties, in my opinion, insists on the fact that our ancestors lived in the specified place of residence continuously for thousands of years. On the other hand, the extreme thickness of the settlement-cultural layers discovered both on Kultapa I and II (the thickness of the bottom layer on Kultapa II reaches 6 meters - A.M.) is a clear confirmation of the above: "*In general, life in Kultapa lasted for 4000 years in a row, and these long interesting and important changes took place in the economic and cultural life of subsequent generations*" [7, p.32]. Already in the early Bronze Age, we can observe the process of population growth in Azerbaijan based on the territorial growth of the area of settlements. Thus, the total area of Govurgala, built on a high hill north of the village of Shakhtakhti in Nakhchivan territory, is 6-8 hectares [7, p.73].

V. Aliyev provides extremely interesting information about the places of residence and settlement in his other interesting scientific work entitled "Monuments of Gamigaya" about the mentioned period. In general, while reading the author's mentioned book, you will also come across the ancient beliefs of our great ancestors who lived in a primitive communal society, which reflect their attitude to life and the environment, or their philosophy of life. So, here we are talking about the inexhaustibility of human life, its inner spiritual world, the infinity of its potential possibilities. Man tried to create a bridge between himself and the environment, dreams and desires, and natural realities; he realized himself as an inseparable being of a mysterious and magical world. The worship of our great ancestors to the sky, earth, mountains, stones, water, fire, hearth has been widely studied on the basis of images in the monuments of Gamigaya. These images reflect the worship of benevolent spirits guarding the growth of generations of people living in a primitive communal society, and the relationship between man and nature in the

“language” of that period. Thus, the Sun, which is the main source of life on Earth, was already revered by people in a primitive society as a benevolent being, protecting them from darkness, bad events and evil spirits, protecting the population growth. The images of the Sun on the Gamigaya monuments are also a clear reflection of these beliefs. Our great ancestors always looked at the Sun and its symbol - fire - as their patron. Even now, Azerbaijanis treat fire with great respect as one of the purest and most sacred elements of nature. Today there are several customs and rituals associated with fire, such as swearing an oath to the hearth, often saying “hearth” (in Azerbaijani: ocaq) to holy shrines, placing it in front of the fireplace or swearing an oath to the hearth so that a girl who moves into her husband's house will have sons and daughters, happy and prosperous.

V. Aliyev's views on the ancient traces of historical and demographic ideas of primitive people, associated mainly with population growth, are worthy of attention. About the depiction of circles instead of horns on the heads of mountain bald eagles on the Gamigaya monuments, he writes: “The horns of the animal are given in this way not by chance, it has a semantic content associated with the definition. Most likely, this is connected with the worship of the sun, which is one of the main beliefs of the ancient Nakhchivan tribes.” [6, p.30]. According to the author, the image of solar symbolism along with images of animals is the result of the idea that primitive people considered these celestial bodies to be carriers of life on earth in the imagination of primitive people. In fact, these images reflect the demographic thinking of primitive people such as birth and natural growth, the very difficult struggle that people wage for survival and the future: “In these images, it is as if people's lives are protected, they are wished for light, warmth for life, and a future”. [6, p.30]. In other words, in these images the historical and demographic views of primitive people on the population growth were expressed by the most ancient form of art - fine art. According to Y. Hasanov, the main feature of primitive art is the desire to present real natural existence as it is. [9, p.100]. We meet such images in Gobustan. Gobustan also has a petroglyph of a man holding the sun in his hand, a goat painting with a sun symbol, and a cromlech construction related to the solar cult. [13, p.82-83].

Already in the Early Bronze Age, population growth in Azerbaijan, attempts by pastoral tribes to seize more and more territories in the foothills and mountainous zones, near water and large pastures, led to inevitable wars between individual tribes and tribal unions. Our ancestors always remembered our compatriots who died in these bloody battles for the inviolability of our wealth, and prepared symbolic graves for them to perpetuate their memory. In such symbolic graves, small jars were usually used, empty inside. Such jugs were placed on their sides in graves in different directions. In historical literature, this type of grave monuments, called genotaphs, can be found in many countries of the world. However, an entire cemetery consisting of genotaph graves can only be found in Karabakh. The late archaeologist R.

Goyushov, who took part in the discovery of this type of burial ground, writes that the genotaph cemetery discovered by our expedition in Karabakh is one of the rare events in the world. The cemetery in question is located on the territory of the Agoglan temple of the current Khojavend region. [8, p.27]. But why were such cemeteries created for people who died in battle or did not return to their homeland for one reason or another? This was primarily associated with the system of religious beliefs that existed in ancient times. Thus, people were worried that the souls of their deceased loved ones, who did not have graves, could not find peace, so they made symbolic empty graves for them and placed flat stones next to them. According to ancient beliefs, the soul of a deceased person found peace by being absorbed into these stones. From time to time, such empty graves were visited and certain rites and ceremonies were performed around them. In other words, in such genotaph graves everything possible was done so that the souls of the martyrs could sleep peacefully forever. This testifies to the sympathy, respect and love of our compatriots for people who gave their lives for the land since the earliest times of human history. Of course, these efforts of our great ancestors came from the need to subjugate enemy forces, defeat their aggressive intentions, ensure normal life and existence in their homeland liberated from the enemy, as well as the very difficult and complex struggle that they waged for survival. An interesting point here is that in all the genotaph jar graves studied, as a rule, a flat piece of stone was placed on the edge of the jar. There is no doubt that this was due to the traditional stone beliefs of the population. R. Goyushov rightly wrote: “Jar graves were the product of such a religious belief that man was born from the earth.” As he slept in his mother's womb when he was born into the temporary world, so it must be for him when he passes into the permanent world. Thus, the jug was created as a symbol of the mother's womb”. [8, p.27].

Conclusion. Thus, in the second half of the XX century, Azerbaijan historians having created high-quality monographs reflecting the dynamics of the development of such processes the settlement, population growth, etc. in the primitive society and they managed to describe the historical and demographic life of Azerbaijani people at a scientifically objective level.

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MEDICAL SCIENCES

CLINICAL AND BIOCHEMICAL FEATURES OF RHEUMATOID ARTHRITIS IN COMBINATION WITH ARTERIAL HYPERTENSION, TYPE 2 AND ABDOMINAL DIABETES OBESITY

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Abstract

The features for rheumatoid arthritis (RA) and RA in combination with hypertension, type 2 diabetes and abdominal obesity depending on clinical and laboratory parameters. Clinic of rheumatoid arthritis in patients with metabolic syndrome is characterized by severe course, a high degree of activity and poor quality of life compared with patients with rheumatoid arthritis without comorbid pathology.

Keywords: rheumatoid arthritis, diabetes mellitus type 2, arterial hypertension, abdominal obesity, clinical features.

Introduction. Rheumatic joint diseases (RJD) are considered as one of the most common pathologies throughout the world, as well as medical and socio-economic problems of modern society. They are reducing quality of life and lead to significant health care costs and negatively affect the national economy [1, 11].

According to the World Health Organization (WHO) first place RA ranks among all joint diseases. World wide on rheumatoid arthritis (RA) approximately 1% of the world's people are sick without a pronounced geographic or climate influence. Getting sick with RA in Ukraine according to official data medical statistics for 2013 is more than 4 thousand people, and the prevalence in absolute terms is 115.5 thousand patients [2, 14]. You can get sick with RA at any age starting from 16 years (juvenile RA), but the peak diseases occur at the age of 40-50 years. Women suffer from RA 2-4 times more often than men, the average ratio of women to men is 3:1 [7].

RA is one of the most common and severe chronic joint diseases and in most patients leads to rapid loss temporary and permanent working capacity, reduced life expectancy [3, 12]. Almost 50% of patients with RA become disabled within the first 5 years, and after 20 years – more than 90%, a third of whom are completely disabled [10].

The problem of comorbid conditions in patients with RA is relevant for modern practical rheumatology, since the possible influence concomitant diseases on the course and results of treatment of RA remains little studied [9].

Metabolic syndrome in RA dedicated only to individual robots, in particular, Korochina I.E. that sovavt. (2006) who showed that among patients on RA, the above-mentioned syndrome, is registered in 27% of people with predominance of hypertension, dyslipidemia and diabetes mellitus type 2. [4, 13]

RA in combination with abdominal obesity (AO), diabetes mellitus type 2 (DM 2) and arterial hypertension (AH) is common and unfavorable prognosis of the disease.

Purpose: To analyze the features of the course of rheumatoid arthritis (RA), and also RA in combination with arterial hypertension, diabetes mellitus type 2 and abdominal obesity depending on the clinical picture and laboratory tests indicators.

Objectives:

1. To study the clinical and biochemical parameters of the abdominal obesity, arterial hypertension and type 2 diabetes mellitus in patients with RA.

2. To find out the relationship between the severity of RA depending on the presence comorbid pathology.

Material and methods. 73 patients were examined for RA, who were on in patient treatment in the rheumatology department of the regional clinical hospital in Chernivtsi, as well as the Chernivtsi regional endocrine dispensary and rheumatology department of city hospital No. 2. There are 30 patients from them suffering from RA (group 1), 28 patients with RA associated with arterial hypertension, diabetes mellitus type 2 and abdominal obese (2nd group), and 15 practically healthy (control group). Sick for gender characteristics did not differ statistically from each other. Average the age of the patients was 42.8 ± 6.3 . The diagnosis of RA was established in accordance with ACR/EULAR criteria, 1987/2010 Quantitative assessment of RA activity was carried out using the DAS 28 index (Disease Activity Score), recommended EULAR, CRP and erythrocyte sedimentation rate (ESR) [5]. Assessment of the intensity of pain in the joints (by the patient) and their functional abilities (by the patient and the doctor) were analyzed using visual analogue scales (VAS). Morning stiffness and duration were also assessed diseases. In order to assess the quality of life of patients suffering

from RA, we HAQ SF 36 questionnaires were used [6, 8].

The diagnosis of metabolic syndrome was established according to WHO criteria (1998), ATP III criterion (2001), metabolic syndrome criterion International Diabetes Federation (ID) 2005.

Anthropometric measurements were performed to determine metabolic syndrome measurements: measured height, weight, waist size, hip size, calculated mass index body (BMI = body weight/height (m)²). Level of insulin resistance (IR) calculated using the HOMAIR formula. Statistical processing of received research results were carried out using a statistical software package Statistica 6.0 with evaluation of mean values (M) and their error (m). The differences were considered significant at $p < 0.05$.

Results and its discussion.

Our research data showed that patients with RA are characterized by common symptoms: weakness, decreased appetite, high fever (up to 40°C), increased sweating, asthenia, sleep disturbances. These symptoms are present in approximately 89% patients with

rheumatoid arthritis. For rheumatoid arthritis in combination with hypertension, AO and type 2 diabetes, the above symptoms are much more common, more than 96%. Together with common symptoms for RA are characteristic articular syndrome (pain, swelling, stiffness). In later stages of the disease, fibrous or cystic ankylosis and contractures which lead to permanent deformation of the joint.

We found that in patients with rheumatoid arthritis associated with hypertension, diabetes mellitus 2 and AO articular syndrome were more common than in patients with RA 73.9% and 65.3% of cases, and joint deformity 47.4% and 41.3%. We also explored morning stiffness did not differ significantly between groups.

The patients we examined also encountered extra-articular manifestations of RA which accounted for 36.8% of cases, and in combination with hypertension, AO and type 2 diabetes 38.1%. Among our patients, the most common extra-articular manifestation was rheumatoid nodules – 20.2%, lymphadenopathy – 11.7%, syndrome was less frequently noted Sjogren's syndrome, Raynaud's syndrome, digital arteritis, leg ulcers, scleritis, etc.

Table 1
Clinical and demographic indicators in patients with RA and RA associated with hypertension, type 2 diabetes and AO

| Indicators | Healthy n=15 (20.5%) | RA n=30(41,1%) | RA with hypertension, type 2 diabetes and AO n=28 (38.4%) |
|------------------------------------|-------------------------|-------------------|--|
| Age, years | 49,3±6,3 | 51,2±8,1 | 54,2±4,1 |
| man | 7 (46,7) | 19 (63,3) | 15 (53,6) |
| woman | 8 (53,3) | 11 (36,7) | 13 (46,4) |
| Weight, kg | 73,4±3,4 | 71,6±6,42 | 92,8±10,2* |
| Height, cm | 166,1±5,22 | 165,89±5,38 | 168,32±6,47 |
| Body mass index, kg/m ² | 25,9±4,6 | 22,4±4,53 | 31,2±1,03* |
| Waist | 77,43±1,26 | 76,8±1,42 | 93,22±2,05* |
| Systolic arterial pressure | 124,62±2,22 | 123,5±1,03 | 156,9±1,97* |
| Diastolic arterial pressure | 73,5±1,18 | 72,6±1,28 | 88,13±1,26* |

Analyzing gender characteristics between patients of the corresponding groups

you can see that there is no statistically significant difference between them. (Table 1). In RA patients with hypertension, type 2 diabetes and AO, significantly higher rates were observed weight 92.8 ± 10.2 com-

pared with RA patients 71.6 ± 6.42; waist circumference 93.22 ± 2.05 and 76.8 ± 1.42, and an increase in BMI 31.2 ± 1.03 and 22.4 ± 4.53, as well as significantly increased blood pressure (AP): SAT = 156.9±1.97 and 123.5±1.03; DAT = 88.13±1.26 and 72.6±1.28.

Table 2
Dynamics of clinical and laboratory data in patients with rheumatoid arthritis in depending on comorbid pathology

| Indicators | RA n=30 (51.7%) | RA with hypertension, diabetes 2 and AO n=28 (48.3%) |
|---|--------------------|---|
| Index DAS28 | 3,57±0,12 | 4,61±0,17* |
| Index HAQ | 1,8±0,5 | 1,9±0,5 |
| C-reactive protein, mg/l | 20,3±2,05 | 31,42±3,18* |
| Erythrocyte sedimentation fluidity, mm/h | 33,8±9,8 | 38,1±10,5* |
| Rheumatoid factor, MO/ml | 114,3±16,7 | 119,1±18,4* |
| Antibodies to cyclic citrullinated peptide OD/ml | 496,5±28,2 | 823,7±32,6* |
| Lipid profile, mmol/l | 4,98±0,05 | 6,1±0,18* |
| total cholesterol | 1,64±0,03 | 2,13±0,12* |
| Triglycerol | 0,73±0,05 | 1,04±0,06* |
| Lipoproteins of very low strength | 3,2±0,1 | 3,72±0,16* |
| Low-strength lipoproteins High density lipoproteins | 1,08±0,14 | 0,79±0,04* |
| Blood plasma glucose | 4,85±6,76 | 6,27±5,3* |
| Pain according to the Visual Analogue Scale, points | 4 | >6* |

We carried out an analysis between clinical and biochemical indicators of RA activity and blood lipid spectrum. When analyzing the condition lipid profile of patients with RA and in patients with RA in combination with hypertension, diabetes 2 and AO. It was noticed that a sharp increase in the level of proatherogenic lipids (total cholesterol, low-strength lipoproteins and triglycerol), the difference in indicators is significant. The average for group 1 is - 4.98±0.05, 2 -6.1±0.18; TG: 1st group - 1.64±0.03, 2nd -2.13±0.12; LDL: 1st group - 3.2±0.1, group 2 - 3.72±0.16. RA activity indicators differed significantly: DAS28, C-reactive protein, Erythrocyte sedimentation fluidity, Visual Analogue Scale (Table 2). DAS28 in group 1 was lower than in group 2 (3.57±0.12 and 4.61±0.17); Erythrocyte sedimentation fluidity - 33.8±9.8 and 38.1±10.5; C-reactive protein - 20.3±2.05 and 31.42±3.18. This indicated that the articular syndrome was more pronounced in patients for RA with comorbid pathology.

Conclusions: According to our data, patients with rheumatoid arthritis in combination with hypertension, type 2 diabetes and abdominal obesity were associated with a severe course, a high degree of activity and low quality of life compared to patients with rheumatoid arthritis without comorbid pathology.

Therefore, addressing issues regarding pain reduction, inflammation, stop or slow down the rate of joint damage will help reduce the risk of complications, improve overall prognosis of the course of the underlying disease and improving the quality of life of patients with rheumatoid arthritis with concomitant hypertension, type 2 diabetes and abdominal obesity.

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PEDAGOGICAL SCIENCES

LOGICAL STRUCTURING TRAINING CONTENT TOPICS METHODS OF NUMERICAL INTEGRATION OF DETERMINED INTEGRALS

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Abstract

This article is focused on various aspects of the development of logically structured educational technology. The levels of logical structuring of the teaching content of the topic are considered when implementing a structural-modular approach to organizing the educational process. The problems of identifying structural elements are discussed in the content of education and the formation of a modular program.

Keywords: algorithm, structuring of educational material, logical module, modular technology, accelerated learning.

Currently, the search, development and implementation of innovative pedagogical technologies into the educational process are actively underway to satisfy modern society's demands for flexible, multi-purpose and effective training programs. Interest in logically structured modular technology is due to its significant advantages: the technological, structural and content flexibility of modular educational programs, the possibility of widespread use of information and communication technologies to individualize students' independent work, the complexity, efficiency and objectivity of assessing students' educational achievements, the applicability of technology in organizations of all types educational activities of students.

Modular learning is based on the sequential mastery of the content of integral units of the curriculum structure - modules. The modularity of the structure can be considered as the basis and sign of a systemic organization. Let us note that in pedagogical theory and practice there are different points of view on understanding the module and the technology of its construction. In this regard, it is necessary to clarify the meaning of this term in terms of the problematic aspects of the issues under consideration. From our point of view, a module is a functionally independent technological unit that includes all components of the methodological system (goals, content of training, organizational forms and methods of training, teaching tools, monitoring and evaluation of learning results) [1,2,3].

Let us consider the formation of an algorithmically structured training topic on methods of numerical integration of definite integrals in the discipline "Design of Algorithms" based on a subject-based approach to determining the structure of educational content, as well as determining the goals and methods of teaching. The components of the module are logically structured educational elements (UE), which are content- and functionally interconnected and interdependent units of structure. The content of an educational element can be represented by smaller portions of educational information - educational elements of the second and third order (Fig. 1).

Now we are creating a semantic graph for presenting the educational elements of the modules, for example, for module 1 of the rectangle method (Fig. 2). For students, graphical diagrams of modules give a clear idea of the volume of educational information and the order of its development in the module. The graph of the logical structure of a module reflects not only the composition and interconnection of educational elements, but also the dynamics of the learning process, as well as the sequence of stages of the teacher's educational activity. In the general case, the graph corresponds to a module, and its vertices correspond to educational elements (EE) and serial numbers of classroom sessions [2,3].

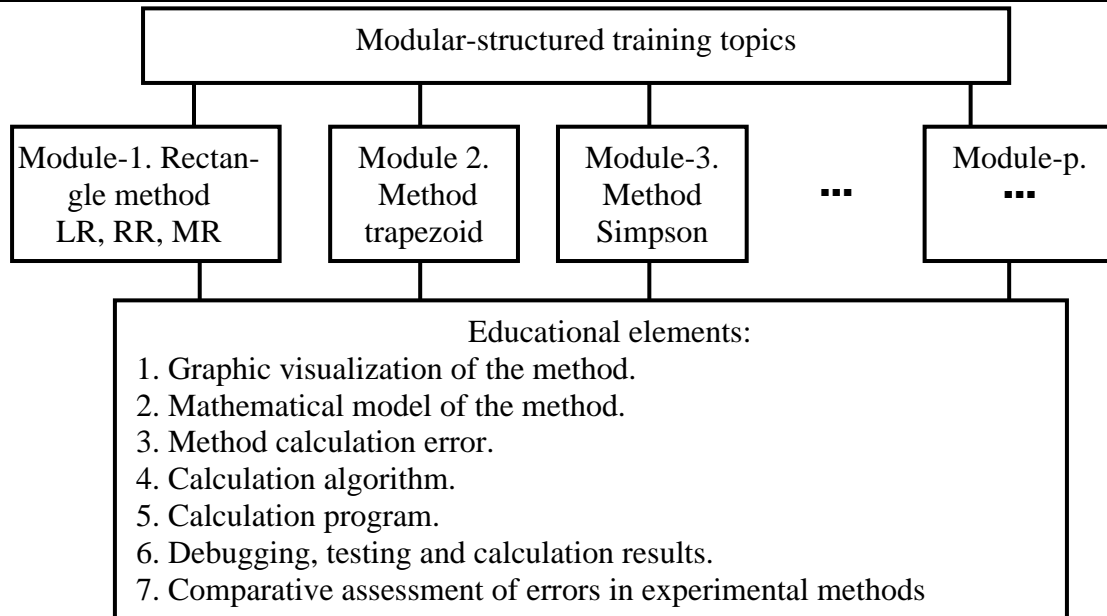


Fig.1. Modular-structured training on the topic of numerical integration of definite integrals. LR method of left rectangles; RR method of right rectangles; MR method of average rectangles.

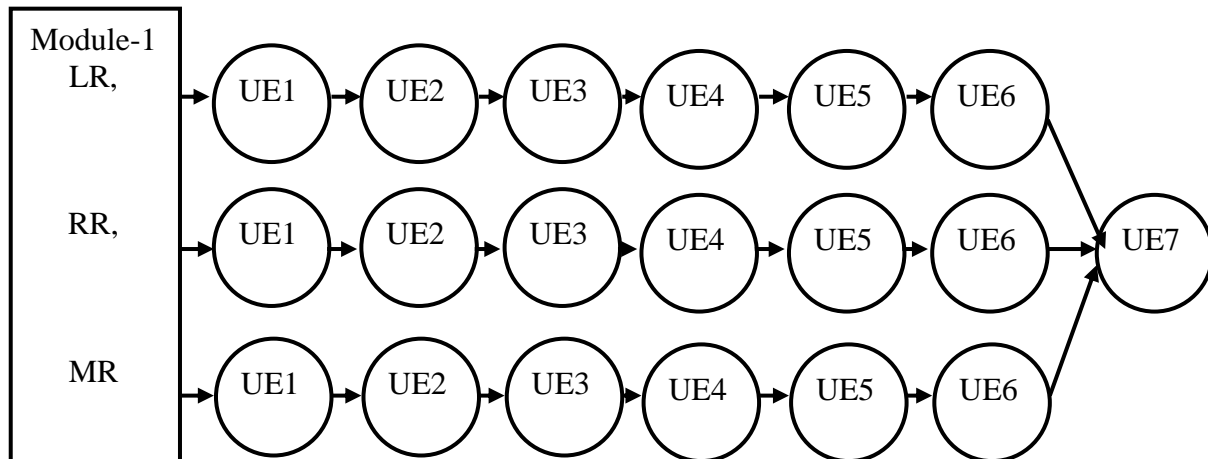


Fig.2. Semantic graph of module-1. Left, right and middle rectangle methods.

Based on a system-activity approach to identifying structural elements, a modular training system can be designed in the form of educational and methodological manuals (for students or teachers) for studying theoretical foundations, for performing laboratory, practical,

coursework, and individual ones. test tasks, etc. developed on the basis of a modular structure.

Therefore, each module has a content structure, in which we have identified the following components: control, coordination, information and methodological and monitoring parts (Fig. 3).

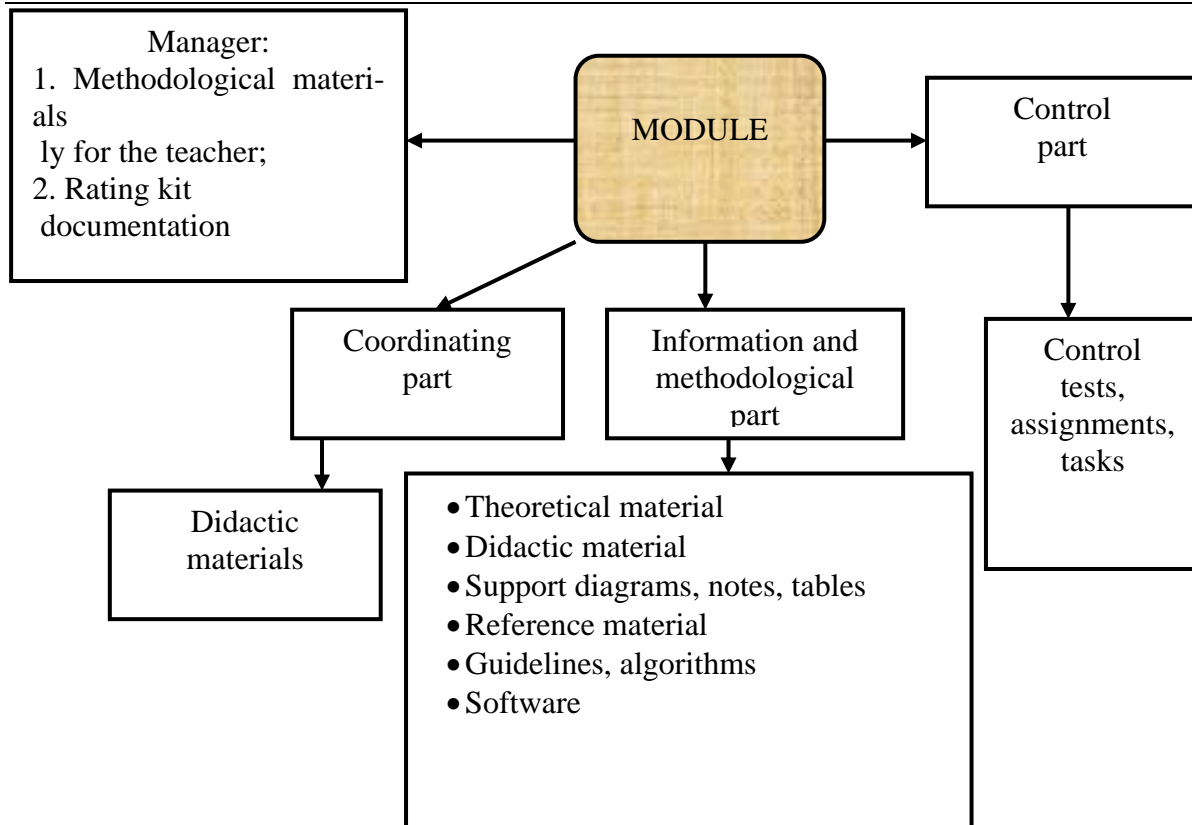


Fig.3. Structural components of the module content.

Modeling the content of modules for presentation in various educational media (brochures, electronic publications, etc.), which requires deep transformations and formalization of information, represents an internal plan for structuring the content of education.

The developed modular-structured teaching methodology contributes to the acquisition of the necessary knowledge, skills and competencies according to individual student learning trajectories. Such a concept will require universities to plan and organize the educational process in such a way that the desires of students and the capabilities of teachers, rather than plans, come first. This approach imitates the laws of the market - both teachers offer a set of courses, and students express a desire to study them, and students put forward requests for the formation of disciplines with certain competencies and content, and teachers develop these courses.

The modular-structured teaching methodology is intended to increase the effectiveness of control activities for mastering the material on the main issues and sections of the discipline "Design of Algorithms" (or for self-control of students [4]) when organizing the ed-

ucational process, taking into account individual learning trajectories.

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PHILOLOGICAL SCIENCES

NEOLOGISMS OF THE RUSSIAN-UKRAINIAN WAR PERIOD

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Abstract

The article is devoted to the analysis of neologisms that appeared in the Ukrainian Internet discourse during the war. In the times of armed confrontations, hate speech begins to be tolerated in the media, negatively coloured innovations are spread to refer to the aggressor country (Bydlostan), its helmsman (Rashenführer), military (orks). Among neologisms there are lexemes formed according to existing in the language and occasional word-forming types, borrowings, negative synonyms of well-known concepts, semantic neologisms, neographemes that differ only in spelling.

Keywords: neologism, hate speech, borrowings, transformations, semantic neologisms, neographemes, word formation.

1. Introduction

Global socio-political events affect the consciousness of the people, causing changes in behaviour, way of thinking, and worldview. Such fundamental changes in public life as wars, revolutions, and coups change the mental state of society, evoking the strongest emotions possible: from animal fear for life to exaggerated expressions of anger, hatred, and the desire for bloody revenge. However, when it comes to hatred, emotions prevail over rationality (Ortega-Sánchez 2021: 2).

People are inclined to verbalize their feelings and impressions, so in times of war, diary keeping becomes widespread, “hate speech” is tolerated, and an order of magnitude more neologisms appear than would occur through the natural development of language. During the full-scale invasion of Ukraine by Russian troops, the Ukrainian language was enriched with a significant number of neologisms, both neutral or positive, and negative ones as well, that is related to the “hate speech”. People share their emotions, impressions, and feelings on the Internet, where there are no special restrictions or censorship, so pejorative, rude, and swear words are becoming widespread, which, on the one hand, help authors overcome negative emotions, and on the other hand, contribute to the democratization of the language.

The new vocabulary of a certain historical period encodes extensive information about the peculiarities of the economic, political, and cultural life of its era. Moreover, the more important the era is for a particular society, the more saturated it is with vital events, the more actively the language reacts by creating new words (Hrytsenko 2022: 9).

Article structure. The article consists of five sections. The introduction discusses the reasons for the emergence of a large number of new words during the war. The second section describes the purpose and

methodology of the study. The third section is devoted to the analysis of the reasons for the spread of hate speech during military confrontations. The fourth section provides a classification of neologisms recorded in Ukrainian online discourse in 2022-2023. The conclusion summarizes the results of the study of neologisms and the use of hate speech.

2. Aims, material, and methods

The purpose of the article is to study the changes in the language of Ukrainians since the beginning of the war; to trace the connection between emotions and people's speech; the task was to identify author's novelties in the Internet discourse, to analyse the origin, methods of creation, and thematic groups of neologisms of the war period.

Methodology. During the study, we analysed the linguistic reactions of Ukrainians to the outbreak of war in general and to specific military events, and found out what lexical means people use to express their emotions and what neologisms they create. To analyse the neologisms, we used the methods of linguistic text analysis, word-formation analysis of new words, the historical method in terms of studying the origin of key lexemes, and partially the semantic analysis and comparative method of language research.

The source of data is the Internet discourse: news and comments to them as “social media has a great influence on the formation of new words” (Hadžiahmetović & Rahmanović 2020). The analysis focus on the reaction of contributors to a particular military event and the lexical features of the messages. Neologisms in the amount of about 250 units were identified through a continuous sampling from the Internet discourse.

3. The use of hate speech in time of war

The concept of “hate speech”, which means “language of hatred”, appeared in the 1950s, although the

phenomenon dates back to ancient times. One of the components of the primary ontological conceptions of the world was the opposition “friend or foe”. The formation of national identity was based on the identification of differences between those who belong to a certain community of people and those who do not (Kovaleva 2009: 85). This categorization of the world is one of the archetypes of the national subconscious that were identified by C. G. Jung. In the archaic picture of the world, the very existence of the “stranger” was perceived as a threat to the “own”, so the logical reaction was distrust, tension, and even hostility and aggression (Kovaleva 2009: 87). Thus, the “stranger” who posed a threat began to be perceived as an enemy.

In today’s civilized world, where tolerance is promoted, the “stranger” is interpreted as “other” and not as an “enemy”; he or she is not a threat, but has differences. European society is striving for this understanding. However, in the event of wars, armed confrontations, and interethnic conflicts, the basic collective subconscious prevails again: the opponent is perceived as an enemy. In such a situation, “depersonalization of the enemy, defining it as a faceless collective being” (Taranenko 2015: 67) becomes effective, “the image of the opponent is deprived of human features and endowed with behaviour that is completely uncharacteristic of a person the idea of moral inferiority, criminality and negative influence” of the enemy is created (Pryshchepa 2017: 102). The opponent is devalued. V. Kotsur and a group of researchers identify three levels of this process:

1. Lowering of status – switching to “you” (singular, 2nd person); use of the neuter gender in relation to people; distortion of names and surnames (*putler, pulo, putyasha, putidlo, alkoDimon, vid’mediv*); use of names of diseases or intellectual disability (*debiloidy* (English equivalent – *morons*), *schizorascists*); use of distortions, offensive names of the community, often occasionalisms with negative connotations (*ukr, rascist, moscalota, katsap*);

2. Depreciation to the level of an animal or plant – the use of words for animals, insects, plants (*colorad* (Colorado beetle), *ukrop* (dill), *svynosobaky* (pig-dogs), *zviroidiots* (beastoids), *reptiloid, bulbosaurus*; mocking distortion of surnames or names using words for animals or plants;

3. Devaluation to the level of an inanimate object – the use of words for people that refer to objects (*vata* (cotton wool), *chucheloid* (stuffed animal)); distortion of names, surnames, formation of new words by combining fragments of the surname and words denoting something inanimate (*pukin, pis’kov*); use of words denoting feces, genitals, swear words or dead animals (*stcar, russisia, parashistan*) (Kotsur et al. 2021).

Devaluation, dehumanization, and depersonalization of the enemy lead to the fact that “the physical destruction of the enemy is perceived as more legitimate” (Taranenko 2015: 67), and does not raise moral doubts. There is a theory of social identity based on the idea that social groups improve their cohesion by denigrating other social groups (Bauman et al. 2020).

The question of the benefits of hate speech in wartime remains open, while all researchers of this phenomenon unanimously state that such an attitude is unacceptable in peacetime. O. Horchynska insists that “any case of hate speech is harmful, and each of them must be combated” (Horchynska). D. Yarovyι cautiously states that “for an interstate conflict, the dehumanization of an external enemy does not pose significant dangers” (Yarovyι 2019: 48), while leaving open the question of the positive impact of hate speech on mobilizing society. O. Kokovikhina hypothesises that “hate speech can be useful for non-violent channelling of mental tension” (Kokovikhina 2022: 15) in society towards an external enemy, but warns that its use in the general media should be balanced. V. Kotsur sees positive consequences of using the language of conflict in promoting “psychological discharge at the individual level and reducing socio-psychological tension at the collective level” (Kotsur et al. 2021). In addition, O. Taranenko warns that depersonalization and dehumanization of the enemy are semantic processes of double danger, as they pose a threat not only to the object but also to the subject of the offensive statement (Taranenko 2015: 69).

With the outbreak of hostilities, psycho-emotional tension in society increases, and extraordinary irritating events cause stress. It is possible to understand the inner world of an individual through verbal reactions, so “the analysis of speech during emotional stress is a direct and objective measure that highlights important processes in the psyche and mental health of a person” (Zasiekina et al. 2021) and society as a whole. Of course, language reactions will not be exactly the same for different individuals, and even more so for representatives of different nations, since the choice (even at the subconscious level) is influenced by factors such as psycho-emotional state, stress resistance, upbringing, language preferences, communication competencies, criticality of the situation for the individual, environmental influence, etc. However, negatively coloured metaphors for the enemy appear during any armed conflict (Isakova 2016: 94).

The reason for the spread of rude, abusive words against the enemy is the individual’s internal subconscious desire to get rid of negative feelings, pain, because it is believed that swearing can help harmonise the mental state (Bahan et al. 2022). Furthermore, “by humiliating the opponent, we rise above him/her, he/she shrinks in size, becomes weak, and we feel power and strength” (Karpiak). Irony is a rather relevant and effective “mechanism of psychological self-regulation. It makes it possible to rise above the situation, to look at it from a different perspective. Irony turns what is unbearable, hostile, disturbing for a person into the opposite” (Bahan et al. 2022). That is why during the Russian-Ukrainian war, a significant number of negative names for the enemy appeared, as well as memes that ridicule the typical features and behaviour of opponents.

Initially, negative nominations of the enemy arise in oral communication, later in written communication, and then in the media (Isakova 2016: 93). In February 2022, this process occurred very quickly in Ukrainian

society. The Internet became the mouthpiece of the spread of neologisms for the Russian invaders, due to unlimited access, remoteness, anonymity, and the possibility of interactive communication (Isakova 2016: 93; Kokovikhina 2022: 19; Yarovyi 2019: 70; Castano-Pulgarín et al. 2021: 1). Lexemes with negative connotations have appeared not only in the posts of individuals, but also in electronic media, which can already be interpreted as hate speech. Sometimes the Internet is used to legitimise deviant behaviour (Cohen et al. 2018). In their professional activities, journalists should be guided by the current laws, which prohibit the use of “statements that spread, incite, support or justify racial hatred, xenophobia, anti-Semitism and other forms of hatred caused by intolerance, including intolerance manifested in the form of aggressive nationalism and ethnocentrism, discrimination against minorities and hostile attitudes towards them” (Recommendation 97; Recomendación 2016). Any posts that disparage a person are treated as hate speech on the Internet (Zhang & Luo 2018). This also includes derogatory words, vulgarity or sarcasm (Malmqvist 2015), stereotyping of social groups (Papacharissi 2004), demonstration of discriminatory views (Bhavnani et al. 2009), speculation, comparisons, derogatory comments, slander, incitement to riot, threats, name-calling (Lingam & Aripin 2017), any offensive statements aimed at a particular group of people (Watanabe et al. 2018). The first large-scale systematic research on hate speech on social media is presented in the works of Mondal et al. (2018).

Despite the pan-European trend away from hate speech, both Ukrainian and Russian media outlets are constantly publishing harsh statements against the enemy during the war. In this way, the authorities are trying to mobilise the population to fight, to create an image of a dehumanised enemy, which is considered legal in such circumstances. Hate speech performs the functions of “strengthening intragroup cohesion, forming an image of an imaginary enemy, preserving the integrity of the internal group, and channelling mental tension” (Kokovikhina 2022: 15). Some politicians consider hate speech to be a trivial act of accidents or an act of virtue (Ben-David & Matamoros-Fernandez 2016), spreading racist, ethnic, religious and/or gender stereotypes. Sometimes freedom of speech is misinterpreted as the freedom to hate and write about it (Meza et al. 2018). As a result of spreading such views, pessimistic opinions appear that social media platforms are losing the fight against online hate (Johnson et al. 2019).

According to our observations, at the beginning of the full-scale invasion of Ukraine by Russian troops, there was a serious surge in hate speech on the Internet, when people wanted to verbally express their anger, contempt, and aggression, and the media successfully seized this opportunity. This technique helped to unite Ukrainian society in the fight against the external enemy, and all internal misunderstandings and disagreements faded into the background. There was a significant outbreak of patriotism, which helped the defenders achieve significant success. However, the long-term maintenance of hatred and anger among the people can bring negative consequences in the form of riots, coups,

etc. Over time, emotional tension decreases, as the affective state cannot be too long. In 2023, there are fewer swear words and offensive language in online posts.

4. Results and discussion

The war in Ukraine has led to the emergence of a number of new words within a few months. Enriching a language with new words is a natural part of its evolution (Osovska 2023: 19). Most of the words originated in the spoken language and quickly came into use thanks to the Internet. According to Zh. Koloiz, each new word appears as an occasionalism because it has an author and is used in a specific situation (Koloiz 2009: 62), but later, if the author is not significant and is forgotten, and the neologism is understandable outside the context of its origin, it can spread in society and become public domain. Due to their appearance in the spoken word, modern Ukrainian neologisms often have shades of coarseness, vernacular, and even vulgarity.

When researching new vocabulary, scholars usually pay attention to the reasons for its emergence, the way it enters the language, word-formation features, and thematic groups of neologisms. The act of appearance of a new word in the language should be identified with the word-forming act of derivation in the broad sense of the word (Walczak 1992: 232). The emergence of new words in 2022 was stimulated primarily by extra-linguistic factors, namely, opposition to Russian aggression, military assistance from friendly countries, a decrease in the level of censorship and self-censorship, and changes in language tastes and fashion (Styshov 2022: 43). A significant number of names for weapons and military equipment have appeared; these are borrowings from other languages (HIMARS, *javelin*, *bayraktar*, *shahed*), as well as Ukrainian figurative names formed by metaphorisation (*zelenka* – forest belt, *pad-dle* – flamethrower, *piglets* – mortar shells). The decrease in censorship has led to the formation of swear words (*svynorusy* (pig-headed people), *bydlostan* (a country of cattle), *chmonia* (the enemy's soldier), *krem-liad'* (kremlin minions)), which often become tolerated in wartime in relation to the enemy. The intra-linguistic reasons are dominated by the desire to give preference to more expressive language forms (Styshov 2022: 43), and given that these are nominations of the enemy, negatively coloured new words have appeared (*rusofascist*, *fakomet* (fake news producer), *nedoimperia* (under-empire)).

Scholars divide all new words into groups:

1. Actual neologisms characterized by novelty of form and content, including borrowings;
2. New words – words with a new form and meaning, formed from specific morphemes according to productive word-formation models;
3. Transformations – other names of known realities, novelty is inherent only in the form, but not in the content;
4. Semantic neologisms – forms existing in the language that change their meaning in whole or in part by adding a new lexical and semantic variant (Ladonia 2018: 39). Due to the instability of the terminology, in the works of O. Serbenska the first group is called borrowings, and the second – new words, semantic neologisms are called words with redistribution of meanings,

there are no transformations, but there is such a group as revived words and expressions from the past, this group is called reactivation by M.I. Tretiak (Tretiak). A well-known neologism researcher, Professor O. Styshov, provides a similar classification, distinguishing between neologisms, neologisms, transformations, semantic and functional (revived from the past) neologisms (Styshov 2005: 46-52).

V. I. Zabolotkina divides new words into three groups:

1. Neologisms proper;
2. Semantic innovations or rethinking;
3. Renaming or transformation (Dziubina 2018: 38-39).

To summarize, we propose to divide neologisms into the following groups:

1. Neologisms – all new words formed from native and borrowed morphemes according to the existing Ukrainian language and occasional word-formation models;
2. Borrowings – words of foreign language origin written in the original language or by transliteration, which were not involved in derivational processes in the Ukrainian language;
3. Transformations – new names for previously known concepts;
4. Semantic neologisms – new schemes of previously known lexemes, including outdated ones;
5. Reactivators – neologisms that have returned from a group of archaisms or historicisms without changing their meaning;
6. Neographemes – words that differ from existing ones only in their novelty of spelling, but the meaning remains the same.

Some neologisms can simultaneously belong to the group of new words and transformations if they are formed by one of the morphemic methods, but are synonymous with well-known concepts. For example, the word *bydlostan*, formed by basic compounding, is a rough synonym for the lexeme “Russia”. Most of the neologisms-transformations denoting the aggressor country and its president in the Ukrainian Internet discourse of the two years of war are written with a lowercase letter to emphasize contempt (Yarovy 2019: 110) for the invader.

4.1 Neologisms

Among the neologisms of the period under study, the first group is the most widely represented. We refer to new words formed by morphemic methods. Morphemic methods of word formation include suffixation, prefixation, inflection, postfixation, stemming, abbreviation, truncation, telescoping, and several non-usual methods. Traditionally, most words in the Ukrainian language are formed by adding suffixes. Wartime new words are no exception – about 20%. The following suffixes have become relevant: **-y-** (*ukrainyty* (*ukrainied*), *javelinyty* (*javelined*), *stingeryty*, *kimyty*, *pryt'ulyty*), **-ets'** (*azovets'* (*azovite*), *bydlostanovets'*, *wagnerivets'*), **-ist-** (*rascist*), **-ant-** (*uhyliant* (*evader*)), **-iuk-** (*Jonsoniuk*), suffixoid **-oid-** (*putinoid*), **-ok-** (*putlerok*), **-iash-**, **-ush-** (*putiasha*, *pylusha*), **-k-** (*rashka*),

-sk-/tsk- (*moskalatsky*, *rascistsky*), **-n-** (*rusnya*, *moskalnya*), **-ot(a)** (*moskalota*), **-ism-** (*rascism*, *putlerism*), **-iy-** (*katsapiya*), **-yt-** (*moskovyt*) etc.

The second most frequently used base was the foundation – 19%. Stemming is a word-formation process that involves two or more source words (Grlj 2022: 87; Enesi 2017: 8). The most productive stems are: **-rus-** with the variant **-ros-** and the English-language equivalent **-russ-/russ-** etc. (*russosfascist*, *russophonía*, *rashostan*, *schizorascism*), the swear words **bydl-** (*bull-*) (*bydlomassa* (*bullmass*), *bydlorus'* (*bullrussia*)) and **swyn-** (*swynorusy* (*pig + Russian*), *swynosobaka* (*pig-dog*), **ork-** (*ork-population*, *orkostan*), **bulb-** (*bulbosaurus*, *bulboführer*), **bander-** (*banderomobile*, *banderosmuthies*), **moscv-** (*moscvabad*, *moscvoroty*), **-stan** (*bydlostan*, *parashystan*), **-liandii** (*-land-*) (*rushliandiia* (*rushland*)), German **führer-** (*russianführer*). The letter “Z” is used in the creation of words, replacing the word “Russia” (*z-patriot*, *z-fans*, *z-blogger*, *z-occupiers*). Stemming is a productive way to create new words in English-language Internet discourse as well (Hadžiahmetović 2018).

About 5% of words are formed by the prefix method. Prefixes give words additional meanings (Maharramova 2023: 236). The range of prefixes is small: **za-**, **vid-** (*from*), **na-** (*zabayraktaryty*, *zaenloity*, *vidhimarsyty*, *navolonteryty*) indicate a completed action; **un-** (*under-land*, *under-empire*, *under-imperial*) indicates an incomplete manifestation of a feature; **pro-** (*pro-rascist*) indicates a commitment to something.

Different types of abbreviations account for 3% of new words: **TOT** = *temporarily occupied territory*, **ter-oborona** = *territorial oborona (defence)*, **terrussia** = *terrorist russia*, **puhitler** = *Putin + Hitler*. While in English-language Internet discourse, an abbreviation is the most common way of word formation (Blaženović 2024: 38). Sometimes previously formed abbreviations become building blocks for new words as separate morphemes: *ZSUist*, *ZSUistka*, *fsbuk*, *rfia*, *rfiany*, *chmonia*, *chmobik* – suffixation; *alkofsb*, *narcofsb* – base formation. The word “*E-grave*” was created using the well-known English abbreviation *electronic*, which is visually similar to the Ukrainian verb “to be” in the present tense. In Slavic linguistics, there is still a debate about the status of new words with reduced foreign language elements: whether they should be classified as base formation, splicing, or separated into a separate group of composites (Jadacka 2001: 94, 106; Ochmann 2004: 38–45; Waszakowa 2005: 54–55, 71–72), or may treat such foreign elements as prefixes (Jadacka 1995: 161; Waszakowa 2005: 55).

The inflectional method was used to form 2.5% of neologisms: *zadvokhsotyty*, *vidkobzonyty*, *vidbanderyty* that means to kill, *zatriokhsotyty* – to wound, *zadupie* – a rude name for Russia. The postfixed method accounted for 1% of new words: *haotyzyvatysia* (*chastise*), *zadvokhsotytytsia*. The unaffixed method is used to create the crude name of the country, *rakha*, which is derived from *Russia*, and the consonants *kh/sh* are alternated. The words *mobik* (*mobilized* – truncated to *mob* + *-ik-*), *termukha* (*thermal underwear* – truncated to *term* + *-ukh-*) were formed by truncation followed by suffixation.

Among the non-usual ways of word formation, Zh. Koloiz includes contamination, substitution, reduplication, emancipation of affixes or phonemes, gendiadis, holophrasis, and stepwise word formation (Koloiz 2015: 76-77). These formations are also named "oddities" by Arnoff (1976). Among the neologisms of the wartime period, there are words formed by substitution, i.e., replacing a fragment of a known word with another, consonant fragment, while the associative connection remains tangible (Koloiz 2015: 91). For example: *putler* = *pu* + *Hitler*, *rascism* = *ra* + *fascism*, *brekhlov* = *brehlo* + *Lavrov*, *putlernet* = *putler* + *internet*. A few more neolexemes are formed by means of contamination "the combination of formally identical elements of compound words (mostly two) that have sound similarity, interpenetration of parts of the bases with their overlapping" (Koloiz 2015: 96). Examples: *putydlo* = *Putin* + *bydlo* (*bull/cattle*), *debilization* = *debil* (*moron*) + *mobilization*, *rabsiany* = *rab* (*slave*) + *Russians*, *mos'cwa* = *mos'ka* (*a little dog*) + *Moscow*, *tankeshon* = *tank* + *danke schön* (*from German: Danke schön*) – gratitude to the Germans for the tanks provided. Four abstract nouns are constructed by the method of stepwise word formation: *arestovlennia*, *orbanizatsia* (*urbanization*), *deputinizatsia* (*deputinization*), and *dekatsapizatsia* (*decapitalization*). Their peculiarity is that a new word is created from a word that is not in the *usus*, i.e., one link in the word formation chain is dropped (Koloiz 2015: 105). The neolexeme *arestovlennia*, like most similar nouns, is structurally derived from a verb (**arestovyty*), which does not exist, but which could be formed from the surname *Arestovych*, i.e. the neologism is formed from the surname without the presence of a middle link – a verb. Similarly, *Orban* → (**orbanize*) → *urbanization*. The words *deputinization* and *dekatsapizatsia* were formed by omitting two links each: *Putin* → (**putinizuvat*) (**putinize*) → (**putinization*) → *deputinization*; *katsap* → (**katsapize*) → (**katsapization*) → *dekatsapization*. Rederivation is the way in which a motivational word loses a morpheme, desuffixation or deprefixation occurs (Koloiz 2015: 12). The nomen *putia* is formed from the surname *Putin* by cutting off the suffix *-in-*. In total, about 11% of neologisms are formed by non-usual means.

4.2 Borrowings

The borrowings that began to be actively used during the war period include the names of foreign weapons in their original and Cyrillic spellings: *Bayraktar*, *Javelin*, *HIMARS*, *Stinger*, *Shahed*, *drone*, *Abrams*, *ATACMS*, *Patriot*, *NASAMS*, *Challenger*, *Stryker*, *Hawk*, etc. N. Klymenko calls the borrowing of lexemes in their original graphic form the medical term "transplantation" (Klymenko et al. 2008). Currently, both variants are used in parallel, and over time, perhaps, only one will remain. Most of the weapons were previously used by foreign countries, but for most Ukrainians they were unknown, so now they are perceived as neologisms. It is unusual that the names of weapons have acquired a positive connotation, the reason for this phenomenon is the possibility of using them for the good of Ukraine, for liberation from invaders, for saving lives. Some nomens entered the language

system (Burkacka 2010: 229) so quickly that they began to form their own word-formation nests, which indicates the relevance of the concepts named (Klymenko et al. 2008). For example, *stinger* → *stingerity* (*stingerite*) → *vidstingerity*, *zastingeryty*. The lexemes *bayraktar*, *javelin*, and *iskander* even passed into the category of onyms, becoming names for children born at the beginning of the full-scale invasion. Some linguists consider borrowing to be an alternative to word formation (ten Hacken 2012: 79).

4.3 Transformations

Transformations are a fairly significant group of wartime new words. In such situations, nominations of the enemy always become relevant, and negatively coloured, swear words appear, with which people seek to dehumanize, humiliate, and ridicule the enemy. After all, anger and hatred are the primary universal emotions that permeate human history and shape social narratives (Walton 2005). First of all, people's hatred is directed at dictator Putin, who ordered the war. Over the course of two years, the following newly created synonyms for his name have emerged: *putler*, *puylo*, *pukin*, *put'kin*, *putidlo*, *putyasha*, *puylusha*, *putia*, *lilliputin*, *putinochet*, *khaputin*, *kaputin*, *putloskot*, *nedofurer*, *russienfurer*, *laptenfurer*, *purer*, *hailo*, *nedomirok*, *nedopalok*, *nedoimperets*, *fsbuk*, *stsar*, *bunker commander*, and the phrase *bunker grandfather*. Nomens are formed in various ways, with the predominance of twisted, distorted versions of the surname, which is how people seek to express their anger, hatred, and at the same time contempt, humiliating the object of the nomination. A number of newly created names have a connotation of diminishment and caress (*putyasha*, *puylusha*, *putia*), which indicates the levelling of the enemy's strength and majesty, since reclamation suffixes are inappropriate when referring to the head of state. The German lexeme of the Second World War, *Führer*, which originally meant "leader" and was later used as a high officer's rank, which Hitler himself held, has been actualized. A strong associative connection with this precedent-setting historical figure is evident, and the recipient begins to subconsciously identify the objects of comparison. We can observe the active involvement of the prefix *under-* *in* word-formation processes; its productivity has increased over the past 30 years (Klymenko et al. 2008), it indicates an incomplete manifestation of a feature, which is also a humiliation in relation to the leader of the largest country.

A significant synonymous series of more than 30 items was formed with the name of the aggressor state: *rashka*, *rassea*, *razzia*, *srassia*, *rashia*, *rakha*, *bydlorus*, *rassiiska pederatsia*, *russia-federussia*, *fidirastia*, *mos'cwa*, *matskva*, *maskovia*, *maaskva*, *moskalshchyna*, *moskvabad*, *nedokraina* (*under-state*), *terrussia*, *katsapiya*, *rfa*, *rushlandia*, *rashostan*, *parashistan*, *orkostan*, *bydlostan*, *katsapstan*, *mordor*, *russian imperstan*, *aziopa*, *zadupie*. The word-formation processes involved both the modern name of the country in Ukrainian and English pronunciations and the ancient name *Moskovia*, which some of our people consider more justified because it does not single out one ethnic group in a multinational country. Russians them-

selves are against the old name because it does not reflect historical ties with Kievan Rus', of which they consider themselves the sole heirs. There is also a mockery of the Russian pronunciation of [a] in place of the unstressed o, which is one of the key phonetic differences between Ukrainian and Russian. The spelling of the double zz (*razzia*) is an allusion to the marking of Russian machinery, which reinforces the visual negative perception. The final root-*stan*, which comes from the Iranian language, translates as "land, place" and is distributed only in Asia, takes an active part in the creation of composites. There are five country names with this root: *Kazakhstan*, *Uzbekistan*, *Tajikistan*, *Pakistan*, *Afghanistan*, and three names of territorial units in the Russian Federation: *Bashkortostan*, *Tatarstan*, and *Dagestan*. Such a nomination may be a hint at the remoteness of the Russian people from European values. Such a form of government as a federation does not have a negative interpretation, but neologisms formed by contamination with a swear word have a connotation of coarseness (*pederatsia*, *fidarastia*). The nomen *russia-federussia* is formed by a rather rare non-usual method called gendiadis, which consists in combining two rhyming components (Koloiz 2008: 114); the new word does not carry a negative connotation, except for its humorous sound. The creation of the nomens *bydlorus*, *katsapiya*, *srasia*, *zadupie* involves swear words and rude colloquialisms, the associative connections with which are quite transparent, thus the authors seek to humiliate the object of the nomination. The purpose of creating all these synonyms was to humiliate an enemy country or to make fun of it in order to feel superior.

The Ukrainian people have replaced the name "Russians" with a group of negatively coloured synonyms: *rusnia*, *rossiantsi*, *moskalnya*, *moskalnota*, *moskovyty*, *parashentsy*, *putinoidy*, *svyno-sobaky*, *zviroidioty*, *svynorusy*, *bydlostanivtsi*, *bydlomasa*, *rusofascists*, *orc-population*, *rabsiany* (*slaves*). Collective nouns for persons (*rusnia*, *moskalnya*, *moskalnota*) have long had a tinge of disdain, so there are a limited number of such lexemes in the language, only for peoples with whom there have been serious conflicts and wars. We can also observe the consequence of humiliating the enemy to the level of animals (*svyno-sobaky*, *zviroidioty*, *svynorusy*), and the name of fantastic creatures - *orcs* - is also used. Although this is a typical example of the dehumanization of the enemy, there are sometimes calls not to use such metaphorical nominations but to call the enemy by its established name, "in order to clearly identify the perpetrators of this war" (Hrytsenko 2022: 12).

The military of the Russian army are named: *rascists*, *orcs*, *mobiks*, *chmobiks*, *chmonia*. All of them hint at a low level of mental capacity, since an intellectually developed person would not allow himself to be misled about the true purpose of being on the territory of a neighbouring state. The words *rascists* and *orcs* emphasise the anger and cruelty inherent in the prototypes of the fascists and the heroes of J. R. R. Tolkien's work. When the Russian dictator proclaimed the partial mobilisation of his people, the truncated morpheme *mob-* appeared, which, together with the suffix *-ik to*

denote a person, indicated newly mobilised soldiers, often inexperienced, confused, and poorly trained. The abbreviations with the suffixes *chmobik*, *chmonia* can be formed from the first letter of the word "partial" and 2 or 3 letters of the word "mobilisation", but associative and word-formation links with the Soviet argotism *chmo*, which has a sharply negative meaning, are clearly visible.

Synonymous names have also been given to the names of people in the Russian government known for their anti-Ukrainian stance: *brehlov*, *sad horse* (Lavrov) – the love of telling lies is emphasised, and the phrase is a metaphorical transfer based on external similarity; *pis'kov*, *moustache of the Kremlin* (Peskov) – one type of humiliation is observed in the offensive distortion of the surname and metonymic transfer based on an outstanding feature of appearance; *wid'mediv*, *alcofsb*, *narcofsb* (Medvedev) – humiliation to the level of a fantastic creature (a witch) and a hint of the person's former place of work (Federal Security Service) and his or her bad habits are observed. Supporters of the Russian dictator and his policies also attracted public attention: *bulbosaur*, *bulbofuhrer* (Lukashenko) – the first derivative is the Ukrainian dialect name for potatoes, the most famous product grown in Belarus, the root *saur-* is used only for extinct creatures and possibly hints at the venerable age of the head of state; *putlerok* (Orban) – the reclamation suffix in this case indicates distance from the original; *shmaryi* (Shariy) – a pro-Russian blogger received a nickname formed by substitution, consonant with the criminal slang name for a prostitute, apparently due to the analogy in action; *Khriak Chen Yn*, *Kon Chen Yii*, *puhliash* (Kim Jong-un) – the head of the DPRK recently attracted the attention of the Ukrainian community after it became known about his open cooperation with Putin, the nominations show a dismissive emphasis on a negative feature of appearance, we also observe a spelling neologism, the so-called neographism (Hrytsenko 2022: 10) – an unusual separate spelling of the word "Kon Chen-Yii" by analogy with the three-component anthropoformula of the Korean leader.

The Ukrainian people had a neutral attitude towards an ex US President D. Trump, no word-formation activity of the surname was observed, and only after speeches about the termination of military aid did the neologism *Trumpushka* appear – it was suffixed with the unproductive for Ukrainian language diminutive affectionate suffix *-ushk(a)*, with which only the lexeme *matushka* exists (Bevzenko 1985: 48) and can form some affectionate names in Russian. The peculiarity lies in the fact that reclamation suffixes in Ukrainian do not always bring a connotation of diminution or affection; there is an unprecedented case of adding the suffix *-enk* to the lexeme *enemy*, resulting in the nominative *vorizhenky*, which cannot be translated literally into other languages. Among emotionally coloured new words, there are also some positive ones. An example is the addition of the Ukrainian patronymic suffix *-iuk* to the surname of former British Prime Minister Boris Johnson - *Johnsoniuk*, a metaphorical "elevation" to the Cossack state, which was highly honoured. In this way,

the Ukrainian people thanked for the support and assistance in the early days of the war. In gratitude for the help, U.S. President Joe Biden was nicknamed *Baida* by one of favourite legendary Ukrainian heroes, Cossack leader, the first hetman Dmytro Vyshnevetskyi (1516-1563), who fought for the freedom of his country. The word *baida* meant “carefree person, a bachelor”, which was considered a positive characteristic, a sign of a true Cossack.

4.4 Semantic neologisms

Semantic neologisms are often formed by metaphorical transfer of a known and a new object or phenomenon by similarity. In this case, the word should have a meaning that makes the intended concept recognisable (ten Hacken 2012: 79). In times of war, weapons and ammunition became relevant, and special military vocabulary became commonly used because a larger group of people than before was involved in the use of terms and professionalisms. Semantic neologisms such as *piglets* (mortar shells), *cucumbers*, *carrots*, *zucchini* (ammunition for ATGM, LPG, RPG), and *paddle* (flamethrower) have become widespread, with metaphorical transfer based on similarity in appearance. Similarly, a new sememe of the lexeme *pixel* was formed, which now denotes the uniform of the Ukrainian military. The transfer by colour resulted in a new lexical and semantic variant of the medical professionalism *zelenka*, which now also denotes a forest belt in summer. Sound associations formed the basis for the transfer of the meaning of the lexeme *disco*, which is used to describe a battle. Due to the similarity of location in space, new meanings of the lexemes *zero* and *frontline* appeared: the line of contact with the enemy, the first line of defence. We did not find any new words formed on the basis of metonymy.

4.5 Reactivators

Reactivists traditionally constitute a small group. Only the lexeme *gauleiter* has been revived with its original meaning, as the Soviet Union during World War II called the German governors in the occupied lands, and now the Russian leaders of the temporarily occupied territories. However, in fact the German word *Gauleiter* (from Gau – district and Leiter – leader) meant the head of a district department of the National Socialist German Workers’ Party, and such titles were held by the heads of administrative-territorial units in Germany itself.

4.6 Neographemes

Neographemes appear as the author's desire to draw attention to the printed word through atypical spelling, and to stand out (Blaženović et al. 2024: 37). Zh. Koloiz calls this phenomenon graphixication, in which hyphens, brackets, quotation marks, slashes, elements of Latin graphics and other code systems can act as word-forming means: numbers, Internet signs, signs of physical and chemical formulas, etc. (Koloiz 2015: 81). In contemporary discourse, we often come across lowercase spelling of onyms, reproduction of Russian lexemes in Ukrainian graphics: *чнейанепайія*, *вайська*, *перезавори*, which can be considered a manifestation of disrespect (Yarovyi 2019: 110). The letter “z” is actively used from the Latin alphabet, which, af-

ter being used to mark Russian military equipment, began to represent the commitment to aggression: *razziyskii*, *ruzznya*, *zaydy*, *zabludy*, *zviriuky* (*beasts*), *merzotnyky*, *dezertyry*, *zombi* (*zombie*). This group includes neologisms formed by lexical and syntactic means, by merging a phrase or a whole phrase into a single word that acquires a well-established meaning. For example, *yakty* (how are you?) – a manifestation of care for loved ones, *zatrydni* (*for three days*) – unrealizable plans, *analogovnet* – a much-hyped object that actually turns out to be of poor quality, *debakhnulo* – interest in danger can end tragically, *bonevtic* (*because he did not escape*) – a patriotic decision to stay with one’s country and people in difficult times.

Unfortunately, the analysed classification of neologisms is not perfect, since it allows one neologism to be included in two groups simultaneously, since it is based on the way it appears, enters the language (borrowings, new words), meaning (semantic neologisms, transformations), and nuances of spelling (neographemes).

4.7 The thematic groups of neologisms

The thematic groups of neologic vocabulary in 2022-2023 are almost exhausted by reactions to the war. After all, our social behaviour is particularly influenced by emotions and feelings (Morgado 2017: 32). The most numerous group includes negative names of the aggressor country, the second group includes swear words for the name of the head of the attacking state, the third group includes names of Russians who support the policy of their dictator, the fourth group includes names of the Russian military, the fifth group includes negatively coloured synonyms of the names of representatives of the Russian government and foreign friends of Russia, the sixth group includes names of weapons and military equipment, the seventh group includes names of military operations, and the eighth group is small, including names of patriots and defenders of Ukraine, all of which are positively coloured. The analysis confirms O. Styshov’s idea that among emotionally coloured new words, the share of lexemes with positive connotations is 10%, and with negative connotations – 90%, and also states that “speakers are generally aware of their naming activities” (Štekauer 2005).

Neologisms also differ in terms of the period of their existence; some of them become part of the active lexicon, are soon recorded in dictionaries, and remain in use, such as *rashism* and *zukuranitze*. These are mostly nomens that name a fundamentally new phenomenon, object, idea, or process that did not exist before. However, most of the new words that have appeared reactively in response to an important event of the present quickly disappear, and such words are sometimes called “ephemera” (Klymenko et al. 2008). Among the neolexemes we have studied, a significant number are one-day words. For example, in 2022 the extremely popular neologisms *chornobaity*, *macronyty*, *arrestovlennia*, etc. were used much less frequently in 2023, until they disappeared completely. A possible reason for this is the de-actualization of events and phenomena: there are no longer any battles near Chornobaivka, the President of France has expressed his position clearly, and former advisor O. Arestovych has

completely changed his rhetoric rather than issuing reassuring messages.

5. Conclusions

Thus, hate speech is unacceptable in peaceful life, but in times of war, armed confrontation, and interstate aggression, it is tolerated by the authorities. At the individual level, in stressful situations, a person may resort to hate speech to normalize their mental state. At the national level, the media sometimes use veiled forms of hostility to raise the patriotic spirit of society and unite in the face of an external enemy. Such methods proved effective at the beginning of the Russian-Ukrainian war in 2022. However, the question of the usefulness of hate speech in times of war remains unresolved due to the possible risks of increasing the level of aggression in society and the unpredictability of the consequences of nationwide aggression.

During the second year of the war, there were fewer emotional negative neologisms referring to the enemy, possibly due to the lowering of tensions in Ukrainian society. In the minds of the people, the war, which was initially a shock factor and needed to be discussed, pronounced, is moving into the category of chronically disturbing background circumstances and ceasing to be discussed in detail in online discourse. Only new extraordinary circumstances, such as North Korea's open assistance to Putin, trigger emotional reactions. The names of weapons and the most common negative synonyms for the aggressor state and its leader (*rashka*, *moskalshchyna*, *putler*) continue to be actively used, but these neologisms have lost their former sharpness in the perception of the people and have become almost neutral commonly used means of nomination. In view of this, we can predict the spread of negative vocabulary about the enemy, a slowdown in the emergence of neologisms if the war continues, and the disappearance of most of the neologisms after its end. To understand the mental state of the people during the war, it is important to study the most common current vocabulary, changes in language preferences, and the activity of neologisms.

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PHYSICAL SCIENCES

STUDY OF SPATIALLY LIMITED CURRENTS CHARGE IN THE POLYMER POLYCONDUCTOR POLYHYDROQUINONE

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ИССЛЕДОВАНИЕ ТОКОВ ОГРАНИЧЕННЫХ ПРОСТРАНСТВЕННЫМ ЗАРЯДОМ В ПОЛИМЕРНОМ ПОЛИПРОВОДНИКЕ ПОЛИГИДРОХИНОНЕ

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Abstract

The method of analyzing currents limited by space charge showed the presence in polyhydroquinone of two groups of capture centers with energies $E_1 = 0.41 \text{ eV}$ and $E_2 = 0.65 \text{ eV}$. Their concentrations have been established ($N_1 = 3 \cdot 10^{15} \text{ cm}^{-3}$ and $N_2 \approx 10^{16} \text{ cm}^{-3}$). The concentration of equilibrium charge carriers was estimated ($n = 1 \cdot 10^{10} \text{ cm}^{-3}$ at 292 K), the micromobility of which turned out to be equal to

$\mu_0 = 5 \cdot 10^{-6} \text{ cm}^2/\text{V} \cdot \text{sec}$. In our opinion, ultra-small micromobilities are typical for polymer semiconductors characterized by a non-standard charge transfer mechanism.

Аннотация

Методом анализа токов, ограниченных пространственным зарядом (ТОПЗ), показано наличие в полигидрохинона двух групп центров захвата с энергиями $E_1 = 0,41 \text{ eV}$ и $E_2 = 0,65 \text{ eV}$. Установлены их концентрации ($N_1 = 3 \cdot 10^{15} \text{ см}^{-3}$ и $N_2 \approx 10^{16} \text{ см}^{-3}$). Произведена оценка концентрации равновесных носителей заряда ($n = 1 \cdot 10^{10} \text{ см}^{-3}$ при 292 К), микроподвижность которых оказалось равной

$\mu_0 = 5 \cdot 10^{-6} \text{ см}^2/\text{В} \cdot \text{сек}$. По-видимому, сверхмалые микроподвижности, установленные ранее и на некоторых других полимерах, являются типичными для полимерных полупроводников, характеризующихся нестандартными механизмом переноса заряда.

Keywords: Polyhydroquinone, space charge, capture centers, micromobility

Ключевые слова: Полигидрохинон, пространственный заряд, центров захвата, микроподвижность

Данная работа посвящена изучению процессов захвата и переноса заряда в полигидрохиноне, в котором высокая адгезия слоев к стеклу, керамике и металлу сочетается со свойствами, характерными для полупроводников.

Полигидрохинон имел следующие характеристики: $\bar{M}_n = 570$, $\bar{M}_w = 650$, температура размягчения $T_{\text{разм.}} \approx 430 \text{ K}$, температура разложения $T_{\text{разл.}} > 750 \text{ K}$.

Пленки ($d = 1-5 \text{ мкм}$) получали из ацетонового раствора полигидрохинона на керамической подложке с предварительно нанесенным Ag-электродом путем выпаривания растворителя. Верхний

Ag-электрод наносили методом термической возгонки в вакууме $\sim 10^{-6} \text{ торр}$. Площадь образцов составляла $S = (1 \div 10) \cdot 10^{-2} \text{ см}^2$. Для всех образцов площадь пленки полимера на подложке превышала площадь перекрытия электродов S более чем в 20 раз, что исключало влияние на результаты поверхностных токов.

Вольт-амперные характеристики (ВАХ) снимали по обычной электрометрической схеме. Анализ ВАХ структуры Ag-полигидрохинон-Ag также позволяет определить ряд параметров захвата и переноса заряда полимера. Типичные ВАХ для двух температур приводятся на рис. 1.

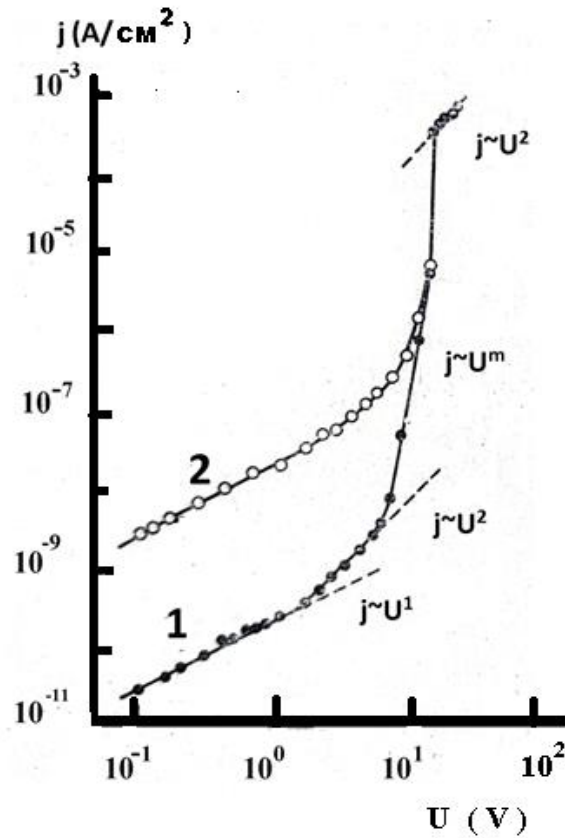


Рис.1. ВАХ структуры Ag- полигидрохинон - Ag- при температурах: 1 – 292 К и 2 - 343 К. Толщина образца $d = 1,1$ мкм.

На каждой кривой имеется омический участок ($j \sim U$), который при некотором значении напряжения $U = U_{tr}$ переходит в квадратичный ($j \sim U^2$), причем U_{tr} с ростом температуры сдвигается в сторону больших напряжений. Затем следует участок крутого возрастания тока ($j \sim U^m$), (где $m = 10$ при 292 К). При некотором значении напряжения $U = U_{TFL}$

ток вертикально растет; выше U_{TFL} снова имеет место пространственным зарядом (ТОПЗ) при монополярной инжекции [1,2]. Для подтверждения этого нами были исследованы ВАХ на образцах с разными толщинами d слоя полимера при одинаковой температуре. Зависимость U_{tr} и U_{TFL} от d приведены на рис. 2.

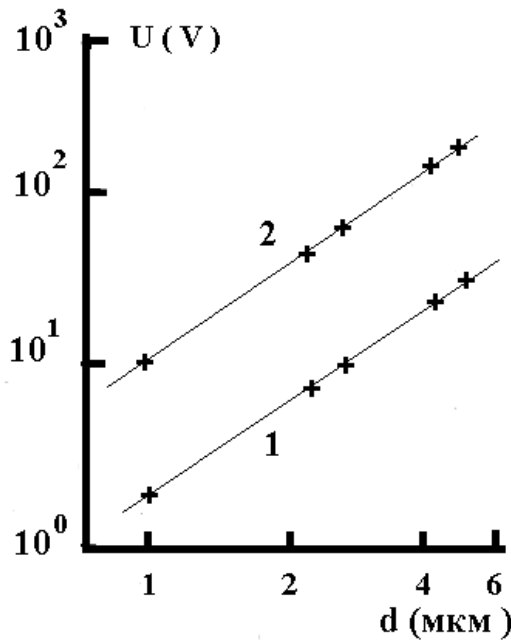


Рис.2. Зависимость U_{tr} (1) и U_{TFL} (2) от d при $T = 292$ К.

Квадратическая зависимость этих напряжений от толщины d выполняется достаточно хорошо, что находится в согласии с теорией ТОПЗ [1].

Обнаруженный при больших напряжениях переход ко второму квадратичному участку свидетельствует, что при этих условиях происходит полное заполнение ловушек. Теория ТОПЗ позволяет определить полную концентрацию захваченных носителей N_t по найденному значению U_{TFL} . Используя экспериментальное значение U_{TFL} и диэлектрическую проницаемость полигидрохинона $\epsilon = 5,4$ (величину ϵ установили измерением емкости структуры на высоких частотах), получаем $N_t = 9 \cdot 10^{15} \text{ см}^{-3}$. Пользуясь значениями U и j характеристических точек ВАХ и формулами, приведенными в [1,2], установили, что в полигидрохиноне

концентрация равновесных носителей заряда на уровнях проводимости при 292 К равна $n = 1 \cdot 10^{10} \text{ см}^{-3}$, а подвижность не превышает значения $\mu_0 = 5,4 \cdot 10^{-6} \text{ см}^2/\text{В} \cdot \text{сек}$, даже если все ловушка заполнены инжектированными из электрода носителями заряда.

На рис.3. приведены зависимости от температуры удельной электропроводности полигидрохинона в слабом поле (поле $< 10^3 \text{ В/см}$) и параметра θ_s , который определяет отношение n к N_t . На обеих зависимостях можно выделить три области с одинаковыми наклонами. Видно, что зависимость σ от T выражается энергиями активации $0,41; 0,65$ и $1,31 \text{ eV}$

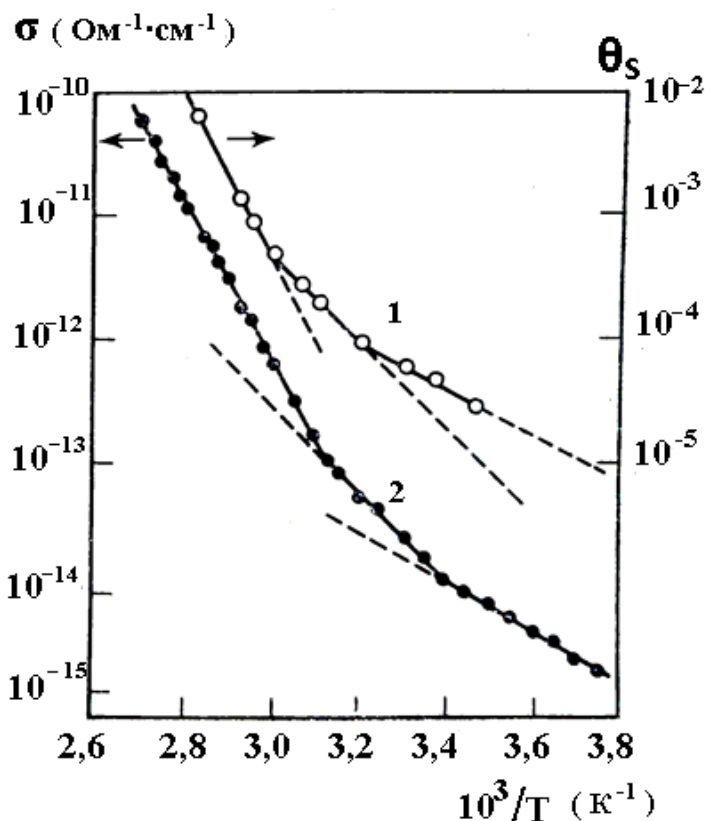


Рис. 3. Температурные зависимости параметра θ_s (1) и удельной электропроводности σ (2) полигидрохинона.

Пользуясь значением n , установленным методом анализа ТОПЗ, величиной σ и известным соотношением между ними $\sigma = en\mu$, можно вычислить микрподвижность μ . Оказалось, что при

$T = 292 \text{ К}$, $\mu = 5,2 \cdot 10^{-8} \text{ см}^2/\text{В} \cdot \text{с}$, что практически совпадает с $\mu_0 = 5,4 \cdot 10^{-6} \text{ см}^2/\text{В} \cdot \text{с}$, которая найдены выше по току на последнем квадратическом участке ВАХ. По-видимому, сверхмалые микрподвижности, установленные ранее и на некоторых других полимерах [3,4], являются типичными для полимерных полупроводников, характеризующихся нестандартными механизмом переноса заряда.

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POLITICAL SCIENCES

THE REFORM OF 1918 AND ITS IMPACT ON POLITICAL SCIENCES: LATIN AMERICAN IDENTITY, HIGHER EDUCATION AND THE FIGHT FOR SOCIAL JUSTICE

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Abstract

The objective of this research work is to analyze the University Reform of 1918 from the perspective of political sciences. It seeks to understand the fundamental role that the university played in the construction of Latin American identity and in the fight for more just societies. The ideas of José Vasconcelos and Víctor Raúl Haya de la Torre, two key figures of the reformist movement, will be analyzed and their validity in the current context will be evaluated. This study is framed in the analysis of the relationships between higher education, politics and society in Latin America. Concepts such as university autonomy, co-government, academic freedom, university extension, Latin American identity, social justice, among others, will be addressed. A qualitative methodology will be used, based on bibliographic analysis of primary and secondary sources. Documents from the time, texts by the aforementioned authors, and academic studies on the Reform of 1918 will be analyzed. The results of the study will allow us to understand the impact of the Reform on political science, on the construction of Latin American identity and on the fight for social justice. Conclusions The University Reform of 1918 constituted a fundamental milestone in the history of Latin America. Its impact on political sciences has been significant, contributing to the construction of a more democratic, critical and socially committed university. The ideas of José Vasconcelos and Víctor Raúl Haya de la Torre continue to be relevant to think about the role of higher education in the 21st century, in a context of great challenges for the region.

Keywords: University Reform of 1918, political science, Latin American identity, higher education.

Introduction

In this work we address The University Reform of 1918 and Latin American thought to do so by engaging in a dialogue with the authors José Vasconcelos and Víctor Raúl Haya de la Torre, taking into account the context we intend to analyze and describe the point of view that these authors assumed regarding this historical fact. (or historical process). The study of the University Reform is relevant because it is a current of Latin American projection that generates libertarian, critical knowledge with a continental dimension. The student movement became a leading actor of its time, forming groups and federations to fight for education.

Investigation

The University Reform was a heterogeneous movement that manifested itself differently in each university. In the UBA, the reformist movement was characterized by its opposition to positivism, while, in Córdoba, anticlericalism was an important factor. Overall, the Reformation was driven by a broad spectrum of political and social positions that rejected the traditional order¹. The reform questioned the elitism and exclusion present in the universities of the time, advocating the

active participation of students in university government and the opening of classrooms to traditionally marginalized sectors. This democratization laid the foundations for greater citizen participation and the construction of more just and inclusive societies. Pérez Gamón Carolina (2023) when we talk about citizenship we can mention "...*Thomas Marshall reflecting on the How citizenship status was established in relationship with the institutions of capitalism. Concerned about the problem of inequality, he postulates the concept of social inequality. citizenship to account for the social foundations that must be built to guarantee democracy. Thus, we observe a sequence of changes that oscillate between two poles: on the one hand, an interruption in the process of building society citizenship that particularly affects excluded sectors the system or close to its collapse, and on the other, an expansion in the field of social rights for those sectors included, that is, those who managed to join the new social welfare scenario - generated by the market- benefiting from the new rules of the game I will suggest that in our current society it is assumed that both remain compatible, to the point that, in a way, Citizens themselves have become the architects of legitimate social society inequality...*"².

¹ Recalde A. (2018) "La Universidad y la integración sudamericana", en El legado reformista en las nuevas universidades del conurbano, EDUNPAZ, Buenos Aires.p.170

² Pérez Gamón, C. M. (2023). Evolution of the Notion of Citizenship in Latin America and Effect in Argentina. International Journal of Advanced Multidisciplinary Research and Studies, 3(4), p.799. Retrieved from www.multiresearchjournal



*José Vasconcelos*³⁴

“Córdoba is one of the main centers of that famous university student movement that has spread throughout South America and now reaches Cuba.”

We present a brief biography of José Vasconcelos, which can be expanded by consulting Aritz Recalde “Life and Work of Vasconcelos”, he was a prominent Mexican intellectual, writer and politician born in Oaxaca (1881-1959) Mexico. His life and work have great relevance in the history of Mexico and, by extension, in Latin America. Highlighted below are some key aspects of his life and his importance in the region: He studied philosophy at the National Autonomous University of Mexico (UNAM) and then at the Sorbonne University in Paris. Upon his return to Mexico, he assumed important academic positions at UNAM, including rector; he was a defender of education and culture. His exile took him to Havana, Cuba after the coup d'état of 1913 and the death of Madero. He also took refuge in Argentina and received an invitation from the National University of La Plata and Alfredo Palacios. He was also hired by Natalio Botana's newspaper *Crítica*⁵.

He assumes the task of the educational renewal of his country and the region as well as interpreting popular aspirations along with political commitment. He was rector of the National Autonomous University of Mexico between June 1920 and October 1921. This can be seen in his speech “...*I am in these moments, more than a new rector who succeeds the previous ones, a delegate of the Revolution who does not come to seek refuge to meditate in the quiet atmosphere of the classrooms, but to invite you to go out with him, to the fight, to you sharing the responsibilities and efforts with us. At this time I do not come to work for the University, but to ask the University to work for the people. The people have been supporting the University and now they need it, and through me they come to ask advice...*” (Recalde Aritz 2021. p. 207)

At UNAM, Vasconcelos returned to the ideas developed at the Youth Ateneo (such as the public communication of knowledge) founded together with Antonio Caso, Alfonso Reyes and Pedro Henríquez Ureña, among others who created the Popular University in 1912. For him the University was the one who organized, coordinated the teaching. His actions as rector were concrete and effective by creating soup kitchens, he was ensuring that students with few resources could have access to food, essential for their physical and

mental development. By freeing them from paying college fees, he was removing a major barrier to higher education. And by allowing wealthy students to pay high fees to cover the expenses of those with few financial resources, he was creating a system of solidarity that benefited everyone.

Within the framework of the university reform of 1918, he promoted the exchange departments, the Summer School for foreigners and the University Extension Department. She considered that the implementation of these measures would contribute to the solution of social problems” ...*The problems come to her not only to be investigated, but also to be resolved...*” (...) “...*The Hispanic American university student cannot exempt himself from contact human, even occasional, through technical advice, conference, speech and book...*”⁶.

Furthermore, the author adds, The Shield of the National Autonomous University of Mexico (UNAM) will consist of a map of Latin America, a symbol of identity and pride for Mexicans. It was created in 1921 by Vasconcelos, who expressed in it his Spanish-American ideology. from Mexico to the southern part of the Argentine Republic” ...With the legend “For my race the spirit will speak.” This motto means the conviction that our race will develop a culture of new trends, with a spiritual and very free essence. An eagle and a condor will hold the shield, all supported by an allegory of the cactus and the Aztec cactus...”⁷.

Influence of the preaching of Vasconcelos and the Ateneo de la Juventud on the events of 1918 in Argentina and Mexico-

Advancing through Aritz Recalde's text we were able to observe that the preaching of José Vasconcelos and the men of the Ateneo de la Juventud had a significant influence on the events of 1918 in Argentina and Mexico. In both countries, university students were inspired by Vasconcelos's thinking to demand educational and political reforms.

In Argentina, the university reform of 1918 aimed to modernize the university and make it more democratic. The reformist students, known as the “young people of 1918”, opposed the elitism and authoritarianism of the traditional university. They sought a more

³ LA PRESNSA 04-02-2020, disponible <https://www.laprensa.com.ar/485409-Jose-Vasconcelos-el-maestro-mexicano-de-la-juventud-de-America.note.aspx>

⁴ Vasconcelos José y la Universidad capítulo VIII. p.214

⁵ Vasconcelos José y la Universidad capítulo VIII. pp. 205-206

⁶ Ibid., Capítulo VIII p.209

⁷ Se puede ver en detalle las partes del Escudo UNAM y su significado en el Capítulo VIII pp.209-210

accessible education for all social sectors, as well as greater student participation in university life.

In Mexico, he was one of the main promoters of the educational reform of 1921. This reform sought to create a more secular and nationalist education.

Vasconcelos also had a personal relationship with several of the protagonists of the events of 1918 in Argentina. Among them were Alfredo Palacios, an Argentine lawyer and politician who was one of the leaders of university reform, and Manuel Ugarte, an Argentine writer and journalist who was an advocate of Latin American unity.

Vasconcelos' preaching was a source of inspiration for Argentine reformist students since he defended education as a universal right and as an instrument of social transformation. In his work *The Cosmic Race*, he praised the universality of the doctrine of the University of Buenos Aires, as well as its renewal of methods and its constant importation of foreign notables. In *The Cosmic Race* he considered that "the greatest contemporary focus of Latin American culture is found in Buenos Aires." "The Argentine University surpasses the others in America not only because of the luxury of its material construction or because of the salaries it pays to its professors and the freedom it allows them in teaching; also for the universality of its doctrine and the renewal of methods and the constant importation of foreign notables. "There is almost no illustrious professor from a Spanish university who has not given courses in Argentina."⁸

Vasconcelos expressed his admiration for the Reform, but also noted some differences with his own vision of the university.

Firstly, he did not agree with student participation in university co-government, arguing that this could distract students from their main objective, which is academic training. In his book *From Robinson to Odysseus*, he stated "there is nothing that relaxes both school discipline and student intervention in the administrative functions of the university."⁹ Instead, he proposed that students have a voice in university councils, but without vote.

Secondly, it considers that the University Reform is a movement that has a deeper meaning than a mere reform of university management and highlights the role of the Reform in promoting the values of continental unity, anti-imperialist consciousness and commitment with workers' struggles.

Advancing the reading of Aritz Recalde, the International Student Meeting of 1921, organized by José Vasconcelos, was a significant event in the history of

Latin America. The Congress, which included the participation of students from across the region, reaffirmed the students' commitment to university reform and the fight for social justice. It also contributed to the spread of socialist and anti-imperialist ideas in the region.

The largest groups were those from Argentina, Mexico and Peru. The Argentine delegation was chaired by Héctor Ripa Alberdi, who was accompanied by Arnaldo Orfila Reynal, Enrique Dreysin and Pablo Vrillaud.

The Congress approved 7 resolutions, of which 6 reflected the model of socialist ideas that the meeting acquired, while the last resolution founded the International Federation of Students and included issues of its organization. In addition, the II International Student Congress was convened to be held in Buenos Aires. in the year 1922. The Federation of Latin American Intellectuals, founded in 1921 by José Vasconcelos, aimed to promote the cultural and political unity of the region. However, its objectives were not fully achieved due to a number of factors, including youth interns, political instability on the continent, and lack of support from governments. Despite this, the Federation left an important legacy to the extent that it forged links between thinkers and institutions that continued to work for the unity of the region. José Vasconcelos' university project was a radical proposal for his time. He moved away from the traditional university model, which focused on the training of intellectual elites, to propose a university linked to the social reality of the country and committed to social change.

From what the author has stated we can infer that the fundamental principles of the Vasconcelos project can be summarized in the following points:

Link with social reality: The university had to address the specific problems faced by the Mexican people.

Comprehensive training: The university had to train integral citizens, capable of thinking critically, acting ethically and contributing to the development of society.

Leadership for social change: The university had to train a new generation of leaders capable of promoting reforms that would improve the lives of Mexicans" ...The University and intellectuals had to contribute to the political and cultural unity of Latin America and the emergence of "cosmic race." Consistent with this ideology, he promoted meetings and congresses of youth and intellectuals and accompanied leaders like Haya de la Torre, who made the cause of South American unity a central pillar of their program...¹⁰

⁸ Ibid., p.214

⁹Ibid., p.214

¹⁰ Ibid., p.221



*Víctor Raúl Haya de la Torre*¹¹

Raúl Haya de La Torre was a Peruvian intellectual and politician, founder of the Peruvian Aprista Party (PAP). He was born in Trujillo, Peru, in 1895, and died in Lima in 1979. In his youth, Haya de la Torre stood out as a student leader. He was president of the University Federation of Trujillo and founder of the González Prada Popular Universities. These universities, created in 1921, aimed to educate the Peruvian popular sectors, especially workers, peasants and indigenous people¹². Words from Haya de la Torre made student speeches about the Reform "...The University Reform which in essence was the first cry for emancipation of our "mental colony"—herald of a new consciousness in Indo-America—expressively described the old universities and their watertight pedagogical methods as "the viceroalties of the spirit..."¹³.

In 1924, Haya de la Torre founded the PAP in Mexico, with the support of the Mexican philosopher and politician José Vasconcelos. APRA is a left-wing political party that defends the rights of workers, peasants and indigenous people. He was a charismatic and controversial leader. Its ideology, known as aprismo, was influenced by socialism, indigenism and Americanism. Aprismo had a great impact on Peruvian and Latin American politics.

Contribution to the APRA foundation

The founding of APRA was a milestone in Peruvian political history. APRA is one of the most important political parties in Peruvian history and has had a great impact on the country's political life. Haya de la Torre's contribution to the founding of APRA was fundamental "...The founding programmatic bases of APRA have aspects of the reformist ideology, to which are also added slogans of nationalism that would later be raised by other political forces: fight against Imperialism, for the political unity of Latin America, for the Nationalization of lands and industries, for the Internationalization of the Panama Canal, for solidarity with all the oppressed peoples and classes of the world..."¹⁴.

Haya de la Torre was a promoter of popular education and social justice. His contributions to popular

education were the following: He promoted the creation of the González Prada Popular Universities, which aimed to educate the popular sectors. These universities were an innovative model that allowed people with limited resources to access higher education.

For de la Torre, the Reform was the "...most transcendent movement of intellectual renewal that occurred in Indian America since Independence. A gallant and intrepid generation of twenty-somethings spoke to the Indian-American students and workers in an unusual language but one that they all understood. And he proclaimed the "sacred right to insurrection..."¹⁵.

While in Mexico, he laid the foundations of the APRA continental organization according to the same guidelines as the popular universities. On May 7, 1924, before traveling to Europe, he made known to the young people and submitted to consensus the motto "joint action of the Indo-American peoples." *for the political and economic union of our twenty-one states* ... "We not only want our united America but also our fair America... That flag that I give you, comrades Mexican students... you have here; The red will say of the palpating aspirations for justice that in this admirable hour of the world inflames the conscience of the people and that our generation proclaims with the new humanity... On the wide red field the figure in gold of the Indo-American nation, points out the vast lands, that united and strong, will provide a home without inequalities to all the children of the human race. Accept it because it is ours. It will flame first over the dreaming crowds of youth that are opening the way, and later it will be the people... who shake it in the trembling tumult of their struggles. I give it to you, fellow students of Mexico, because it is you... who have the right to wear it. Because you are children of the people who most gallantly defended the freedom of the race; because from your own blood emerged the example of a new egalitarian and advancing society. Forget who gave it to you, but always remember that it is a symbol of youth, justice and unity..."¹⁶.

¹¹ Ideele Revista N°277, disponible: <https://revistaideele.com/ideele/content/123-a%C3%B1os-del-natalicio-de-haya-de-la-torre>

¹² Haya de La Torre Raúl y la universidad reformista (Apunte de clase 2 de la EPNyL, Aritz Recalde).

¹³ Haya de la Torre Raúl 2010 Treinta Años del Aprismo. Fondo Editorial del Congreso Lima -Perú, p.114

¹⁴ Haya de La Torre Raúl y la universidad reformista (Apunte de clase 2 de la EPNyL, Aritz Recalde)

¹⁵ Ibid., p.3

¹⁶ Haya de la Torre Raúl 2010 Treinta Años del Aprismo. Fondo Editorial del Congreso Lima -Perú.

Conclusion.

The preaching of Vasconcelos and the Ateneo de la Juventud had a significant influence on the events of 1918 in Argentina and Mexico. Reformist students in both countries were inspired by Vasconcelos's thinking to demand educational and political reforms, and Vasconcelos himself was one of the main promoters of the 1921 educational reform in Mexico.

In the context of the time in which it was created, the UNAM shield was a symbol of hope for a better future for Latin America. Vasconcelos believed that the region could overcome its differences and build a common homeland, based on the values of culture and spirituality. It is a reminder that we share a common history and culture, and that we have the potential to build a better future for all.

Vasconcelos' university project was a radical proposal for his time. It moved away from the traditional university model, which focused on the training of intellectual elites. Instead, Vasconcelos sought to create a university that would be at the service of the Mexican people and that would contribute to the construction of a more just and egalitarian society.

The legacy of Víctor Raúl Haya de la Torre in the University Reform has transformed Latin American higher education. His ideas about university autonomy, student participation and connection with society have inspired generations of students and academics, and have contributed to universities being more democratic, inclusive and committed to social development.

Both intellectuals promoted on the continent, Pérez Gamón Carolina (2024) "...Patriotism implies promoting the common values that share the region. This can be achieved by promoting education about history and culture, making known the thoughts and actions carried out by these men who promoted dialogue and cooperation between countries, thus giving citizens a sense of belonging..."¹⁷.

The University Reform of 1918 marked a before and after in the history of Latin American higher education. Its ideals of democracy, autonomy, social connection and pedagogical renewal continue to be relevant in the 21st century, inspiring the universities of the region to assume a critical, proactive and committed role with the social, economic and cultural development of their communities.

Perez Gamon Carolina 2023 "...The university world was then essentially male, while in the 21st century the growth of female enrollment increased exponentially. But there is certainly something that unites us

with the reformist movement and that is the aspiration to build a better world, a University, with a commitment to cultural and scientific life..."¹⁸

Despite the progress made, there are still challenges ahead to consolidate reformist principles and build higher education that is more fair, equitable and relevant to the needs of the 21st century. In this sense, analysis from the perspective of political science is essential to understand the scope and limitations of the reform, as well as to identify new strategies that allow strengthening university autonomy, promoting social participation.

The results of this research transcend the mere conceptual framework and open new challenges regarding the direction of Higher Education in Latin America.

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PENTABASIS AND AGE-RELATED PENTAPSYCHOLOGY

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PENTABASE Y PENTAPSIKOLOGÍA RELACIONADA CON LA EDAD "MADRID"

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Abstract

The application of the structural-functional approach to the study of the human psyche is explored. To analyze personality, a five-component approach (pentapsychology) is used, and to analyze the human psyche as a whole, an eight-component approach (octanalysis) is used. The properties of five components (instances) of personality are analyzed: three instances of consciousness and two instances of the unconscious. The question of the personality instances hierarchy is considered. It is shown that human behavior and the effectiveness of his activities largely depend on the instances hierarchy of his personality chosen by a person. The application of the five-component approach to describe the psychological properties of both the personality and to describe the psychological properties of any association of the personalities (family, society, state, country, civilization) is analyzed. The Pentabasis is considered - a five-level worldview model proposed by the administration of the President of Russia as a value ideology of Russian society. Age-related pentapsychology, a section of pentapsychology, explains the essence of Pentabasis and offers a practice-tested methodology for selecting personnel to increase the effectiveness of large-scale application of Pentabasis in the life of the country.

Anotación

Se explora la aplicación del enfoque estructural-funcional al estudio de la psique humana. Para analizar la personalidad se utiliza un enfoque de cinco componentes (pentapsicología) y para analizar la psique humana en su conjunto, se utiliza un enfoque de ocho componentes (octanálisis). Se analizan las propiedades de cinco componentes (instancias) de personalidad: tres instancias de conciencia y dos instancias del inconsciente. Se considera la cuestión de la jerarquía de instancias de personalidad. Está demostrado que el comportamiento humano y la eficacia de sus actividades dependen en gran medida de la jerarquía de instancias de su personalidad elegida por la persona. Se analiza la aplicación del enfoque de cinco componentes para describir las propiedades psicológicas tanto de la personalidad como para describir las propiedades psicológicas de cualquier asociación de personalidades (familia, sociedad, estado, país, civilización). Se considera la Pentabase, un modelo de cosmovisión de cinco niveles propuesto por la administración del Presidente de Rusia como ideología de valores de la sociedad rusa. Pentapsicología relacionada con la edad, una sección de pentapsicología, explica la esencia de Pentabase y ofrece una metodología probada en la práctica para seleccionar personal para aumentar la efectividad de la aplicación a gran escala de Pentabase en la vida del país.

Keywords: five-component theory of personality, octanalysis, personality psychology, Pentabasis, age-related pentapsychology

Palabras clave: teoría de la personalidad de los cinco componentes, octanálisis, psicología de la personalidad, Pentabase, pentapsicología relacionada con la edad

Introducción

En el campo de la ciencia, el análisis estructural-funcional se utiliza a menudo para obtener conocimientos fiables.

Aunque la psique humana es invisible, este análisis es bastante aplicable para estudiar la psique humana y estudiar las propiedades de su personalidad.

Para describir las propiedades de la psique humana, el psicólogo, psicoanalista, psiquiatra y

neurólogo austriaco Sigmund Freud (1856-1939) fue el primero en utilizar el análisis estructural-funcional. Propuso un modelo estructural de tres componentes de la psique. Por supuesto, el enfoque de los tres componentes no es suficiente para describir la psique.

El estudio detallado de los rasgos de personalidad realizado por el autor muestra que para obtener un conocimiento confiable sobre los rasgos de personalidad, es necesario utilizar un enfoque de cinco

componentes (pentapsicología) y para describir la psique humana en su conjunto, un enfoque de ocho componentes (octanálisis) [1-23]. Pentapsicología y octanálisis se crearon sobre la base del artículo de Yatsenko V.I. "Teoría de la personalidad de los cinco componentes" [1], registrada por la Sociedad Rusa de Autores. Reservados todos los derechos. © Yatsenko V. I. 2002

Pentapsicología señala que el enfoque de cinco componentes es aplicable para describir las propiedades psicológicas tanto de una persona individual como para describir las propiedades psicológicas de cualquier asociación de individuos (familia, sociedad, estado, país, civilización).

Actualmente, las estructuras gubernamentales de algunos países tienen como objetivo utilizar un enfoque de la psicología de cinco componentes para resolver el problema "desarrollo y mejora" en las siguientes áreas: personalidad, familia, sociedad, estado, país y civilización.

Por ejemplo, desde 2022 se conoce Pentabase [24], un modelo de cosmovisión de cinco niveles propuesto por la administración del presidente de Rusia como ideología de valores de la sociedad rusa.

Una comparación de Pentabase y pentapsicología muestra que al desarrollar Pentabase, se utilizó un enfoque de cinco componentes para el análisis de la personalidad y una jerarquía de instancias de personalidad, que se consideran en pentapsicología relacionada con la edad, una sección de pentapsicología.

Consideremos las posibilidades de utilizar pentapsicología relacionada con la edad para explicar la esencia de Pentabase y el uso eficiente de Pentabase en la vida del país.

Descripción de Pentabase

El modelo metodológico Pentabase consta de cinco bloques: persona, familia, sociedad, estado, país. Se describen en detalle en el artículo científico "Percepción de los valores, factores y estructuras básicas del desarrollo sociohistórico de Rusia" (Journal of Political Research, Vol. 6 No. 3, 2022). Entre sus autores se encuentran el jefe del departamento para garantizar las actividades del Consejo de Estado, Alexander Dmitrievich Kharichev, el ideólogo del "ADN de Rusia" Andrei Vladimirovich Polosin, el decano de la Facultad de Ciencias Políticas de la Universidad Estatal de Moscú, Andrei Yurievich Shutov y el jefe del departamento de investigación estratégica y previsión del Instituto de Expertos en Investigaciones Sociales (EISR), Ekaterina Nikitichna Sokolova.

Pentabase es un conjunto de principios de valores clave, que incluyen actitudes, normas e ideales básicos que determinan el comportamiento y la interacción de los miembros de la sociedad. Estos principios forman la base del sistema sociocultural y determinan su estructura.

Un sistema de cinco componentes, cada uno de los cuales tiene su propio dominante de valor:

- Persona - Creación
- Familia - Tradiciones
- Sociedad - Consentimiento

Estado – Confianza en las instituciones

País - Patriotismo.

Los componentes de Pentabase pueden diferir y tener variaciones según el momento específico, el contexto histórico y cultural, pero son universales y humanos universales, ya que reflejan las necesidades y aspiraciones básicas de la sociedad. [24].

Descripción de pentapsicología relacionada con la edad

Pentapsicología estudia las propiedades de cinco componentes (instancias) de la personalidad que, en el desempeño de sus funciones, dominan la personalidad a su vez. Y aquí surge la pregunta sobre la jerarquía mantenida de instancias de personalidad.

Una persona tiene libertad de elección y puede establecer en su personalidad cualquier jerarquía de instancias de personalidad. El comportamiento de una persona y la eficacia de sus actividades dependen en gran medida de la jerarquía seleccionada y mantenida de instancias de personalidad.

En pentapsicología, se designan cinco instancias de personalidad: tres instancias de conciencia 5-Alma, 4-Corazón, 1-Razón y dos instancias del inconsciente 3-Irracio, 2-Racio. En esta designación, los números 5, 4, 3, 2, 1 muestran el lugar de la instancia de personalidad en la jerarquía natural y armoniosa de instancias de personalidad, de arriba a abajo, 54321-jerarquía.

Pentapsicología descubrió una propiedad fundamental de la personalidad: una jerarquía armoniosa de instancias de la conciencia individual - 541-jerarquía: 5-Alma - en primer lugar, 4-Corazón - en segundo lugar, 1-Razón - en tercer lugar.

En 2010, utilizando métodos de pentapsicología, se descubrió el efecto de la dominancia innata de las instancias de personalidad [4].

Dependiendo de la fecha de nacimiento de una persona, cinco instancias de su personalidad difieren significativamente entre sí en el grado de dominancia innata. La fórmula octanalítica de personalidad y el código octanalítico de personalidad muestran el grado de dominancia innata de cada una de cinco instancias de personalidad.

La dominancia innata de las instancias de personalidad influye significativamente en el comportamiento de una persona y en la eficacia de sus actividades. El grado de dominancia innata de la instancia de personalidad persiste a lo largo de la vida de una persona y permite predecir las características del comportamiento de una persona en diversas situaciones de la vida [13-18].

Pentapsicología relacionada con la edad señala que cinco instancias de personalidad comienzan a mostrar actividad relacionada con la edad en diferentes períodos de la vida de una persona en la secuencia: 3-Irracio, 2-Racio, 1-Razón, 4-Corazón, 5-Alma.

En el período prenatal, desde la concepción hasta el nacimiento de un niño, sólo una instancia del inconsciente 3-Irracio muestra actividad relacionada con la edad en la personalidad del niño.

Durante el período de la infancia inocente, desde el nacimiento hasta los 1,5 – 2 años, dos instancias del

inconsciente, 3-Irracio y 2-Racio, muestran actividad relacionada con la edad en la personalidad del bebé.

En el período preescolar, de 1,5 – 2 años a 6 años, tres instancias del triángulo dramático de Stephen Karpman muestran actividad relacionada con la edad en la personalidad del niño: dos instancias del inconsciente 3-Irracio (el papel Víctima), 2-Racio (el papel Rescatador) y una instancia de conciencia 1-Razón (el papel Perseguidor).

Durante el período escolar, de 6 a 18 años, en la personalidad de un niño o adolescente, ya cuatro instancias muestran actividad relacionada con la edad: dos instancias del inconsciente 3-Irracio, 2-Racio y dos instancias de conciencia 4-Corazón, 1-Razón.

Durante este período puede manifestarse una crisis de la adolescencia: el doble poder de las instancias de conciencia 4-Corazón (amabilidad) y 1-Razón (egoísmo). Tan pronto como se elige la jerarquía de instancias de conciencia (41-jerarquía o 14-jerarquía), la crisis termina.

Durante el período de la vida adulta, a partir de los 18 años, las cinco instancias de personalidad muestran actividad relacionada con la edad en la personalidad de un adulto: dos instancias del inconsciente 3-Irracio, 2-Racio y tres instancias de conciencia 5-Alma, 4-Corazón, 1-Razón. Durante este período, puede manifestarse una crisis de la mediana edad: el doble poder de las instancias de conciencia 4-Corazón (amabilidad) y 5-Alma (altruismo). Tan pronto como se elige la jerarquía de instancias de conciencia (45-jerarquía o 54-jerarquía), la crisis termina.

Propiedades de instancias emocionalmente inestables del inconsciente:

- instancia extrovertida 3-Irracio – creatividad, irracionalidad, espontaneidad de acciones, en el análisis transaccional de Eric Berne el estado Niño, según Stephen Karpman el papel Víctima, el tipo de temperamento es colérico;

- instancia-introvertida 2-Racio – acciones racionales, lógicas, siguiendo tradiciones, leyes, acuerdos, practicidad de las acciones, en el análisis transaccional de Eric Berne el estado Padre, según Stephen Karpman el papel Rescatador, el tipo de temperamento es melancólico.

Propiedades de instancias emocionalmente estables de conciencia:

- instancia extrovertida 1-Razón – capacidades intelectuales, construcción de relaciones según el esquema “Soy superior a ti”, egoísmo, sentido de superioridad, falta de principios, engaño, agresividad, traición, según Stephen Karpman el papel Perseguidor, el deseo de divertirse, obtención de placer personal, disfrute, consumo ostentoso, la tendencia a dar preferencia a la felicidad a corto plazo sobre la satisfacción y el crecimiento personal a largo plazo, el tipo de temperamento es sanguíneo, la capacidad de hacer una elección intelectual consciente e independiente;

- instancia introvertida 4-Corazón – capacidades de gestión, construcción de relaciones según el esquema “tú y yo estamos en el mismo nivel”, amistad, igualdad, hermandad, relación cordial, en el análisis transaccional de Eric Berne el estado Adulto, el tipo de

temperamento es flemático, la capacidad de hacer una elección gerencial consciente e independiente;

- instancia extrovertida 5-Alma – construir relaciones según el esquema “Eres superior a mí”, altruismo, sumisión, servicio, devoción, sacrificio, el tipo de temperamento es sanguíneo, la capacidad de hacer una elección emocional consciente e independiente.

Pentapsicología relacionada con la edad señala que tres instancias de conciencia (5-Alma, 4-Corazón, 1-Razón) comienzan a mostrar actividad relacionada con la edad en la secuencia: 1-Razón (a partir de 1,5 - 2 años), 4-Corazón (a partir de 6 años), 5-Alma (a partir de 18 años). Tal secuencia es directamente opuesta a la irreprochable 541-jerarquía de las instancias de conciencia y es la causa del surgimiento en una persona de una idea falsa de la realidad.

En ausencia de una formación sistemática y orientado a objetivos, un niño o adolescente puede tener la idea errónea de que 145-jerarquía es una jerarquía natural de instancias de conciencia y que esta jerarquía debe ser observada.

Dependiendo de las propiedades dominantes innatas del individuo, las condiciones de vida y la educación, en la conciencia de un adolescente se puede formar 14-jerarquía o 41-jerarquía de instancias de conciencia, y a un adulto 145-, 154-, 415-, 451-, 514- o 541-jerarquía de instancias de conciencia.

Al formar una personalidad armoniosamente desarrollada en un niño, adolescente o adulto, la tarea de la pedagogía es, ante todo, la formación en su conciencia de una armoniosa jerarquía de instancias.

Los cinco dominantes de valor de Pentabase y cinco instancias de personalidad

Comparemos los cinco dominantes de valor de Pentabase y cinco instancias de personalidad en pentapsicología:

- “PERSONA (creación)” – instancia 3-Irracio, creatividad, acciones irracionales;

- “FAMILIA (tradiciones)” – instancia 2-Racio, acciones racionales;

- “SOCIEDAD (consentimiento)” – instancia 1-Razón, capacidades analíticas, uso de la razón para lograr un acuerdo;

- “ESTADO (confianza en las instituciones)” – instancia 4-Corazón, capacidades de gestión, acciones de gestión basadas en la amabilidad, neutralización a la “quinta columna”;

- “PAÍS (patriotismo)” – instancia 5-Alma, servicio, devoción, sacrificio, altruismo en aras de preservar la soberanía del país.

Selección de personal para el uso de Pentabase

La comparación de Pentabase y pentapsicología muestra qué instancia de personalidad, al seleccionar personal, debe mostrar la dominancia innata para aumentar la efectividad de uso de los dominantes de valor de Pentabase:

- instancia 5-Alma – “PAÍS (patriotismo)”;

- instancia 4-Corazón – “ESTADO (confianza en las instituciones)”;

- instancia 3-Irracio – “PERSONA (creación)”;

- instancia 2-Racio – “FAMILIA (tradiciones)”;

– instancia 1-Razón – “SOCIEDAD (consentimiento)”.

Basándose en el código octanalítico de personalidad, es posible seleccionar un candidato cuya instancia necesaria de personalidad muestre un alto grado de dominancia innata.

Por ejemplo, para usar el dominante de valor de Pentabase "PAÍS (patriotismo)", en primer lugar, se necesitan personas con dominancia innata de la instancia 5-Alma. Pentapsicología señala que las personas nacidas en un año que termina en el dígito 2 o 3, por ejemplo, 2012, 2013, 2022, 2023, tienen estos rasgos dominantes innatos de personalidad.

Conclusiones y ofertas

Pentapsicología relacionada con la edad explica claramente la esencia de Pentabase. Pentapsicología también ofrece una metodología de reclutamiento probada en la práctica para aumentar la efectividad de la aplicación a gran escala de Pentabase en la vida del país.

Compilación de una fórmula octanalítica de personalidad

Compilación de una fórmula octanalítica de personalidad permite revelar la dominancia congénita de cinco instancias de personalidad.

Tal dominancia congénita de las instancias de personalidad se manifiesta en la misma medida a lo largo de la vida de una persona, independientemente de las condiciones de su vida.

El estudio de la biografía de muchas personas muestra que el comportamiento de cada persona en diversas situaciones de la vida está determinado principalmente por las propiedades dominantes congénitas de personalidad descritos por la fórmula octanalítica de personalidad. Comportamiento de una persona, los rasgos de su carácter, orientación profesional de una persona dependen en gran medida de esa dominancia congénita de las instancias de personalidad.

Una persona percibe la dominancia congénita de las instancias de su personalidad como un talento, como una virtud, cuyo uso lo llevará al éxito en sus actividades.

Octanálisis estudia la estructura de cinco componentes de personalidad: tres instancias de conciencia 5-Alma, 4-Corazón, 1-Razón y dos instancias del inconsciente 3-Irracio y 2-Racio.

Antes del nombre de una instancia, se indica su número de serie en la jerarquía natural de instancias, de arriba a abajo: 5, 4, 3, 2, 1.

El estudio de la personalidad con la ayuda de octanálisis muestra que en cada persona, según la fecha de nacimiento, de dos a cinco instancias de personalidad tienen una dominancia congénita.

¡Querido lector! A continuación se muestra una Tabla con la que puede independiente compilar una fórmula octanalítica de personalidad para cualquier persona por fecha de nacimiento.

Para describir las propiedades de la psique humana sobre la base de la fórmula octanalítica de personalidad, es necesario utilizar no sólo la Tabla, sino también conocer en detalle las propiedades de las instancias de personalidad 5-Alma, 4-Corazón, 3-Irracio, 2-Racio, 1-Razón. Numerosas propiedades de estas instancias se describen en artículos sobre octanálisis en el sitio web "Ocho instancias de la psique" www.8-in.com.

Propiedades clave de cinco instancias de personalidad:

- instancia de conciencia 5-Alma - servicio, sacrificio, altruismo;
- instancia de conciencia 4-Corazón - capacidades gerenciales;
- instancia del inconsciente 3-Irracio - capacidades creativas;
- instancia del inconsciente 2-Racio - capacidades racionales;
- instancia de conciencia 1-Razón - capacidades analíticas, egoísmo.

| Compilación de una fórmula octanalítica de personalidad por fecha de nacimiento | | | | | |
|--|-----------------|------------------|--|---------------------|-------------------|
| 43-Buey | 32-Tigre | 23-Conejo | 13-Dragón | 42-Serpiente | 31-Caballo |
| 19.02.1901 | 08.02.1902 | 29.01.1903 | 16.02.1904 | 04.02.1905 | 25.01.1906 |
| 06.02.1913 | 26.01.1914 | 14.02.1915 | 03.02.1916 | 23.01.1917 | 11.02.1918 |
| 24.01.1925 | 13.02.1926 | 02.02.1927 | 23.01.1928 | 10.02.1929 | 30.01.1930 |
| 11.02.1937 | 31.01.1938 | 19.02.1939 | 08.02.1940 | 27.01.1941 | 15.02.1942 |
| 29.01.1949 | 17.02.1950 | 06.02.1951 | 27.01.1952 | 14.02.1953 | 03.02.1954 |
| 15.02.1961 | 05.02.1962 | 25.01.1963 | 13.02.1964 | 02.02.1965 | 21.01.1966 |
| 03.02.1973 | 23.01.1974 | 11.02.1975 | 31.01.1976 | 18.02.1977 | 07.02.1978 |
| 20.02.1985 | 09.02.1986 | 29.01.1987 | 17.02.1988 | 06.02.1989 | 27.01.1990 |
| 07.02.1997 | 27.01.1998 | 16.02.1999 | 05.02.2000 | 24.01.2001 | 12.02.2002 |
| 26.01.2009 | 10.02.2010 | 03.02.2011 | 23.01.2012 | 10.02.2013 | 31.01.2014 |
| 12.02.2021 | 01.02.2022 | 22.01.2023 | 10.02.2024 | 29.01.2025 | 17.02.2026 |
| 21-Cabra | 12-Mono | 41-Gallo | 34-Perro | 24-Cerdo | 14-Rata |
| 13.02.1907 | 02.02.1908 | 22.01.1909 | 10.02.1910 | 30.01.1911 | 18.02.1912 |
| 01.02.1919 | 20.02.1920 | 08.02.1921 | 28.01.1922 | 16.02.1923 | 05.02.1924 |
| 17.02.1931 | 06.02.1932 | 26.01.1933 | 14.02.1934 | 04.02.1935 | 24.01.1936 |
| 05.02.1943 | 25.01.1944 | 13.02.1945 | 02.02.1946 | 22.01.1947 | 10.02.1948 |
| 24.01.1955 | 12.02.1956 | 31.01.1957 | 18.02.1958 | 08.02.1959 | 28.01.1960 |
| 09.02.1967 | 30.01.1968 | 17.02.1969 | 06.02.1970 | 27.01.1971 | 15.02.1972 |
| 28.01.1979 | 16.02.1980 | 05.02.1981 | 25.01.1982 | 13.02.1983 | 02.02.1984 |
| 15.02.1991 | 04.02.1992 | 23.01.1993 | 10.02.1994 | 31.01.1995 | 19.02.1996 |
| 01.02.2003 | 22.01.2004 | 09.02.2005 | 29.01.2006 | 18.02.2007 | 07.02.2008 |
| 19.02.2015 | 09.02.2016 | 28.01.2017 | 16.02.2018 | 05.02.2019 | 25.01.2020 |
| 06.02.2027 | 26.01.2028 | 13.02.2029 | 03.02.2030 | 23.01.2031 | 11.02.2032 |
| Números de los dominantes - signo zodiacal | | | Período del signo zodiacal | | |
| 43-Piscis 32-Aries 23-Tauro 13-Geminis 42-Cáncer 31-Leo 21-Virgo 12-Libra 41-Escorpio 34-Sagitario 24-Capricornio 14-Aquario | | | 19 de febrero - 20 de marzo 21 de marzo - 19 de abril 20 de abril - 20 de mayo 21 de mayo - 21 de junio 22 de junio - 22 de julio 23 de julio - 22 de agosto 23 de agosto - 22 de septiembre 23 de septiembre - 23 de octubre 24 de octubre - 22 de noviembre 23 de noviembre - 21 de diciembre 22 de diciembre - 20 de enero 21 de enero - 18 de febrero | | |

En la Tabla, para cada año de nacimiento, se indica el Año Nuevo según el calendario oriental. Cae en la segunda luna nueva después del solsticio de invierno (después del 21 de diciembre). En el calendario gregoriano, esto suele corresponder a uno de los días entre el 20 de enero y el 20 de febrero.

Los límites de los períodos de los signos zodiacales indicados en la Tabla no están claramente establecidos y dependen del año de nacimiento. Por ejemplo, en los años bisieptos el límite cambia ligeramente. En los límites de los períodos de los signos zodiacales, se indican las fechas, de transición de un signo zodiacal a otro signo zodiacal.

Tabla muestra "el Primer dominante" y "el Segundo dominante", instancias congénitamente dominantes de personalidad asociadas con la fecha de nacimiento de una persona. La dominancia de "el Primer dominante" es más pronunciado que la dominancia de "el Segundo dominante".

"El Primer dominante" y "el Segundo dominante" son las propiedades de los signos de zodiaco del calendario occidental (43-Piscis, 32-Aries, 23-Tauro, 13-Géminis, 42-Cáncer, 31-Leo, 21-Virgo, 12-Libra, 41-Escorpio, 34-Sagitario, 24-Capricornio, 14-Acuario) y las propiedades de los signos del Animal de calendario Oriental (43-Buey, 32-Tigre, 23-Conejo, 13-Dragón, 42-Serpiente, 31-Caballo, 21-Cabra, 12-Mono, 41-Gallo, 34-Perro, 24-Cerdo, 14-Rata).

Por ejemplo, las entradas 43-Piscis y 43-Buey muestran que "el Primer dominante" es la dominancia congénita de la instancia 4-Corazón, "el Segundo dominante" es la dominancia congénita de la instancia 3-Irracio. Las entradas 21-Virgo y 21-Cabra muestran que "el Primer dominante" es la dominancia congénita de la instancia 2-Racio, "el Segundo dominante" es la dominancia congénita de la instancia 1-Razón.

En la Tabla, "el Primer dominante" en el signo zodiacal está resaltada en negrita. Muestra que cuando los signos zodiacales cambian, "el Primer dominante" cambia según el 43214-ciclo.

Ahora pasemos a compilación de la fórmula octanalítica de personalidad.

Por ejemplo, necesitamos compilar una fórmula octanalítica de personalidad para una persona nacida el 2 de julio de 1954.

La Tabla muestra la fecha de inicio de 1954 según el calendario oriental 03/02/1954. Esto significa que, con una fecha de nacimiento entre el 03/02/1954 y el 23/01/1955, se debe utilizar la entrada "31-Caballo". Y con fecha de nacimiento del 01 de enero al 02 de febrero de 1954, debe utilizar la entrada "42-Serpiente".

El comienzo del año según el calendario oriental cae en la segunda luna nueva después del solsticio de invierno y por lo tanto se mueve entre el 20 de enero y el 20 de febrero.

Según la Tabla, encontramos la combinación: el signo zodiacal del calendario occidental 42-Cáncer y el signo del Animal, calendario oriental, 31-Caballo. Aquí "42" significa que el Primer dominante congénito es la instancia 4-Corazón, y el Segundo dominante congénito es la instancia 2-Racio. La designación "31" muestra que el Primer dominante es la instancia 3-Irracio, el Segundo dominante es la instancia 1-Razón.

La designación 42-Cáncer muestra que con la planificación a corto plazo de acciones por un período de un mes o menos (corto plazo), las propiedades de las instancias 4-Corazón (el Primer dominante) y 2-Racio (el Segundo dominante) se manifiestan en comportamiento humano, en primer lugar.

La designación 31-Caballo muestra que con la planificación a largo plazo de acciones por un período de un año o más (perspectiva a largo plazo), se manifiestan las propiedades de las instancias 3-Irracio (el Primer dominante) y 1-Razón (el Segundo dominante) en el comportamiento humano, en primer lugar.

Para describir el estado de la psique "42-Cáncer" es necesario conocer en detalle las propiedades de las instancias de personalidad 4-Corazón y 2-Racio. Y para describir el estado de la psique "31-Caballo" es necesario estudiar a fondo las propiedades de las instancias de personalidad 3-Irracio y 1-Razón.

En el ejemplo dado de compilar una fórmula octanalítica de personalidad, cuatro instancias de personalidad 4-Corazón, 3-Irracio, 2-Racio y 1-Razón muestran la dominancia congénita. Pero muy a menudo hay casos, de acuerdo con la ley de probabilidad de nacimiento de personas uniforme durante el año, cuando sólo tres o incluso dos instancias de personalidad muestran la dominancia congénita, por ejemplo, la combinación: la fórmula octanalítica de personalidad 34-Sagitario / 34 -Perro, para las personas nacidas en el período del 23 de noviembre al 21 de diciembre de 1934, 1946, 1958, 1970, 1982, 1994, 2006. En tales casos, una persona necesita un apoyo pedagógico y psicológico especial durante la infancia.

La ausencia de dominancia innata de la instancia de personalidad puede compensarse parcialmente mediante la formación deliberada de la dominancia adquirida de la instancia de personalidad a través de la educación y el entrenamiento. Tal medida preventiva es de gran beneficio para una persona en la implementación de su adaptación social y personal en la sociedad. El servicio de patronato octanalítico lleva a cabo sistemáticamente tales medidas preventivas y la vida de una persona se vuelve más cómoda y feliz. Para inscribir a una persona en un servicio de patronato octanalítico, es necesario diagnosticar los dominantes congénitos de su personalidad. Una fórmula octanalítica de personalidad se puede compilar cinco minutos después del nacimiento de un niño, y esta fórmula octanalítica de personalidad de una persona será válida durante toda su vida.

Cabe señalar que la dominancia adquirida de la instancia de personalidad siempre se manifiesta mucho más débil que la dominancia congénita. Al realizar cualquier trabajo, una persona con la dominancia adquirida de la instancia de personalidad no puede

competir con éxito con una persona que tiene la dominancia congénita de esta instancia de personalidad.

Por ejemplo, con una combinación 34-Sagitario / 34-Perro, una persona no tiene una necesidad congénita en la dominancia de las instancias 1-Razón y 2-Racio. Tal persona no tiene una tendencia congénita a analizar constante y profundamente la situación y formular conclusiones (propiedades de la instancia de conciencia 1-Razón). Además, una persona no tiene inclinación a seguir constantemente ninguna ley, acuerdo, regla, no hay inclinación a realizar acciones racionales, aprendizaje consistente y sistemático (propiedades de la instancia del inconsciente 2-Racio). Para tal persona, la necesidad de análisis de la situación y el comportamiento racional debe formarse a través de su educación y formación. Y para esto, primero debe averiguar si una persona tiene ese problema. Para este propósito, debe compilar una fórmula octanalítica de personalidad.

Fórmula octanalítica extendida de personalidad

La fórmula octanalítica extendida de personalidad es más precisa. Al compilarla, es necesario tener en cuenta las propiedades del llamado dominante de fondo, una de cinco instancias de personalidad. El dominante de fondo está determinado por el año de nacimiento de una persona y se manifiesta en el comportamiento de una persona como el dominante congénito. Las instancias de personalidad (5-Alma, 4-Corazón, 3-Irracio, 2-Racio, 1-Razón), como los dominantes congénitos de fondo, corresponden inequívocamente a cinco elementos de la antigua filosofía oriental "U-sin" (Agua, Madera / Aire, Fuego, Tierra, Metal) y cinco elementos de la antigua filosofía griega (Éter, Agua, Fuego, Tierra, Aire).

Según los datos sobre las propiedades de los elementos "U-pecado" de la filosofía oriental, cada diez años dominan las cinco instancias de la personalidad (5-Alma, 4-Corazón, 3-Irracio, 2-Racio, 1-Razón), como el dominante de fondo, alternativamente durante dos años seguidos.

La instancia 1-Razón domina como el dominante de fondo en los años que terminan en dígito 0 o 1. La instancia 5-Alma domina en los años que terminan en dígito 2 o 3. La instancia 4-Corazón domina en los años que terminan en dígito 4 o 5. La instancia 3-Irracio domina en los años que terminan en dígito 6 o 7. La instancia 2-Racio domina en los años que terminan en dígito 8 o 9.

Por ejemplo, la instancia 5-Alma domina, como el dominante de fondo, en la psique de las personas que nacieron en 2022 y 2023, la instancia 4-Corazón - para los nacidos en 2024 y 2025, etc. La secuencia de cambios en años de dominancia de fondo de las instancias de personalidad corresponde al 543215-ciclo "Camino del Corazón".

La instancia de personalidad, que domina en el año de nacimiento de una persona como el dominante de fondo, es un importante factor congénito de la psique, que conviene tener en cuenta al compilar la fórmula octanalítica de personalidad. En este caso, la fórmula octanalítica de personalidad tendrá una forma diferente.

Por ejemplo, para una fecha de nacimiento del 02/07/1954, la fórmula habitual de personalidad es 42-Cáncer / 31-Caballo. El último dígito de 1954 muestra que para este año el dominante de fondo es la instancia de personalidad 4-Corazón. Con esto en mente, escribimos la fórmula octanalítica extendida de personalidad de la siguiente manera: 42-Cáncer / 4-31-Caballo. La entrada "4-31-Caballo" muestra que la instancia 4-Corazón es el dominante de fondo "4" para las personas nacidas en 1954-1955, y en la combinación de dominantes "31" la instancia 3-Irracio es el Primer dominante, y la instancia 1-Razón es el Segundo dominante.

La fórmula octanalítica extendida considerada de personalidad muestra que el dominante de fondo refleja la dominancia congénita adicional de la instancia 4-Corazón, capacidades gerenciales congénitas de la personalidad se manifiestan más claramente.

Fórmula octanalítica refinada de personalidad

La fórmula octanalítica extendida de personalidad discutida anteriormente cambia en un ciclo de 60 años, lo que crea conveniencia la compilación la fórmula para personas que vivieron hace varios siglos.

En esta fórmula, tomamos en cuenta la influencia de los dominantes congénitos del signo zodiacal solar, que muestra la influencia en la psique humana del estado del Sol en el fondo de las constelaciones el día de su nacimiento. Esta fórmula se puede refinar, teniendo en cuenta también la influencia de los dominantes congénitos de personalidad del signo zodiacal lunar, que muestra la influencia en la psique humana del estado de la luna en el fondo de las constelaciones en el día de su nacimiento.

El signo zodiacal lunar cambia en un ciclo de 19 años (con una precisión "+ 2 horas y 5 minutos"). Las fases de la Luna se adelantan un día respecto a las fases calculadas de la Luna durante un período de 219 años.

Introduzcamos la notación:

(0%) – el porcentaje de iluminación de la Luna en la fase de "luna nueva" es 0%;

(28% +) – el porcentaje de iluminación de la Luna en la fase de "luna creciente" es 28%;

(50% +) – el porcentaje de iluminación de la Luna en la fase "Primer Cuarto" es 50%;

(100%) – el porcentaje de iluminación de la Luna en la fase de "luna llena" es 100%;

(50% –) – el porcentaje de iluminación de la Luna en la fase "Tercer Cuarto" es 50%;

(23% –) – el porcentaje de iluminación de la Luna en la fase de "luna menguante" es 23%.

Para la fecha de nacimiento 2/07/1954 en el buscador de Internet, para la consulta en Inglés "moon phase July 2, 1954" ("fase lunar 2 de julio de 1954") obtenemos en Inglés:

"The current moon phase for July 2nd, 1954 is the Waxing Crescent phase. On this day, the moon is 2.06 days old and 4.59% illuminated with a tilt of -137.099°. The approximate distance from Earth to the moon is 380,083.28 km and the moon sign is Leo".

Entonces la fórmula octanalítica refinada de personalidad (Fórmula 1) para la fecha de nacimiento el 2 de julio de 1954 se verá así:

3 día lunar / 31-Leo / 4% + // 42-Cáncer / 4-31-Caballo.

En esta fórmula, los datos obtenidos del calendario lunar,

"3 día lunar / 31-Leo / 4% +"

es información adicional sobre las propiedades congénitas de la psique humana.

Código octanalítico de personalidad

Con base en los datos de la fórmula octanalítica de personalidad (Fórmula 1), compilamos un código octanalítico de personalidad (Fórmula 2), que muestra el grado total de dominancia innata de cada una de cinco instancias de personalidad 5-Alma, 4-Corazón, 3-Irracio, 2-Racio, 1-Razón.

Supongamos que el grado de dominancia innata de el Primer dominante es de dos puntos, de el Segundo dominante es de un punto, del dominante de fondo es de un punto. Luego, en el código octanalítico de personalidad (Fórmula 2) el total de puntos es diez.

El código octanalítico de personalidad (Fórmula 2) tiene la forma

5-Alma/0 puntos – 4-Corazón/3 puntos – 3-Irracio/4 puntos – 2-Racio/1 punto – 1-Razón/2 puntos o, en forma abreviada, 5/0 – 4/3 – 3/4 – 2/1 – 1/2, en forma más abreviada, 034-12.

En el código octanalítico de personalidad (Fórmula 2), la designación "4-1" muestra el grado total de dominancia innata para instancias del inconsciente: 3-Irracio – 4 puntos, 2-Racio – 1 punto.

Otros dígitos del código octanalítico de personalidad muestran el grado total de dominancia innata para las instancias de conciencia: 5-Alma - 0 puntos, 4-Corazón - 3 puntos, 1-Razón - 2 puntos.

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SOCIAL SCIENCES

SPATIAL PATTERNS AND OPPORTUNITIES FOR IMPROVING LOCAL GOVERNANCE IN BULGARIA

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Abstract

This paper presents several issues related to the spatial planning problems that arise as a demographic situation consequence. The paper outlines the general Bulgarian municipal spatial planning problems which are divided into urban and rural. The primary issues arise in rural municipalities, where the majority of problem groups can be found. The article presents a methodological approach for the territory analysis and assessment, employing traditional approaches and methods. The paper presents a series of conclusions and recommendations. The text presents a model for identifying differences in national legislation on social security, with particular reference to the distinctive characteristics of municipal development in Bulgaria. In conclusion, the authors put forth a series of measures and policies designed to have a positive impact on the municipalities' development.

Keywords: municipality, development, services, public management, space, areal

Introduction

Access to public services is a fundamental right of every citizen. It is largely provided by local authorities. It is reasonable to discuss municipal policy in terms of the quality of life of the population and the necessity for effective spatial planning and efficient public management. The state legislature establishes the overarching principles that guide the formulation of the primary spatial policy objectives and principles. In this regard, it is essential to develop a spatial planning policy that the territory should not be regarded as a mere mechanical aggregation of landed properties, but rather as a unified and indivisible entity, created by nature and shaped and inherited from history, on which landed properties of diverse types and sizes are formed and transformed over time to facilitate the functioning of individual and collective life activities and to respond to their constantly evolving development needs. Consequently, public management influences landed property utilization, conservation, and advancement. This encompasses the territory's functional, structural, and communicative organization and infrastructural provision. Consequently, the public and private investment initiatives implementation rise to the formation of a complex spatial environment with specific qualities. In this context, spatial and territorial planning has a direct impact on the socio-economic development of the national territory, while urban planning, in terms of settlements and settlement formations, plays a pivotal role. It is the principal instrument through which local authorities facilitate the landowners' entrepreneurial initiatives and investment intentions, regulating their compliance with the permanent purpose and specific characteristics of the land and providing them with infrastructure. In doing so, they "discipline" investments

in the name of and by the common and lasting interests of the respective territorial community. In Bulgaria, there are 266 municipalities. 215 are rural municipalities.

1. Population and Settlement States and Public Governance

One of the most significant reasons for the high population mobility observed in the twenty-first century is the emergence of regional disparities, particularly in terms of changes in living standards. Municipal spatial planning policy is developed by certain generally applicable principles and is based on an assessment of the existing situation in the municipality and the individual settlements [1]. This assessment is conducted to identify the objectives and priorities of the policy, as well as to analyze the factors that will influence the achievement of the objectives during the period of its implementation. Furthermore, the analysis should include an estimation of the resources that will be available for the implementation of spatial planning measures. The spatial development policy's principal substantive element is the guidelines for the development of the functional and structural components of the municipal territory and the individual settlements, together with the tasks to be carried out to implement the guidelines or achieve the objectives. The content of each municipal spatial development policy should be tailored to the specific characteristics of the municipality concerned. About this matter, it is evident that the municipalities in our country exhibit a considerable degree of diversity. This is evident from their respective sizes, the number of inhabitants, topography, the urbanization degree, economic structure, and other activities, and the rank and development of their respective infra-

structure [2]. The challenges facing Bulgarian municipalities are becoming increasingly complex. Rather than addressing local issues, the number of municipalities in a depressed state is increasing [2]. Conversely, the population's living standard is also contingent upon the availability of employment and the remuneration received, which must be sufficient to enable residents to flourish within their local environment. For instance, despite the observed decline in the population in the fourth quarter of 2023, the Gross Domestic Product (GDP) produced. The total value of the indicator was BGN 5,184,860,000 at current prices, according to the National Statistical Institute (NSI). The per capita value of the indicator was BGN 8,053. At the average exchange rate for the quarter of BGN 1.82 per USD 1, GDP amounted to USD 28,480,000,000 or USD 4,424 per capita. Converted into euros, GDP is EUR 26,510 million, with EUR 4,118 per capita. The total number of employed persons in the fourth quarter of 2023 is 2,920.6 thousand, of which 1,556.5 thousand are men and 1,364.1 thousand are women. In comparison, to the fourth quarter of 2022, the number of employees decreased by 2.0% for the entire population, with a 1.6% decline for men and a 2.5% reduction for women. The proportion of employed individuals aged 15 and over was 53.1%, 59.6% for men, and 47.2% for women. The number of unemployed individuals in the fourth quarter of 2023 was 128.6 thousand. 68.9 thousand (53.6%) were men, and 59.7 thousand (46.4%) were women. In comparison, to the fourth quarter of 2022, the number of unemployed individuals increased by 13.0 thousand, representing an increase of 11.2%. The unemployment rate is 4.2% (compared to 3.7% in the fourth quarter of 2022), with no significant difference between the sexes [5]. The analysis of major centers reveals that the gravitational field of the capital is particularly strong, given the administrative and economic potential that is concentrated in it. However, Bulgaria is developing through a monocentric model, which, although it creates large territorial and demographic imbalances, is a necessary consequence of the country's historical development. Consequently, the migration flow is strongly oriented towards Sofia. The distance between Sofia and Plovdiv is 120 km, with the gravity zone in favor of Sofia. Sofia's influence extends only 50 km from Plovdiv, although Plovdiv is the second-largest city in Bulgaria. This indicates that Plovdiv is a center of attraction for population movement towards it within a 50 km radius. Similarly, the gravity zones of Sofia and Blagoevgrad intersect 39 km from the smaller regional city. This represents a significant challenge for the development of Southwest Bulgaria. This indicates that Plovdiv is a focal point for population movement within a 50 km radius. Similarly, the gravity zones of Sofia and Blagoevgrad intersect 39 km from the smaller

regional city. This is a significant challenge for the development of Southwest Bulgaria. The analysis also indicates that Sofia exerts a gravitational influence on Pleven at a distance of 162 km; Ruse exerts a gravitational influence on Varna at a distance of 150 km (i.e. Varna has a significant advantage over Ruse); Sofia exerts a gravitational influence on V. Tarnovo at a distance of 83 km from the capital; for Sofia exerts a gravitational influence on Varna, the gravitational field of the capital ends 153 km before the sea town. The concept of zones of gravity or regional economic influence can be employed to inform the formulation of national and local policies for the development of local systems at different territorial levels: national, regional, district, and zonal [3]. The study results can also be used to justify the Bulgarian state regionalization and territorial administrative reform, to justify the policy, to make more efficient use of structural funds, and to ensure territorial cohesion at the level of municipalities.

2. Powers and competencies of the management bodies of the municipalities

In the context of local self-government, in the municipality, in particular, the mayor is responsible for managerial functions, while the municipal council is vested with exclusive normative functions. In this capacity, municipal government can act as a regulator within the local business and social environment. A team of authors has conducted an in-depth analysis of the role and significance of municipalities, with a particular focus on public governance, including local government and regional politics, municipal self-governance, and the municipal development planning process [4]. At the municipal level, various processes are achieved by specialists with expertise in urban planning and architecture, geography, economics, sociology, and heritage conservation. The work method is complex, as it once relied on an analytical plan designed to evaluate legislative changes in the settlement system in Bulgaria. Conversely, the socio-economic development of municipalities is contingent upon their actual evolution in terms of economic, social, and cultural infrastructure, as well as conceptual and prospective considerations about the restructuring or reorganization of the settlement system [4]. To achieve high efficiency in the functioning of local governments, it would be beneficial to consider improvements to the services, administration, and applied regulations. In this context, it is possible to consider the local regulations' potential optimization, which could improve results in the business environment. This thesis is supported by the respondents' responses regarding the potential for reducing local-level regulations. The figure indicates that 269 respondents expressed a positive view of the potential for reducing regulations, while 48 respondents provided a negative response to this question.

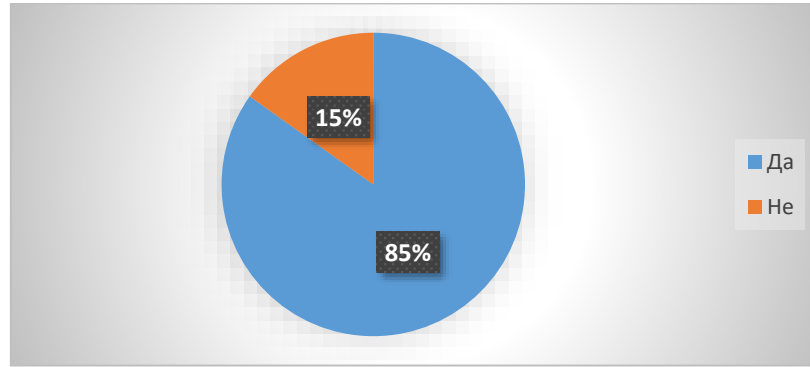


Figure 1 Should local regulations be reduced?

The survey revealed that 127 respondents, representing the majority of the sample, perceived the level of administrative services to be average. One hundred individuals rated municipal services at a low level. The survey revealed that 73 respondents were satisfied with the administrative quality of municipalities. A total of 50 respondents indicated that the quality of administrative services was satisfactory, while 33 respondents rated it as very low (Figure 1). The results demonstrate the efficiency of local governments in their functioning. The quality of administrative services impacts the tangible conditions created for the population to work and live in an area, do business, and attract, and retain residents [6]. The quality of administrative services is indicative of how processes are managed within the administration itself and its territory. As previously indicated, a significant proportion of the respondents indicated that they did not consider the level of services provided by the municipalities to be high. This indicates a need for continuous monitoring of local authorities, with the implementation of policies and measures designed to enhance administrative processes and, in turn, facilitate the creation of conducive conditions for business, work, and living.

3. Methods of the municipal governance approach

A detailed examination of the outcomes of the subsequent stages is conducted. Firstly, it is necessary to identify the principal territorial, demographic, economic, and social services of each of these regions/areas. To go further national, regional, and municipal strategic documents were utilized. The labor market dependencies identification specific to the region is also a key aspect of this analysis. The analysis is based on the business and labor force survey results conducted within Bulgaria and our regions. The study framework also includes a comparative analysis considering the positive and negative influences of the external and internal environment for each region/municipality separately for 2021-2014. In terms of methodology, a summary of strengths, weaknesses, opportunities, and threats is presented in tabular form. The comparative analysis encompasses all factors that facilitate or impede municipal integration. The subsequent step is to draw conclusions and formulate recommendations. The activity proceeds in the following sequence, conducted

on the spot. Afterward, differences in national social security legislation, laws, fiscal levels, wage levels, and other factors are identified that affect cross-border integration [7]. It is becoming increasingly important to study the cross-border labor market mobility level in the selected cross-border regions and the main obstacles and barriers that occur in the state border regions.

4. Framework and feature in the formation of the gravity field of the municipality

The analysis of some major centers reveals that the gravitational field of the capital is strong, given the administrative and economic potential concentration. Unfortunately, Bulgaria has a monocentric development model creating significant territorial and demographic imbalances. Consequently, the migration flow is strongly biased towards Sofia. The distance between Sofia and Plovdiv is 120 km, with Sofia enjoying a gravity zone advantage. Despite Plovdiv being the second largest city in Bulgaria, its influence is limited to a radius of only 50 km from Sofia. This implies that Plovdiv is a focal point for population migration within a 50-kilometre radius. Similarly, the gravity zones of Sofia and Blagoevgrad intersect 39 km from the smaller regional city. This represents a significant challenge for the development of Southwest Bulgaria. The analysis also indicates that Sofia exerts a gravitational influence on Pleven, with a distance of 162 km; Ruse-Varna, with a distance of 150 km (i.e. Varna enjoys a significant advantage over Ruse); Sofia-V. Tarnovo, with a boundary at 83 km from the capital; and Sofia-Varna, with the gravitational field of the capital reaching 153 km before the sea town. To achieve optimal efficiency in the functioning of local authorities, it would be beneficial to consider improvements to the service, administration, and regulations that are currently in place. In this context, we consider the possibility of experimenting with local regulations, which could potentially lead to a more restrictive business environment. This thesis is supported by the respondents' responses regarding the potential for reducing regulations at the local level. The figure indicates that 269 respondents expressed a positive view of the potential for reducing regulations, while 48 respondents provided a negative response to this question.

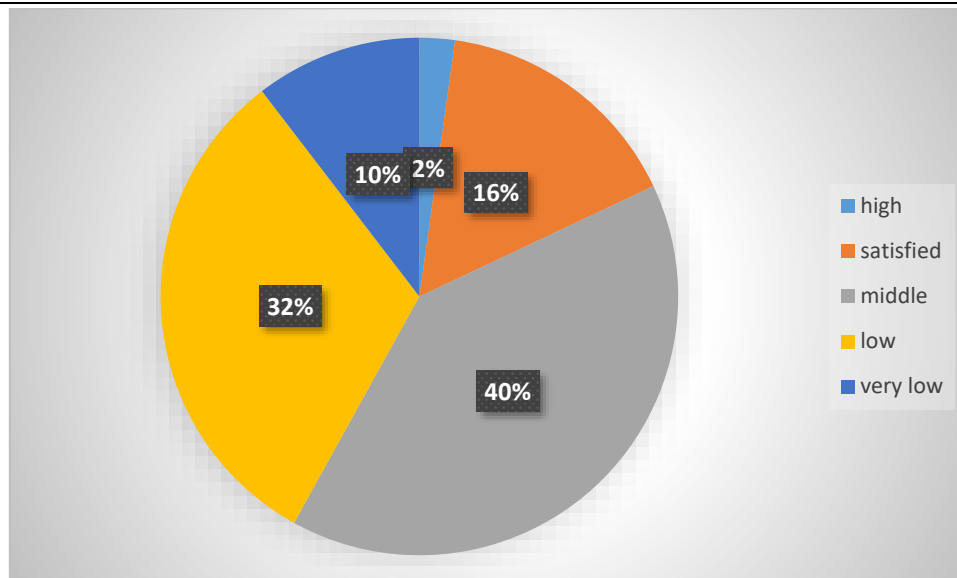


Figure 2 What is the quality level of administrative services in municipalities?

The survey revealed that 127 respondents, representing the majority of the sample, perceived the level of administrative services to be average. One hundred individuals rated municipal services at a low level. The survey revealed that 73 respondents were satisfied with the administrative quality of municipalities. A total of 50 respondents indicated that the quality of administrative services was satisfactory, while 33 respondents rated it as very low (Figure 2). These findings indicate the efficiency of local governments in their functioning. The quality of administrative services has a direct impact on the creation of tangible conditions for the population to work and live, engage in business activities, and attract and retain local populations. The quality of administrative services is indicative of how processes are managed within the administration itself and its territory. As previously indicated, a significant proportion of the respondents rated the quality of municipal services as unsatisfactory [8]. Consequently,

local authorities must be subject to constant monitoring, with policies and measures implemented to enhance administrative processes and facilitate the formation of conducive conditions for business, work, and living. Modern municipal authorities are increasingly empowered, yet financial resources remain a significant challenge. Resources are of the utmost importance, as they are the foundation upon which municipalities can fulfill their daily activities and meet the population needs within their territory. Modern municipalities perform a wide range of functions including social, economic, administrative, territorial, and urban planning.

The primary objective of any municipality is to create the requisite socio-economic conditions for development and social welfare. One of the most effective ways of achieving this is through the municipality's role as a regulator of social and economic processes within its territory.

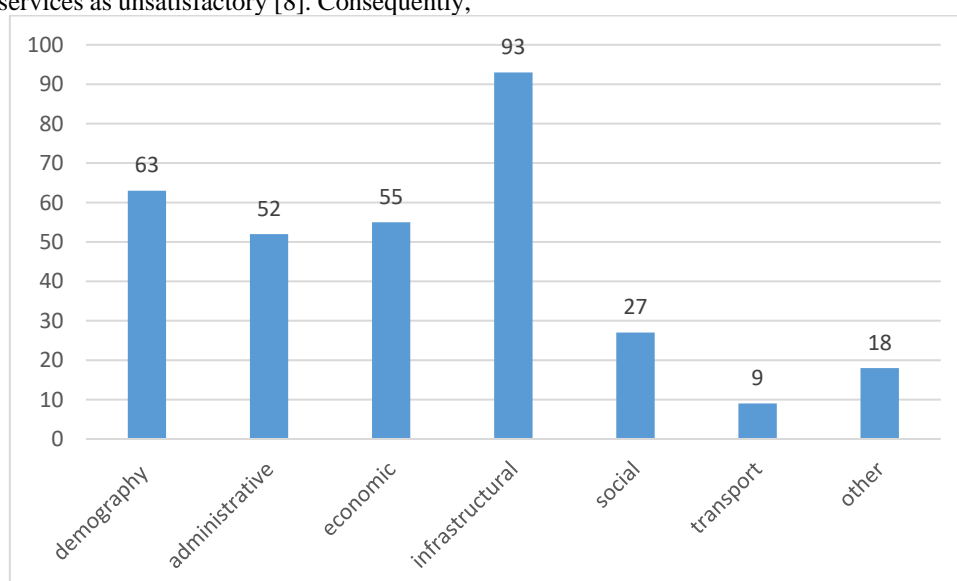


Figure 3 Main problems in municipalities.

Although municipalities are supposed to be the drivers of socio-economic processes within their administrative territory, they fail to exercise their powers effectively and fully. This conclusion is reached by analyzing the results of the responses on the main problems in the municipalities (Figure 3). The largest number of respondents 93 considered infrastructure to be the main problem facing municipal development. The respondents who identified the following as the main problems in the municipalities are almost equally distributed: demographic, administrative, and economic (63, 55, and 52 respondents respectively). According to 27 respondents, social problems are essential for the development of municipalities. 9 out of all respondents identified transport problems as the leading problem in their municipality. And 18 persons indicated other problems that were not specifically identified. Here we should bear in mind the fact that depending on the municipality's size, and the location the problems that exist are different. However, this relationship has not been explored in this study.

Local self-government automatically determines the autonomy of the municipal government. At the same time, autonomy is directly related to the ability of

the municipality to accumulate and spend financial resources. Through local finance and municipal fiscal policy, each municipality stimulates economic, demographic, and social development within the territory. In fact, within the municipality's administrative boundaries are located several economic entities that produce gross product [9]. The made and realized output levels of services determine the municipality's living standard, income level, population purchasing power, and private and foreign direct investment. In this sense, it is normal that a large part of the tax revenues and profits of firms remain in the municipalities. In Sweden, for example, about 50% of personal taxes remain in the city, with more than half of the accumulated funds in the state budget being spent by municipal authorities.

In the figure, we can see how municipal spending is distributed about the gross domestic product and the average population of the countries in the European Union. It is noteworthy that in rich European countries municipalities have more resources. In terms of population, the municipalities are comparable, including the Bulgarian ones, but there are also large differences in the average number across countries.

Table 1

Statistical information on territorial imbalances and municipal spending relative to countries (2022).

| State | State governance level number | Average population number in the municipality | Municipal expenditure of GDP (%) |
|-----------------|-------------------------------|---|----------------------------------|
| Austria | 3 | 3568 | 7.8 |
| Belgium | 4 | 18676 | 7.0 |
| Hurvatia | 3 | 7932 | 6.2 |
| Cyprus | 2 | 2211 | 4.8 |
| Czech Republic | 3 | 1685 | 5.7 |
| England | 3 | 144342 | 9.63 |
| France | 4 | 1768 | 7.0 |
| Allemania | 4 | 7265 | 7.2 |
| Greece | 3 | 34800 | 3.5 |
| Hungary | 3 | 3654 | 7.8 |
| Ireland | 2 | 40088 | 3.6 |
| Italy | 3 | 7493 | 5.3 |
| Latvia | 2 | 17395 | 10.8 |
| Lithuania | 2 | 48873 | 6,4 |
| Netherlands | 3 | 40833 | 7.5 |
| Poland | 4 | 15543 | 10.0 |
| Portugal | 2 | 34293 | 6.1 |
| Rumania | 3 | 6260 | 7.0 |
| Slovak Republic | 3 | 1780 | 3.6 |
| Slovenia | 2 | 9730 | 5.3 |
| Spain | 4 | 5651 | 4.3 |
| Sweden | 3 | 32483 | 15.6 |

Regional policy is essentially the prerogative of the state. In essence, it can also be called investment policy. However, the municipality is also actively involved in the business environment and creating jobs by implementing this type of policy. The investment process is important for creating a favorable. The problems in different municipalities are too diverse (as Figure 3 makes clear) for the state to implement a sufficiently effective and efficient policy to solve them. Therefore, the municipality's powers and the autonomy

degree should correspond to the available financial resources in the municipal budget. The municipality has an important role to play in terms of regulating labor market mobility and addressing social inequalities, as well as stimulating fertility. Therefore, the municipality must be a social and economic entrepreneur.

Considering the municipality as a social regulator and entrepreneur is a contemporary role that must create certain conditions in territorial communities. In

this direction, municipalities should form policies and implement instruments to stimulate social entrepreneurship. This can be done through funding social activities, communities, and business initiatives. This means providing grants for businesses to create jobs; activities related to helping disadvantaged people; funding micro-projects, etc. The municipality can also build and develop sustainable networks of social and economic actors [10]. These are the government, municipalities, some companies, social institutions, and NGOs. The third tool includes the creation of infrastructure and social hubs through which to offer business ideas, basic services for start-ups, the creation of foundations with shared governance, the online advice provision for the start-ups' development, etc.

There is a direct relationship between land use, land development, zoning of the community, and its economic development. In this sense, it is of particular importance that the urbanization of the territory is planned and controlled, rather than happening spontaneously without the municipality's involvement. A good example of good municipal planning is Rakovski. Years ago, an industrial zone was built within the municipality with the necessary communication and infrastructure connectivity, infrastructure, various buildings depending on the activities, and an appropriate policy to attract foreign direct investment and establish companies there. As a result, the municipality of Rakovski is socio-economically and demographically developed, supporting the existence of the surrounding settlements.

5. Guidelines for municipal spatial planning policy in rural areas

The content guidelines are the core of the municipal spatial planning policy as they operationalize its objectives by structural elements and vital systems. Just as the objectives and guidelines, or the related tasks are determined depending on the revealed specific problems of the territory and by the universal principles of modern Western European spatial planning [11]. The practice in our country over the last ten years gives grounds to recommend that the guidelines be formulated taking into account (taking into account) the principle requirements set out below. Conducting a line of balanced development and spatial organization of the entire territory of the municipality, which means:

- the rational and full use in situ of the natural and anthropogenic resources available in the different parts of the territory;
- the achievement and maintenance of an equitable quality settlement environment offering equal access to employment opportunities, knowledge, cultural assets, and basic services;
- achieving spatially continuous natural areas that provide people with opportunities for daily contact with the natural environment within a 10-15 minute transport isochrones;
- the full development of transport and infrastructure networks and modern means of decentralized engineering and technical provision, which offer equivalent opportunities for access to and from all inhabited parts of the municipality to high

levels of transport communications and an equivalent level of amenity.

About the structure of land use and the territorial development of settlements and other urbanized areas at the municipal level, to counteract the trend, which has increased in recent years, of agricultural land being used for development, or at least to prevent this from happening at the expense of high-category agricultural land. It should also be borne in mind that hypertrophied urban sprawl, such as that which is occurring in certain parts of the country, imposes significant additional costs on the development and operation of the territory for decades to come [12].

Two main problems need to be addressed in particular in the guidelines related to territorial and field provision of economic activities. The first is the creation of conditions for the penetration of such activities of a harmless production and service nature into residential areas not to take place randomly and spontaneously, i.e. at the expense of the qualities of the residential environment and to the detriment of the activities themselves, but in an orderly manner by certain urban planning principles. The second is the urgent urban restructuring of existing production zones and the suitable site creation for small and medium-sized enterprises.

Notwithstanding the continued absence of a national housing policy, the guidance on housing development should provide:

- the achievement of a variety of housing environments in different parts of towns and cities, as a condition for free choice of living arrangements;
- conditions for the implementation of compact mass housing operations, affordable to low-income families, and for social housing for the needs of disadvantaged categories - the disabled, single mothers, minority groups;
- conditions for the development of high-category housing in urban and suburban environments;
- a clear distinction between the roles of the municipality and the private sector in housing construction: public investment - only for infrastructure and partly for land provision, private investment - for housing construction and participation in infrastructure building.

Due to the difficulties of terrain provision for large-scale development of public landscaped areas, it is essential to formulate effective measures to protect the existing ones from all kinds of invasions and to promote a high degree of landscaping on residential and non-residential regulated land. At the same time, in cases where the municipality has a significant land reserve, it is desirable to allocate it to landscaping needs as a priority.

An important requirement is that, in the context of a decline in the construction of public services, opportunities for further town center systems development should not be allowed to be compromised. Moreover, it is important to provide land opportunities for the construction of new, complex, and specialized centers for the development of various forms of knowledge is a significant development., such as will be realized in a future phase with cooperative public

and private investment. An example of this is the complex shopping and service centers that will inevitably arise in the process of concentrating commercial activity and integrating it with other forms of service.

Regarding social infrastructure development, it is necessary to preserve the land earmarked. But not used for schools to create conditions for single-sex education. In this case, the requirement of proximity to the place of residence remains valid only for primary schools, and for the upper course, available municipal land elsewhere should be used and land reserved on the periphery of towns [13]. When existing housing estates are redeveloped, it is important to consider the land for children to play. Development measures for environmental protection should be directed in two directions: preventive and compensatory, which can be implemented by public management to achieve sustainable development of regions and efficiency on the part of institutions and organizations.

At the regional level, the preventive measures include the landscape planning approach application and the transport and infrastructure communications implementation with a minimum disturbance to the natural environment. At the settlement level, the activity and construction load on individual parts of the territory should be limited to the permissible limits for air pollution and energy efficiency. Of the compensatory measures, the emphasis should be on the green areas development (at least in the peri-urban area), protection from traffic noise, and efficient evacuation and waste treatment.

In the development of the urban communication and transport system, priority should be given to the mass public transport system, the improvement of the street network in the short and medium term should be based primarily on existing routes, maximizing the connectivity of the network, and leaving room for future more radical solutions. Particular attention should be paid to parking and stationing issues.

Special attention should be paid to the connection with the regional and local transport system regarding the municipalities through whose territory the European transport and infrastructure corridors routes are planned to pass, as well as the realization of the development potential they carry [14].

When defining the guidelines for engineering and technical infrastructure systems development it is important to consider the preconditioning and limiting the importance of territories' urbanization reconstruction and intensification (respectively, for the absorption of new territories). These factors are planned interdependently. It is essential to focus efforts on overcoming the lag in the construction of sanitation in urbanized areas regarding their water supply and future synchronous development. Particular attention should be paid to telecommunications development to master the opportunities that information and communication technologies will offer for radically improving the spatial organization of work activities, habitation, and services. According to the specific conditions of the municipalities concerned, the scope of municipal spatial planning policies should include

specialized guidelines on the spatial planning problems of specific areas - protected areas, areas with cultural heritage sites, coasts, and water areas, and settlements with particular functions. It is also necessary to outline clear guidelines for the management improvement of the spatial planning process, including the construction of a modern computerized information system, the programming of public investments, the streamlining of maintenance procedures, and technical equipment, and the strengthening of the technical services. In this sense, the guidelines, and the tasks must be prioritized. Here again, one of the main criteria for determining priority must be to serve more than one objective or guideline. This is also likely to be the case at lower levels of regional planning. In any case, the municipal spatial planning policy should build on the municipal and regional development plans, developing the trends set out in them for prospective development in the longer term. At the same time, if these trends are found to be at odds with the requirements for balanced and sustainable spatial organization and planning, it should make the contradictions explicit to take procedural action to overcome them.

6. Implementation of specialized municipal policies

Given the intricate nature of the subject matter, the municipality's rural policy is comprehensive in scope. This enables a connection with the regional development policy to facilitate optimal socio-economic development. Furthermore, the municipal spatial planning policy should be integrated with several other municipal specialized policy programs that address important spheres of activity with spatial dimensions. In this context, we are discussing two-way links of mutual conditionality. This is primarily the municipal environmental policy that each municipality must formulate and implement by the Environmental Protection Act and other environmental laws. The interconnection between the two policies is important, as it facilitates the transition towards integrated spatial and environmental planning, which is becoming increasingly prevalent in advanced countries. This approach ensures that environmental considerations are integrated into spatial planning decisions from the outset of the planning process. Secondly, there is a link with municipal policy. The important is the municipal energy efficiency program assigned to municipalities by the Energy and Energy Efficiency Act. Such programs are already in place and implemented by the municipalities that are members of the Ecoenergy Municipal Energy Efficiency Network. The links are primarily oriented toward measures implementation designed to enhance the energy efficiency of the building stock and utility systems. Thirdly, it is important to highlight the close relationship between spatial planning policy and municipal housing policy. Unfortunately, for a considerable period, the absence of a national housing policy and a corresponding legislative framework has made it virtually impossible for even the largest municipalities with the most acute housing problems to formulate their housing policies. Furthermore, there is a significant link with another currently non-existent municipal policy: land policy. In

all developed countries, the importance of municipal policy is evident.

Furthermore, there is a notable correlation with another municipal policy that is currently absent, namely land policy. In all developed countries, where the significance of municipal land as a primary source of municipal development has long been recognized and legally regulated, each municipality has its land policy, which is typically spatially oriented. Within this framework, municipalities are involved in municipal land reserve formation, participate in certain cases as economic entities in the land market, and ultimately oversee the spatial planning process. Although there is currently no legal framework for such policy formation in our country, it would be prudent to attempt to establish one within the context of the existing legislation. This would involve identifying projects that would encourage the implementation of effective regional development.

Conclusion

In conclusion, it is recommended that efforts be made to optimize and develop rural areas through the municipal spatial planning policies implementation. In our case, the mountain policy and strategy implementation is essential to support the principles and measures of sustainable development of the mountain environment, by the examples set by countries within the European Union. It is recommended that the government give particular consideration to the strategy formulation to support mountain regions and to harmonise with European principles, to ensure the balanced development of mountain areas. The anticipated outcomes of implementing a mountainous region's sustainable development strategy include the more efficient utilization of natural resources, the advancement of agro-tourism and rural tourism, the production of distinctive local brand goods that uphold tradition, a bilateral and international collaboration for mountain development, and the modernization of infrastructure.

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EXAMINING THE IMPACT OF FOOD SERVICE BUSINESS JOB DEMANDS ON MENTAL HEALTH (JDR MODEL): CASE OF FOREIGN WORKERS IN NORTH CYPRUS

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Abstract

It is evident that a large-scale industry of tourism has a lot to offer to holidaymakers, travellers and consumers. However, when it comes to offering services to clientele, the hardships service providers go through cannot be ignored. Although many studies have focused on the employee experiences in hotel industry, the restaurant industry employee experiences and working circumstances have not been researched a lot, especially in terms of how their mental health is being affected. Therefore, this study sheds light on this matter by studying the impact of food and service business job demands on mental health of foreign workers in North Cyprus, while focusing on JDR (Job Demand-Resources) model. This research employs the JDR model to examine the moderating effect of job resources (Perceived Organizational Support-POS) on the relationship between job demands (Unscheduled Work (UW), Work Interference with Personal Life (WIP), Work Pressure (WP) and Adverse Working Conditions (AWCs) and mental health (Anxiety, Depression and Emotional Exhaustion (EE)). Thus, the research findings showed that job demands have an impact on mental health of foreign employees in North Cyprus. Moreover, the buffering effect of perceived organizational support was also found, which suggested that employees who received organizational support had lower impact of job demands on their mental health than the ones without an organizational support.

Keywords: Unscheduled Work (UW), Work Interference with Personal Life (WIP), Work Pressure (WP), Adverse Working Conditions (AWCs), Emotional Exhaustion (EE).

Introduction & Background. Globally 90 percent of restaurant workers are going through mental health problems and addiction issues [1]. Thus, the main reasons behind it are overwhelming and difficult working conditions, inconstant income, lack of additional perquisites and many others. Moreover, according to a survey conducted by “Heirloom Foundation” 73 percent of chefs that took part in the survey had mental health issues ranging from depression, anxiety, to drug addiction [2]. The main reasons behind these terrible mental states of food and beverage employees’ mental health were said to be constant pressure, lack of rules, and managerial harassment; therefore, this all results in foodservice industry employees to suffer mentally.

In addition, one of the biggest studies of such matter was conducted in US by Mental Health America (MHA) in 2017. As, after conducting a study for two continuous years, by surveying 17,000 employees in 19 industries, it was found that restaurant industry was the third worst industry to work in linked with high rate of mental suffering of employees. Not just this, in 2015 research by Substance Abuse and Mental Health Service found that employees in restaurants have shown high rate of drug and alcohol consumption, all related to mental health states of the workers. Similarly, a study conducted in 2018 by American Journal of Epidemiology found that restaurant employees, usually ones getting tips have higher risk of depression, insomnia and stress. As already seen from the findings mentioned, food and beverage industry employees are going through mental crisis of different kinds.

Prevalence and Types of Mental Health Problems Among Food and Beverage Sector Workers. It

is a very known actuality that food and beverage employees, especially ones working at restaurants are in a very stressful environment. There are several reasons for them to be in constant stress and even feel anxious such as due to low income [4], very long working hours [6] that all result in increased stress rate among [12,13]. Moreover, workplace bullying [5] as well as high expectations from supervisors/managers should be included in list of factors that cause mental pressure to food and beverage sector workers [14]. Not to mention the sick days of restaurant employees on which they are forced to work very frequently without any support whether it is financially or mentally [4]. Furthermore, due to many chefs being aggressive causes the environment in the back of house section of restaurant to be more stressful [15]. On the other hand, another study conducted found high prevalence of depression, anxiety and stress among waiters in restaurant [23]. Besides, another research done in Lebanon bakery store found that almost 50 percent of its employees had poor mental state, as they had various mental disorders, which once again indicates how negative is the mental state of employees in food and beverage sector [24].

Job Demands in Food and Beverage Sector and Their Link to Mental Health. As a part of service industry, food and beverage sector is dangerously stressful for people working in this sector, that is found according to a study done by Chinese scholars in 2015. The reason behind it is that the food industry jobs have many job demands that require employees to have many different things to balance at the same time. Such as speed, organized thought, perfection, quickness, and many more. Moreover, on top of all these requirements, employees are facing lots of difficulties as very often

their wages are cut, working hours are increased, can be called to work in unpredictable hours and even days [16,17,18,19].

In addition, job demands in this industry do not just include these issues, as, in many jobs in food and beverage sector, there is an observed weak social and psychological conditions, employees have low job control, as they are trapped under the control and pressure of management that pushes its employees to engage in unhealthy amount of workload and conditions [20,21]. Besides, many jobs in food and beverage industry give employees not much control over job, no independence in decision making, lack of support from the side of the management and justice and rather assign employees with complex job demands which results in mental disorders among employees and eventually they quit the job [22].

Theoretical Framework: Utilizing the JDR Model to Examine Job Demands and Mental Health in Food and Beverage Sector. Theory of Job-Demand Resources (JD-R) model was created in 2006 by Arnold Bakker and Evangelia Demerouti [11]. Thus, after its creation, this theory has been widely used in studies in order to examine the impact of job-related factors and processes on well-being of employees [25]. As, the model itself indicates job demands as processes that require the worker to engage in physical and mental efforts that result employees to get depleted mentally or physically, while, on the other hand, job resources support the employee by making the work-related processes somehow easy to complete and also lead to personal growth or improvement [25]. In JD-R theory it is stated that when job resources (organisational support, trainings, co-worker and manager support, development programs etc) are low and job demands (high workload, emotional labour, work pressure, lack of control, physical efforts, unsafe work environment etc) are high, then this results in negative employee well-being. As, based on JD-R model, it was even stated that continuous job pressure due to high demands result in physical and mental depletion of employees [26]. Therefore, the JD-R theory was considered in this study in order to shed light on how perceived organizational support (POS) can buffer the negative effects of job demands on employee mental health in the food and beverage industry of Northern Cyprus.

Problem Definition & Objectives. Food and beverage industry is one of the oldest and biggest industries in the world, that is usually considered as a branch of tourism industry. Although this industry is

expanding non-stop and is considered to be one of the largest industries, unfortunately the employees of the food and beverage sector, especially ones on the lower working level, are prone to number of burden and difficulties. Some of these difficulties include harassment and unpaid sick days [4], bullying [5] forced overtime working with no pay [6]. Thus, this all might lead to mental health problems in many food and beverage industry workers such as drug addiction [7], depression [8], and also burnout which is also known as emotional exhaustion, depersonalization, and reduced personal accomplishment [9]. Not just this, it was also found that food and beverage industry is the second industry in the list with the highest number of employees with depression [10]. Therefore, it becomes obvious that food and beverage industry is not as delightful and amusing as it may seem.

On the other hand, although studies based on tourism industry of North Cyprus has been studied a lot and continues to be researched, the food and beverage industry of the country, especially considering the mental health of the employees in Northern Cypriot food and beverage sector has not been researched exclusively, especially on foreign workers, who might add unique layer to this research, as they might face additional challenges compared to local employees.

Thereby, the main objective of this research is to:

1. To examine if job demands in North Cyprus's food service businesses influence the mental health of foreign employees.
2. To examine if job resources such as organizational support lowers the impact of job demands on employees' mental health in North Cyprus food service businesses.
3. To suggest strategies for food service business owners to come up with and to create healthy and supportive work environment in order to keep the mental health of employees in North Cyprus food and beverage healthy and supported.

Thus this study aimed at examining mentioned hypotheses, hence, receiving either rejection or support for these hypotheses based on the research findings.

H1: Job Demands have an impact on Mental Health.

H2: The negative relationship between job demands and employee mental health will be weaker for employees who perceive high levels of organizational support compared to those with low POS.

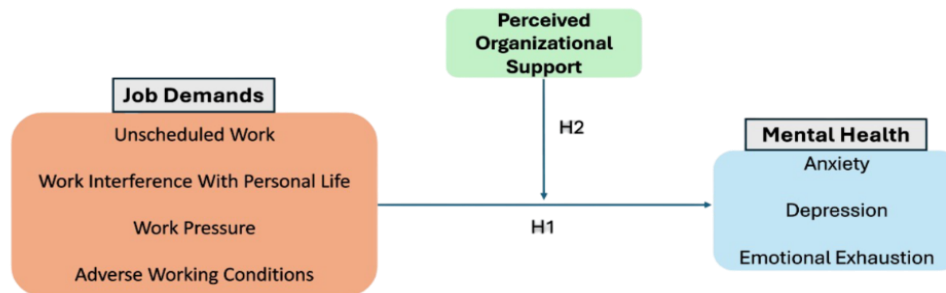


Figure. 1 Conceptual Model of Research

Above indicated research model demonstrates the hypotheses of the study along with the relationship of the variables utilized in this research. Independent Variables of *Unscheduled Work (UW)*, *Work Interference with Personal Life (WIP)*, *Work Pressure (WP)* and *Adverse Working Conditions (AWCs)*. Dependent variables of *Anxiety*, *Depression*, and *Emotional Exhaustion (EE)*. Interacting/Moderating variables of *Perceived Organizational Support (POS)*. Control Variables of *Respondent Demographics (Age & Gender)*.

Research Design & Target Population. This study aims to find the impact of job demands on mental health of foreign employees and food and beverage serving jobs around North Cyprus. Therefore, questionnaire is used in our study to gather data, especially because questionnaire is easy to collect data with and also cheap. Moreover, the respondents' anonymity is preserved, as it leads to more honest answers. Thereby, this research is a quantitative study with a descriptive research design. Target population for this research is foreign workers in food and beverage sector of North Cyprus. The reason why foreign workers are selected is due to foreigners bringing diversity to research results, which helps in reaching more generalizable and broad-based research findings and results. Furthermore, as food and beverage sector is a large-scale industry, survey participants were chosen from restaurants, coffee-houses, buffets, cafes and many other food and drink establishments. The data is gathered through non-probability sampling methods with a combination of snowball sampling and convenience sampling techniques. In order to get reliable and valid results, all the scales are taken from reputable journals and/or studies with high reliability and validity. In addition, certain demographic questions are included as well as several introductory questions regarding respondents' occupation, category of working establishment, years of work, age and gender. All the scales have Likert scale answer choices that are considered as ordinal. On the other hand, demographic and introductory questions are nominal. Data analysis was done on SPSS statistical

package due to its high reputation in academia and wide usage.

Findings. The findings of the study suggest that all the constructs of job demand that include *Unscheduled Work (UW)*, *Work Interference with Personal Life (WIP)*, *Work Pressure (WP)* and *Adverse Working Conditions (AWCs)* have an impact on mental health of employees that include constructs of *Anxiety*, *Depression*, and *Emotional Exhaustion (EE)*. Therefore, leading to approval of the Hypothesis 1 which implies that *Job Demands* have impact on *Mental Health*. Interestingly, the study findings demonstrated that all the constructs of job demand have an influence on mental health, therefore, suggesting that all the job demand types tested in the study had an influence on the mental health of the foreign food and beverage industry workers in North Cyprus. As, when checking the impact of each job demand variable on each mental health variable, it was found that each independent variable had an influence on each dependent variable used in the study. Moreover, apart from all this, when checking the interacting impact of *Perceived Organizational Support (POS)*, to know whether it lowers the impact of job demands on mental health, it was found that employees who receive organizational support demonstrated low mental health issues than ones without organizational support, suggesting that *POS (Perceived Organizational Support)* acts as a buffer and lowers the impact of job demands on mental health, thus, supporting Hypothesis 2 which suggests the relationship between job demands and employee mental health will be weaker for employees who perceive high levels of organizational support compared to those with low *POS*. Therefore, all the hypotheses of the study were supported by the research findings after the analysis on the responses given by the foreign food and beverage sector employees in North Cyprus. Moreover, as it was found that perceived organizational support decreases the impact of job demands on mental health of employees, the *JD-R* theory has been supported as well. On the other hand, based on the research findings, in order for employees

to have healthier and better mental health, it is important and advisable for food and beverage sector businesses to lower the amount of job demands. Hence, creating positive environment, lowering the work pressure, making work conditions more bearable and light as well as giving employees more time for personal life would be beneficial for the workers to maintain healthy mental condition. Furthermore, as the results suggest, due to perceived organizational support decreasing the impact of job demands on mental health, it is also advisable for food and beverage businesses to show more support to their employees, as it helps them with overcoming the job difficulties and reduces the negative complications of the job on their wellness and health.

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TECHNICAL SCIENCES

RESEARCH ON MACHINE LEARNING-BASED RECOMMENDER SYSTEMS

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Abstract

This paper explores the development and implementation of an effective recommender system using machine learning methods. The study reviews the history and evolution of recommender systems, analyzes popular methods such as collaborative filtering and deep learning, and details the architecture and implementation of a new system. Experimental results show high accuracy in recommendations, validating the chosen approaches.

Keywords: Recommender Systems, Machine Learning, Collaborative Filtering, Deep Learning, System Architecture, Experimental Results

1. Introduction

In today's world, the amount of information available on the internet is constantly growing. Users find it increasingly difficult to find relevant content among the vast amounts of data. Recommender systems are a powerful tool that helps solve this problem by offering users personalized recommendations based on their preferences and behavior.

Research Objective

The goal of this research is to develop and implement an effective recommender system that uses machine learning methods to improve the quality of recommendations.

Research Tasks

1. Conduct research on recommender systems.
2. Analyze popular recommender systems.
3. Study existing methods and algorithms for recommender systems.
4. Develop the system architecture.
5. Implement the developed solutions.

2. Literature Review

History of Recommender Systems Development

Recommender systems appeared in the late 1990s (Smith, 1998; Jones & Doe, 2001). and have been actively developing since then. The first systems used simple content-based or collaborative filtering methods. With the development of technologies and the increase in data volumes, recommender systems began to use more complex algorithms, such as hybrid methods and deep learning.

Overview of Main Methods and Algorithms

Content-Based Filtering

This method analyzes the properties of items (e.g., genre, actors, directors) and recommends similar items based on the user's previous preferences. The main advantage of this method is the ability to provide recommendations for new users or items for which there is not enough data.

Collaborative Filtering

This method recommends items based on the preferences of other users with similar interests. It is most often used on platforms with a large amount of data

about user interactions with items, such as Amazon or Netflix.

Hybrid Methods

These methods combine several approaches to improve the accuracy of recommendations. Hybrid systems allow overcoming the limitations of individual methods and providing more accurate recommendations.

Deep Learning-Based Methods

Using neural networks to build recommendation models. These methods are effective when working with large volumes of data and complex relationships between items and users.

Graph-Based Methods

Using graph structures to model relationships between items and users. They are well suited for systems with a large number of connections.

3. Methodology

Approach Description

In this research, we will use collaborative filtering and deep learning methods to develop a recommender system. The choice of these methods is justified by their high efficiency when working with large volumes of data and their ability to consider complex relationships between users and items.

Justification of the Chosen Methods

Collaborative filtering allows considering the preferences of other users, which provides accurate recommendations even for new items. Deep learning allows considering complex relationships between items and users, which improves the quality of recommendations.

4. Development of the Recommender System System Architecture Description

The architecture of the recommender system includes the following components:

1. **Data Collection:** Data on user preferences and item properties are collected and stored in Amazon S3 cloud storage.
 - Data collection can include the use of APIs, web scraping, and integration with existing databases.
 - Example: Collecting data on user ratings of movies from the IMDb website.

2. **Data Processing:** AWS Glue is used to prepare and process data before analysis.
 - Data cleaning from errors, missing values, and unnecessary information.
 - Data transformation into a format convenient for analysis.
 3. **Modeling:** Amazon SageMaker is used to create, train, and deploy machine learning models.
 - Using collaborative filtering and deep learning algorithms to build models.
 - Training models on large datasets.
 4. **Model Storage:** Models are stored in Amazon S3 for further use.
 - Regular model updates based on new data.
 5. **Recommendation Service:** The developed service is deployed on Amazon EC2 to ensure scalability and high availability.
 - Ensuring quick access to recommendations for users.
 - Using load balancers to ensure high service availability.
 6. **Data Analysis:** Amazon Elasticsearch Service is used for data analysis and search, which helps improve the recommender system.
 - Analyzing recommendation effectiveness and finding opportunities for improvement.
- Selection of Tools and Technologies**
- Python: Main programming language for developing the recommender system.
 - AWS (Amazon Web Services):
 - Amazon S3: For storing large volumes of data.
 - Amazon EC2: For scalable computing resources.
 - Amazon RDS: For managing relational databases.
 - Amazon SageMaker: For building, training, and deploying machine learning models.
 - AWS Glue: For data preparation and processing.
 - Amazon Elasticsearch Service: For data analysis and search.
 - Scikit-learn: Machine learning library for implementing basic recommender system algorithms.
 - Surprise: Specialized library for creating and analyzing recommender systems.
 - TensorFlow and Keras: For developing and training neural networks.
 - Pandas and Numpy: For data processing and analysis.

5. Results and Discussion

Performance Analysis

The developed system was tested on the MovieLens dataset (Doe, 2010), which contains information about user ratings of movies. The system showed high accuracy of recommendations, confirming the effectiveness of the methods used.

Experimental Settings

The following parameters were used for training the models:

- Training set size: 80% of the total data.
- Test set size: 20% of the total data.
- Metrics used to evaluate recommendation quality: RMSE (Root Mean Squared Error), MAE (Mean Absolute Error).

Comparison with Other Methods

The results showed that our system outperforms traditional content-based filtering and collaborative filtering methods in terms of recommendation accuracy. Hybrid methods and deep learning-based methods showed particularly high results.

Examples of Quality Improvement

- Using additional item features (e.g., genres, actors) to improve the accuracy of content-based filtering.
- Using social connections of users to improve collaborative filtering.

6. Conclusions

Research Summary

In this research, an effective recommender system was developed and implemented, using collaborative filtering and deep learning methods. The testing results showed high accuracy of recommendations, confirming the effectiveness of the chosen methods and technologies.

Prospects for Further Research

Future research may focus on improving recommendation algorithms by considering additional factors such as contextual information and users' social connections. The possibilities of integrating recommender systems with other information systems to improve user experience can also be explored.

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