NJD-iScience

№130

The Norwegian Journal of Development of the International Science

№130/2024

Norwegian Journal of development of the International Science

ISSN 3453-9875

It was established in November 2016 with support from the Norwegian Academy of Science.

DESCRIPTION

The Norwegian Journal of Development of the International Science, established in 2016 with support from the Norwegian Academy of Science, offers a platform for global researchers, academics, and students. Publishing 24 times annually, it covers current science topics. Submitting your article provides exposure to a diverse audience, enhancing your career. Our commitment to research and SEO ensures timely visibility. Submit to the Norwegian Journal of Development of the International Science today and join esteemed authors.

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Norwegian Journal of development of the International Science

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CHEMICAL CLASSIFICATION OF PESTICIDES

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PESTİSİDLƏRİN KİMYƏVİ TƏSNİFATI

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https://doi.org/10.5281/zenodo.10974875

Abstract

Pesticides are substances or mixtures of substances that differ from each other in terms of their physical, chemical and other properties. Hence, they are divided into different classifications based on these characteristics. Some pesticides are also divided into different classes depending on these reasons. Currently, widely used pesticides are divided into three main classifications - according to the function of the pesticide, the pest organism it kills, and the chemical composition of the pesticide. Based on the toxicity of pesticides, the World Health Organization divides them into four classes: extremely dangerous, highly dangerous, moderately dangerous and less dangerous. Improper application of pesticides can seriously damage living organisms and the environment. Most pesticides do not differentiate between pests and other similar random life forms and kill them all.

Xülasə

Pestisidlər fiziki, kimyəvi və digər xüsusiyyətlərinə görə bir-birindən fərqlənən maddə və ya maddələrin qarışığıdır. Beləliklə, onlar bu xüsusiyyətlərə görə müxtəlif təsnifatlara bölünürlər. Bəzi pestisidlər də bu səbəblərdən asılı olaraq müxtəlif siniflərə bölünür. Hal-hazırda geniş istifadə olunan pestisidlərin üç ən əsas təsnifata – pestisidin funksiyasına, öldürdüyü zərərverici orqanizmə və pestisidin kimyəvi tərkibinə görə bölünür. Ümumdünya Səhiyyə Təşkilatı pestisidlərin toksikliyinə əsaslanaraq, onları dörd sinifə ayırır: son dərəcə təhlükəli, yüksək təhlükəli, orta dərəcədə təhlükəli və az təhlükəli. Pestisidlərin düzgün tətbiq edilməməsi canlı orqanizmlərə və ətraf mühitə ciddi zərər vura bilər. Əksər pestisidlər zərərvericiləri və digər oxşar təsadüfi həyat formaları arasında fərq qoymur və onların hamısını öldürür.

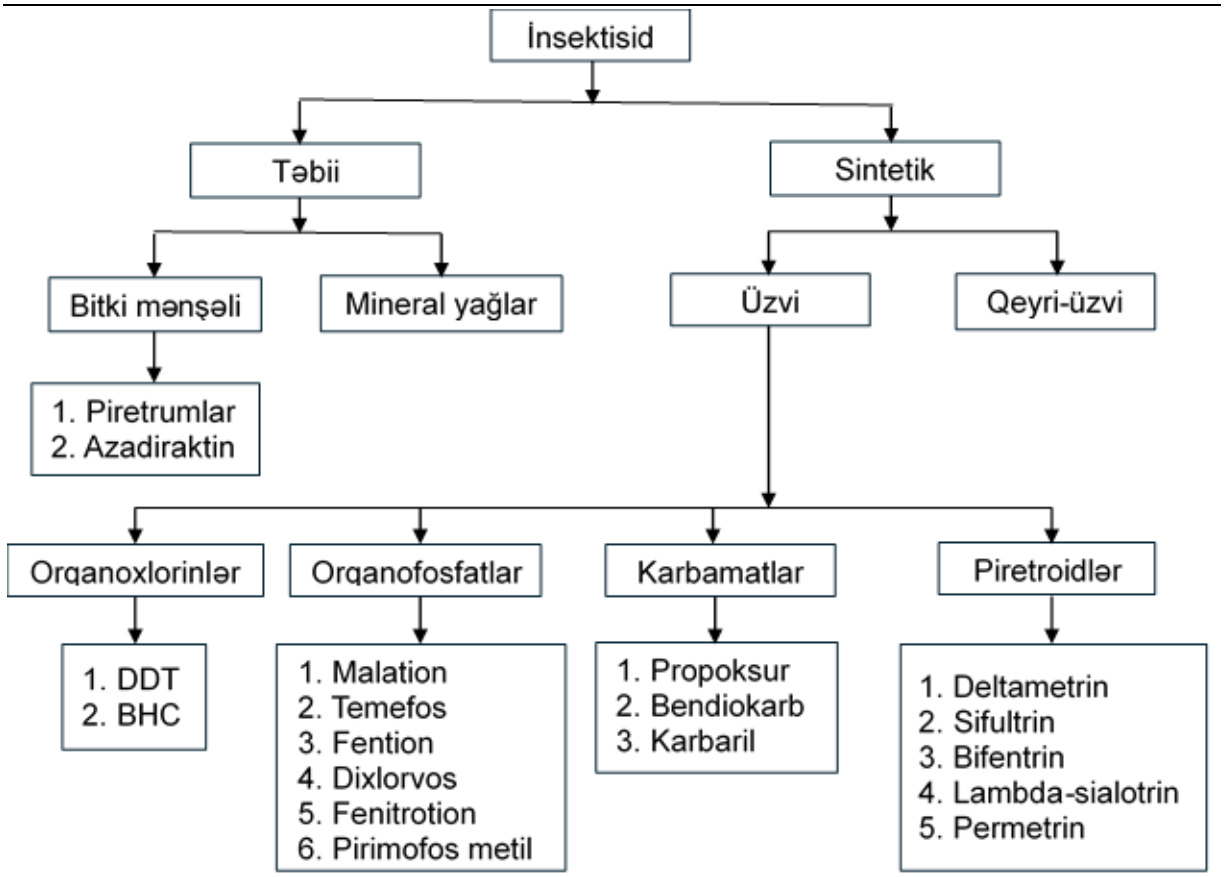
Keywords: pesticide, pest, insecticide, organic matter, classification.
Açar sözlər: pestisid, zərərverici, insektisid, üzvi maddə, təsnifat.

Giriş. Zərərverici həşəratlara təsir göstərməsinə görə insektisidləri şərti olaraq üç qrupa bölürlər: kontakt insektisidlər, bağırsaq insektisidləri və fumiqantlar. Kontakt insektisidlər toxunma (kontakt) nəticəsində təsir göstərir – həşəratın dəri örtüyünə düşərək onun dərisindən orqanizminə keçir və onu zəhərləyir.

Kontakt insektisidlər qrupunda həmçinin bitkiyə daxildən təsir göstərən insektisidlərdə nəzərdə tutulur. Bu insektisidlər biktinin üzərinə düşdüyü zaman sürətlə bitkinin boru sistemində yayılmaq və hüceyrə şirəsini uzun müddət ərzində sorucu həşəratlar və gənələr üçün zəhərli halda saxlamaq qabiliyyətinə malikdir.

Kontkat insektisidlərə üzvi birləşmələr: sintetik preparatlar, sabunlar, mineral yağlar, bitki zəhərləri; qeyri-üzvi birləşmələrdən: qələvilər, kükürd və onun törəmələri aiddir.(1)

Pestisidləri təsnif etməyin ən ümumi və faydalı üsulu onların kimyəvi tərkibinə və aktiv maddələrin təbiətinə əsaslanır. Məhz bu cür təsnifat müvafiq pestisidlərin effektivliyi, fiziki və kimyəvi xassələri haqqında məlumat verir. Pestisidlərin kimyəvi və fiziki xüsusiyyətlərinə dair məlumatlar tətbiq üsulunun, tətbiq zamanı görülməli olan ehtiyat tədbirlərinin və tətbiq nisbətlərinin müəyyən edilməsində çox faydalıdır. Kimyəvi tərkibinə görə pestisidlər dörd əsas qrupa bölünür: üzvi xlor tərkibli, üzvi fosfor tərkibli, karbamatlar və piretrin və piretroidlər. Pestisidlərin kimyəvi əsaslı təsnifatı olduqca mürəkkəbdir. Ümumiyyətlə, müasir pestisidlər üzvi maddələrdir. Bunlara həm sintetik, həm də bitki mənşəli pestisidlər daxildir. Bununla belə, bəzi qeyri-üzvi birləşmələr də pestisidlər kimi istifadə olunur. İnsektisidlər vacib pestisidlərdir və onları bir neçə alt sinifə bölmək olar. İnsektisidlərin alt təsnifatı şəkil 1-də verilmişdir. (3)



Şəkil 1. *İnsektisidlərin təsnifatı*

Pestisidlərin aşağıdakı nomenklaturasında yalnız məhdud sayda kimyəvi növlər göstərilir. Əksəriyyəti müəyyən mənada əhəmiyyət kəsb edir, onların ümumi bir antidotu ola bilər və ya nomenklaturada digər kimyəvi növlərlə qarışdırıla bilər, məsələn, tiokarbamatlar xolinesterazanın inhibitorları deyil və karbamatlarla eyni təsirə də malik deyillər. Bu cür kimyəvi tip həm də BMT-nin nömrələmə sisteminin müəyyənedicisidir. Bu kimyəvi təsnifatlar yalnız rahatlıq üçün daxil edilmişdir və pestisidlərin təsnif edilmə üsulu ilə bağlı Ümumdünya Səhiyyə Təşkilatının tövsiyəsi deyil. Bundan əlavə, bəzi pestisidlərin birdən çox növə aid edilə biləcəyini də başa düşmək lazımdır. (4)

AS Arsenic compound
BP Bipyridylium derivative
C Carbamate
CO Coumarin derivative
CU Copper compound
HG Mercury compound
NP Nitrophenol derivative
OC Organochlorine compound
OP Organophosphorus compound
OT Organotin compound
PAA Phenoxyacetic acid derivative
PZ Pyrazole
PY Pyrethroid
T Triazine derivative
TC Thiocarbamate

Zərərvericilərə Nəzarət Tənzimləmə Agentliyi (PMRA – The Pest Management Regulatory Agency) funqisidlər, herbisidlər və insektisidlər (həmçinin mitisidlər) üçün onların əsas təsiretmə xassələrinə görə ədədi təsnifat sistemini qəbul etmişdir. Bütün pestisid məhsullarının etiketində qrup nömrəsi (hərfi) və pestisidin növü (funqisid, herbisid, insektisid) əks olunmuşdur. (2)

Pestisidlərə qarşı müqavimətin idarə edilməsi proqramının bir hissəsi kimi pestisidləri seçmək üçün bu kimyəvi qrup nömrələrindən istifadə etmək daha çox məqsədə uyğundur. Eyni mövsümdə eyni partiya nömrəli (eyni təsiredici maddəyə malik) pestisidlərin təkrar istifadəsindən çəkinin; çünki bu həmin pestisidə qarşı zərərvericilərin rezistentlik qazanaraq populyasiya daxilində davamlı fərdlərin və ya növlərin yaranmasına gətirib çıxaracaqdır. (2)

Bir növ pestisiddən istifadə etmək eyni sinifə və ya qrupa aid digər növ pestisidlərə qarşı zərərvericilərin rezistentlik qazanaraq həmin qrupun istifadəsinin effektsizliyinə gətirib çıxarır. Bunun qarşısını almaq üçün hər səfərində fərqli qrupa aid olan pestisidlərdən istifadə etmək lazımdır. (2)

Aşağıdakı cədvəllərdə pestisidlərin kimyəvi qrupları və həmin qruplara ekvivalent təsiredici maddələr öz əksini tapmışdır.

Cədvəl 1.

Herbisidlər			6 (Benzothiadiazoles)	Bentazon
Kimyəvi qrup	**Təsiredici maddə**		9 (Phosphanoglycines)	Glyphosate
1 (Cyclohexanones, Oxy-phenoxy-acid ester)	Clethodim Sethoxydim		10 (Phosphorylated amino acids)	Glufosinate
2 (Sulfonylureas)	Halosulfuron Rimsulfuron		14 (N Phenylphthalimides, Triazolinones)	Carfentrazone Sulfentrazone Flumioxazin
4 (Carboxylic acids, phenoxys)	Clopyralid 2,4-D		15 (Acetanilides, Chloroacetamides)	Napropamide Metolachlor
5 (Triazines, Uracils)	Metribuzin Simazine		20 (Nitriles)	Dichlobenil

Cədvəl 2.

İnsektisidlər			10 (Gənə inkişafı lən-gidənlər)	Clofentezine
Kimyəvi qrup	**Təsiredici maddə**		11 (Bacillus thuringiensis)	Bacillus thuringiensis
1A (Carbamates)	formetanate hydrochloride		15 (Benzoylureas)	Novaluron acetamiprid+novaluron
1B (Organophosphates)	Dimethoate Malathion Dimethoate		18 (Diacylhydrazines)	Tebufenozide methoxyfenozide
3 (Pyrethroids)	Deltamethrin Cypermethrin Fenpropathrin		20 (Acequinocyl)	Acequinocyl
4 (Neonicotinoids)	Acetamiprid İmidacloprid Thiacloprid		21 (METI acaricides)	Pyridaben
4C (Neonicotinoids - sulfoximines)	Sulfoxaflor sulfoxaflor+spinetoram		23 (Tetronic acids)	Spirodiclofen Spirotetramat
4D (Neonicotinoids - butenolides)	Flupyradifurone		25 (Beta-ketonitrile derivatives)	Cyflumetofen
5 (Spinosyns)	Spinetoram Spinosad		28 (Diamides)	Chlorantraniliprole cyantraniliprole
6 (Avermectins)	Abamectin		29 (Flonicamid)	Flonicamid
9 (Pyridinecarboxamides)	Flonicamid		UN (Unknown)	Bifenazate Calcium polysulfide
9D (Pyropenes)	Afidopyropen		Sinifləndirilməmişlər	fatty acids kaolin clay mineral oil

Cədvəl 3.

Funqisidlər				
Kimyəvi qrup	**Təsiredici maddə**		29 (Dinitro-anilines)	Fluazinam
1 (Benzimidazoles)	Thiophanate-methyl		33 (Phosphonates)	Fosetyl al Phosphites
2 (Dicarboximides)	İprodione		44 (Microbial Disruptors)	Bacillis subtilis, Bacillus amyloliquefaciens
3 (DMI-fungicides -triazoles, piperazines)	Fenbuconazole Flutriafol Triforine Metconazole Difenoconazole		M1 (Inorganic)	Copper oxychloride Copper octanoate copper hydroxide
4 (Acylalanines)	Metalaxyl-M		M2 (Inorganic)	Sulphur
7 (Pyridine carboxamides)	Boscalid İsofetamid Fluopyram		M3 (Dithiocarbamates)	Mancozeb Metiram Ferbam
9 (Anilinopyrimidines)	Pyrimethanil Fluopyram+pyremethanil		M4 (Phthalimides)	Captan
11 (QoI-fungicides)	Kresoxim-methyl Trifloxystrobin		M5 (Chloronitriles)	Chlorothalonil
13 (Quinolines)	Quinoxyfen		M7 (Guanidines)	Dodine
17 (Hydroxyanilides)	Fenhexamid		M12	BLAD polypeptide
19 (Peptidyl pyrimidine nucleoside)	Polyoxin D zinc salt		U8 (Unknowns)	Metrafenone
24 (Hexopyranoyl antibiotics)	Kasugamysin		U12 (Guanidines)	Dodine
25 (Glucopyranosyl Anti-biotics)	Streptomycin		NC (Not classified)	Potassium bicarbonate, Bacillus subtilis

Nəticə. Pestisidlərin kimyəvi nomenklaturasını bilmək plantasiyalarda, istixana-larda və digər əkin sahələrində zərərvericilərlə mübarizədə daha bir səmərə yaradır. Zərərvericilərə qarşı eyni kimyəvi qrupa aid lakin başqa kimyəvi tərkibə malik pestisidlərdən istifadə zərərvericilərdə rezistentliyin yaranmasının qarşısını alır və həmçinin həmin pestisidin ətraf mühitdə yol verilən qatılıq həddinin (YVQH) normadan artıq olmamasına zəmin yaradır.

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ARTS

FAZIL SAY: TURKEY'S PIONEERING PIANIST-COMPOSER

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Abstract

This article explores the life and career of Fazıl Say, a renowned Turkish musician known for his contributions as a pianist and composer. Born into a family deeply rooted in Turkish art and music, Say's upbringing in an intellectually stimulating environment laid the groundwork for his artistic journey. His initial musical training under Mithat Fenmen in Turkey, followed by further education in Germany, equipped him with a profound classical foundation, while his improvisational skills highlighted his unique musical style. Say's rise to fame was marked by significant international achievements and accolades, enhancing his reputation across classical and jazz genres. His recordings, particularly of classical masterworks and his own compositions, have been critically acclaimed. Say's work not only demonstrates his technical mastery and innovative approach but also reflects his deep connection to Turkish cultural heritage. Through his compositions and performances, he acts as a bridge between traditional Turkish music and global musical influences, embodying the fusion of cultural identity and artistic expression. This article illustrates how Say's career epitomizes the synthesis of personal heritage with a broader artistic panorama, positioning him as a pivotal figure in the modern musical landscape.

Keywords: Fazıl Say, Turkish musician, pianist and composer, classical and jazz music, cultural heritage, improvisational skills, international recognition, music education, artistic influence, cross-cultural fusion, symphony compositions, musical innovation, family background in arts, international awards, recording achievements.

Family Background and Early Influences

Fazıl Say was born on January 14, 1970, in Ankara, Turkey. He comes from a family with a strong background in Turkish art, especially academic painting. His grandmother, Zehra Say (1906–1990), was a well-known Turkish painter and a symbol of the Atatürk era. She fought for equality and passed on her love for art to her daughter, Emel Say, who also became a professional painter. Fazıl's father, Ahmet Say, was a respected musicologist.

Growing up in this artistic and intellectual environment shaped Fazıl Say's path into the world of art. His roles as a composer and performer fit naturally into the rich history of Turkish musical culture. His journey shows a deep, personal connection to 20th-century art, continuing his family's legacy in music.

Rise to Fame and Musical Education

Fazıl Say quickly became known as a talented pianist and composer in the 1990s. He won many competitions and performed with top orchestras around the world. He also made a name for himself in the jazz world, playing at international jazz festivals and showing his ability to succeed in different styles of music.

Say's musical journey began in Turkey, where he learned from Mithat Fenmen (1916–1982), a well-known Turkish composer and pianist. Fenmen taught Say the basics of piano playing and composition, which would be important for his future work. Fenmen himself had studied with Nadia Boulanger and improved his piano skills with Alfred Cortot at the Paris Conservatory. This rich educational background gave Say a strong artistic foundation and inspired him to keep learning and creating.

Mithat Fenmen saw the early talent in his student and encouraged Fazıl Say to improvise every day, focusing on themes that interested him before any structured lessons. This unusual approach to music education allowed Say to be creative and free, which helped develop his impressive improvisational skills and unique style. These early experiences with experimentation and exploration played a big role in shaping Say into an original and thoughtful pianist and composer.

Education and International Recognition

Say continued his education at the Ankara Conservatory, which combines Turkish and European musical traditions. The involvement of Paul Hindemith, an important German musician, in starting the conservatory is especially noteworthy. Hindemith worked to change music education in Turkey and created the "Universal Educational Program of Turkish Polyphonic Music". This helped bridge cultural differences and made the conservatory a place where future generations of Turkish musicians could grow.

Fazıl Say's musical journey then took him to Germany, where he received a scholarship to study at the Robert Schumann Hochschule in Düsseldorf with pianist David Levine, focusing on both piano performance and composition. He continued his studies with Levine in Berlin. From 1990 to 1994, Say began to gain recognition in the international music scene as a very talented and genuine performer.

Say's success in the American music world started with his win at the International Young Concert Artists Competition in New York in 1994. This victory showed his skill and talent as an artist. It also marked the beginning of his influence in the United States, with later performances at important venues like New York and the

Kennedy Center in Washington. In 1995, he won the Beracasa Foundation Award, which led to more international recognition and performances, such as at the International Radio France Festival in Montpellier. In December 2016, he was honored with the International Beethoven Prize in Bonn for his dedication to human rights, peace, and freedom. In 2017, the City of Duisburg in Germany recognized his contributions to music with its Music Prize.

Recordings and Collaborations

Say's recordings of classical works by J.S. Bach, Mozart, Beethoven, Gershwin, and Stravinsky, as well as his performances of Mussorgsky and his own compositions, have received praise from critics and multiple ECHO Klassik Awards. Since 2016, he has worked exclusively with Warner Classics, producing important recordings like a complete collection of Mozart sonatas, which earned him an ECHO Klassik in 2017. His "4 Cities" project with Nicolas Altstaedt, his edition of Chopin's Nocturnes and Secrets (French songs) recorded with Marianne Crebass (mezzo-soprano) won the Gramophone Classical Music Award in 2018.

His 2018 album focuses on the music of Debussy and Satie, while F. Say's latest CD edition, Troy Sonata – FazılSay Plays Say, includes only the composer's original works.

Say performs with orchestras all over the world, including the New York Philharmonic, the Vienna Symphony Orchestra, Concertgebouw Orchestra, BBC Philharmonic Orchestra, National Orchestra of France under the direction of many leading conductors. He plays a mix of Viennese classics and 20th-century masterpieces. Known for his strong stage presence, Say has been dubbed a "genius" by the Le Figaro newspaper, highlighting his influence on the international music scene. He also works with other chamber music musicians, in particular with violinists Patricia Copacinska (a Swiss violinist of Moldovan origin) and Maxim Vengerov (a famous violinist), demonstrating his mastery in various genres of music.

In addition, the musician has established himself as a brilliant stage artist - not just a performer, but a musician of outstanding artistic talent, which is manifested in relevant artistry, which is expressed in countless photographs and videos from F. Sai’s concerts.

Compositions and Cultural Heritage

As a composer, Say's work is very diverse. He writes solo piano pieces, concertos, orchestral works, and music for ballet and film. His compositions often include themes that reflect his cultural background. His "First Symphony - Istanbul" is a good example of this, combining his new compositional voice with elements that show his strong connection to his roots.

Say's ability to perform and compose makes him an important figure in modern music. He brings together different cultures and styles with a unique vision that touches both the heart and the mind.

Symphonic Works and Solo Compositions

Fazıl Say's symphonies take listeners on a journey through rich cultural and historical stories.

For instance, the complete list of his symphonic works includes:

(Symphony No. 1) – "Istanbul Symphony" (Op. 28),

(Symphony No. 2) – "Mesopotamia Symphony" (No. 2, Op. 38),

(Symphony No. 3) – "Universe Symphony" (No. 3, Op. 43), "1914" (Op. 56),

"Four Preludes" for saxophone quartet and string orchestra with percussion (Op. 63),

"Symphonic Dances" (Op. 64),

"Grand Bazaar" (Rhapsody for Symphony Orchestra, Op. 65).

His compositions for solo instruments with orchestra are even more diverse:

Three Marches for Piano and Chamber Orchestra (no opus number)

,Symphonic Concertante for Piano with Orchestra (Op. 3),

Guitar Concerto (Op. 5),

"Hayam Concerto" for Clarinet with Orchestra (Op. 36),

"Hezarfen Concerto" for Ney with Orchestra (Op. 39),

Concerto for Trumpet with Orchestra (Op. 31),

"Thousand and One Nights" Violin Concerto (Op. 25),

Two Romantic Ballads for Piano and String Orchestra (1995),

"Nirvana Explosion" – Concert Piece for Piano with Orchestra (Op. 30),

"Thinking Einstein" – Concert Piece for Piano with Orchestra (Op. 16),

"Silence of Anatolia" (Piano Concerto No. 3, Op. 11).

Artistic Evolution and Cultural Fusion

Fazıl Say's artistic path combines different musical traditions and a strong commitment to trying new things. His early years studying with Mithat Fenmen gave him a foundation in classical music and also planted the seeds for a spirit of exploration, especially in improvisation. This early exposure to creative freedom became a key part of Say's musical identity, which would grow when he experienced American culture. The U.S., with its lively jazz scene, gave Say a place to develop as an artist and sparked a deep interest and involvement in jazz. Starting the Worldjazz quartet in 2000 and playing in places from Montpellier to jazz festivals in Montreux and Istanbul show his flexibility and genuine love for jazz, which can also be seen in his jazz-inspired improvisations and compositions.

Say's journey shows a special mix of cultural identities and artistic fields. His work is not just about his own achievements but also serves as a link between Turkish and European musical landscapes. His active role in both worlds shows a deep commitment to adding to the musical tapestry with his unique voice and vision. Say's work goes beyond traditional boundaries, drawing from a rich well of cultural heritage while embracing global influences.

Moreover, Say's artistic philosophy is deeply rooted in a sense of national pride and historical awareness. His engagement with Turkish history and culture is not just academic but a heartfelt commitment to celebrating and promoting his heritage. This dedication

can be seen in his works that draw from Turkish themes and in his support for the importance of national culture. Through his music, Say invites a conversation about identity, history, and the transformative power of art.

In Say's work, we see a musician who is not only a master of his craft but also an ambassador of cultural exchange and understanding. His story is one of continuity and change, where the echoes of the past meet the innovations of the present. Fazıl Say stands as a guide for future generations, showing how tradition and modernity can come together in the service of artistic expression and cultural pride. His life and work represent the journey of a musician deeply engaged with the world around him, committed to exploring the vast possibilities of music while staying connected to the rich soil of his cultural heritage.

Continuing a Venerable Tradition

Fazıl Say positions himself as a modern carrier of a respected tradition that combines the roles of performer and composer—a lineage that includes great names such as J.S. Bach, D. Scarlatti, W.A. Mozart, and L. van Beethoven. This lineage continued through the 19th century with giants like F. Chopin, F. Liszt, J. Brahms, N. Rubinstein, and into the 20th century with S.V. Rachmaninoff, A. Scriabin, N. Medtner, S. Prokofiev. Say's embodiment of this dual heritage shows a historical continuity within European musical traditions, showcasing the combination of creative performance and composition within a single artist.

In Say's wide-ranging repertoire, one finds a mix that spans time periods and genres - from Baroque keyboard masterpieces to his own modern jazz improvisations. His improvisation on the theme from W.A. Mozart's Piano Sonata in A major K. 331 ("Turkish March") has especially resonated, crossing cultural boundaries to become a symbol of modern Turkey, despite its European origins. Additionally, Say's transcription of J.S. Bach's Fantasy in G minor (BWV 542) and his jazz interpretation of Paganini's 24th Caprice are examples of his artistic versatility and deep engagement with the musical past.

Say's highly skilled performance style has captivated audiences worldwide and earned critical praise. His strategic inclusion of original compositions in concert programs gives him a unique place in the musical landscape, free from competition and fully in line with his artistic vision. This special blend of originality and tradition has not only helped him appear on major global stages but also established his status as one of Turkey's most prominent musical figures.

A strong passion for Turkish musical culture fills Say's creative work. His compositions often draw upon national themes, and when arranging works by other composers, he chooses those with important ties to Turkish culture. When adapting material by others, Say skillfully weaves Turkish musical styles with elements from European and jazz traditions, enriching his works with a distinctive national character.

While not all of Say's piano compositions openly engage with Turkish history or culture, many are filled with a sense of national identity, partly due to his skilled use of improvisation - a technique deeply rooted in Turkish folk music. This national essence is shown both in the musical language and the themes of his works, promising further exploration in future discussions. This exploration into Fazıl Say's work reveals a musician deeply committed to fostering a dialogue between his cultural heritage and a broader musical world, championing a blend of tradition and innovation that continues to resonate across the global music scene.

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THE IMPORTANCE OF CHOOSING A PERFORMING REPERTOIRE FOR A CHORAL GROUP

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ХОР ҰЖЫМЫНА ОРЫНДАУШЫЛЫҚ РЕПЕРТУАРДЫ ТАҢДАУДЫҢ МАҢЫЗДЫЛЫҒЫ

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https://doi.org/10.5281/zenodo.10974922

Abstract

The experience of advanced countries (South Korea, Japan, Germany, Finland) shows that the economic achievements of these states are directly related to the wide and free access of their younger generations to art.in Finland, taxes from show business for many years are directed to the universal musical education of the younger generation, where everyone, without prejudice to the family budget, Asian countries not only limit the share of art in the school curriculum, but also strengthen their influence on the younger generation through various extracurricular art classes. In particular, visiting museums, playing in the orchestra of the school theater or singing in the choir.

The problem of updating the selection of the performing repertoire for choral groups with the promotion of works by Kazakh composers along with works of a global scale was caused by the common problems in the field of cultural introduction to Choral Art. These problems are associated with the global challenges of modernity and pressing problems in the development of music education in general.

The correct choice of a song repertoire for the choral group is of great importance in building the value orientations of society, its ideals. It is the connection of children with beautiful, inspiring music, the transfer of the ideological meaning of the composer of the work to the audience through professional performance that helps to form the socio-cultural, moral priorities and leadership qualities of singers.

Аннотация

Мақалада хор ұжымына орындаушылық репертуарды таңдау мен онымен жұмыс жасаудың маңыздылығы ашылған.

Алдыңғы қатарлы елдердің (Оңтүстік Корея, Жапония, Германия, Финляндия) тәжірибесі көрсеткендей, бұл мемлекеттердің экономикалық жетістіктері олардың жас ұрпақтарының өнерге кең және тегін қол жетімділігімен тікелей байланысты, Финляндияда көптеген жылдар бойы шоу-бизнестен түсетін салықтар жас ұрпақтың әмбебап музыкалық біліміне бағытталады, мұнда отбасылық бюджетке зиян келтірместен әркім аспапта ойнауды үйренуімен қатар ән айту дағдыларын игере алға толықтай мүмкіндігі бар. Азия елдері мектеп бағдарламасындағы өнердің үлесін шектеп қана қоймай, сонымен қатар әр түрлі сыныптан тыс өнер сабақтары арқылы олардың жас ұрпаққа әсерін күшейтеді. Атап айтсақ, мұражайларға бару, мектеп театрының оркестрде ойнау немесе хорда ән салу.

Хор ұжымдары үшін орындаушылық репертуарды таңдауды әлемдік ауқымдағы шығармалармен қатар қазақ композиторларының шығармаларын насихаттаумен өзектендіру проблемасын қою - хор өнеріне мәдени жағынан баулу саласындағы проблемалардың ортақтығынан туындады. Бұл проблемалар қазіргі заманның жаһандық сын-қатерлерімен және жалпы музыкалық білім беруді дамытудағы өзекті мәселелермен байланысты.

Хор ұжымы үшін ән репертуарын дұрыс таңдау қоғамның құндылық бағдарларын, оның мұраттарын құруда үлкен маңызға ие. Бұл балалардың әдемі, шабыттандыратын музыкамен байланысы, шығарманың композиторының идеялық мағынасын кәсіби орындау арқылы көрерменге жеткізу әншілердің әлеуметтік-мәдени, адамгершілік басымдықтары мен көшбасшылық қасиеттерін қалыптастыруға көмектеседі.

Keywords: choral, performing repertoire, singing, Culture, Education, idea, plot, literary text, composer, methods.

Кілттік сөздер: хор, орындаушылық репертуар, әншілік, мәдениет, тәрбие, идея, сюжеті, әдеби мәтін, композитор, әдістер.

Қазақ халқы ежелден ән-күй өнеріне құштар ұлттың бірі. Қазіргі қазақ музыкасы кәсіби музыка өнеріне дейін өсіп жетілді. Халқымыздың музыкалық талғамы жаңа белестерге көтеріліп дамуда. Жеке ән салу мен орындаушылық өнері де одан әрі арта түсіп, көпдауысты хорға, ән-би ансамбльдеріне айналды. Қазақ музыка мәдениетінің ерекшелігі - оның өткен тарихы мен ұлттық сипатында.

Түркі тілдес республикалар композиторларының таңдаулы шығармалары концерттерде радио мен теледидар арқылы халықтар достығының фестивальдарында орындалып, елімізде және шет елдерде кеңінен мәлім болып отыр. Өнер мен мәдениеттің жетістіктері өзара алмасудың нәтижесінде оларды бар саладағы музыка өнерінің өскенін, дамығанын, достық елдердің суреткерлік мәдениетінің нығайып отырғанын, біздің музыкалық мәдени саламызға өз әсерін тигізгенін байқаймыз.

Басқа өнер түрлері сияқты хор өнері де қоғамдық ой санасының негізгі формасы. Қазіргі заман ағымына сай, еліміздің мәдениетінің өркендеуі – хор өнерінің де жаңа тұрғыдан дамуын талап етеді. Себебі хор өнерінің өзіне тән ерекшеліктері бар: ол - сөз өнері, музыкалық орындаушылық шеберлігі, көркемдік бейнелеу, сахналық өнердің амал-тәсілдерін бойына жинаған синтездік өнер. Хормен ән салу өнері жас жеткіншектердің көркемдік танымының өсу жолында эстетикалық көзқарасының қалыптасуына, сонымен қатар, еліміздегі жалпы музыка мәдениетінің өсу саласында аса маңызды орын алады.

Кәсіби хор ұжымдарымен қатар, Қазақстан Республикасында көптеген көркемөнерпаздық, оның ішінде студенттік, мектеп оқушыларының хор ұжымдары бар. Музыкалық білім беру жолында хормен орындаушылық өнер - мектеп оқушыларын музыкаға тәрбиелеудегі бөлінбейтін бір сала болып табылады. Хор өнері – біріккен ұжымдық жиынның қорытындысы іспетті, адамдардың бір-бірімен ынтымақтығы, бірлігі, келісімділігі, ұйымшылдық қасиетін көрсететін және лидерлік ықпалды арттыру, тағы да басқадай қасиеттерді қамтиды.

Хордың жұмысында көрнекті орын алатын мәселе – репертуар. Хор ұжымының мүмкіндігін ескере отырып дайындық дәрежесіне лайықты репертуар таңдаудың, әншілерінің шығармашылық өсуіне әсері бар. Сондықтан орындаушылар үшін де, тыңдаушылар үшін де құнды идеялық және көркемдік жағынан тартымды шығармаларды тыңдау - хор жетекшісінің негізгі міндеті болып табылады [1, 63 б.].

Репертуар таңдау үшін хор жетекшісі ұжымының мүмкіншілігін, өсу деңгейін міндетті түрде ескеру керек. Жаңадан ұйымдастырылған хор ұжымына бірден күрделі шығарманы беруге болмайды. Хор шығармасының партияларындағы тесситуралық қиындықтар, әуендік, дикциялық, ырғақтық қиындықтар, партитурадағы дауыс саны мен жеке партиялардың дыбыс шығару күші, әуеннің сипаты, интонациялық қиындықтар, т.б. анықталады.

Жетекші хормен кез келген шығарманы орындаймын деп талпынғанымен, егер де сол шығарманың орындаушылық қиындығы хордың вокалды – техникалық мүмкіншілігінен жоғары болса, онда шығарманы орындау қиынға соғады. Ондай жағдайда сол шығарманы өз ұжымына ыңғайлап, өңдеуге болады. Концерттік бағдарламаны іріктегенде жетекші репертуардың тек идеялық-көркемдік құндылығына ғана көңіл бөліп қоймай, оның жанрлық жағынан (лирикалық, марш, салтанатты, т.б.) әр түрлі болуын да көздеген жөн. Сонымен қатар концертте орындау ретінде де тақырыбы сипатына қарай, мазмұндық және ырғақтық түрлеріне де байланысты әр түрлі алмасып отыруын көздейді.

Репертуардың мақсаты – хорға қатысушылардың музыкалық бейнелік ой мен шығармашылық белсенділігін дамытып жетілдіру және де интонациялық есту тәжірибесі мен қоғамдық «музыкалық есте сақтау» қабілетін байыту. Қазіргі хор өнерінің репертуар диапазоны өте кең, ал оны қалыптастырудың қайнар көзі - жолдар мен әдістері алуан түрлі.

Хор репертуарымен жұмыс жасау әдістері төмендегідей қарастырылады:

Хор партитурасын талдау жоспары:

а) Жалпы мазмұндық талдауы: негізгі идеясы, сюжеті, әдеби мәтіні, оның авторы, құрылу дәуірі, композитордың өмірбаяны, шығарманың сипаты;

ә) музыкалық шығарма жайлы мәлімет: оның композитордың шығармашылығындағы орны мен мәні; шығарма жайында қысқаша мәлімет, хордың операдағы немесе хор миниатюралардағы алатын орны (хордың рөлі);

б) музыкалық-теориялық талдауы: хор шығарманың формасы, музыкалық идеялар мен олардың дамуы, баяндалу сипаты;

в) гомофония, гармония, полифония, аралас, негізгі тональдіктің гармониясы); вокалдық-хор талдауы: хордың түрі, дауыстар диапазоны, тесситурасы, дауыстардың айтылу сипаты;

г) орындаушылық талдауы: екпін, оның өзгеруі, динамика;

д) шығарманың қиындықтарын анықтау: хордың вокалдық ырғақтығы және т.б.

Музыкалық шығарманы үйрену біраз ұзақ кезең соңында шығармаларды көпшілікпен бірге қорытындылап отырады.

Шығармаларды үйрену 3 кезеңнен тұрады:эскиздік бастау; дайындық-технологиялық; көркемдік-қорытынды.

Үйрену процесінің формула моделі: қиыннан - оңайға; оңайдан – қиынға; үйреншікті – керемет.

1. Шығармаларды талдау: автордың (темп, агогика, ырғақ, дыбыс жүргізу тәсілі, әр түрлі штрихтар, динамика) тыңдаушыға жеткізу қалпын сақтау, әрі қарай т.б.

2. Композитор туындысының ойын жеткізе білу, ашу (хордың вокалды-хор техникасы).

1. Шығарманы талдау барысы - шығармамен танысуы - шығарманы дұрыс жолмен, жүйелі түрде қарастырылады. Хормейстер таныс шығарманы белгілі бір формада алып таныстыруға болады. Мысалы, хор әншілеріне шығармада кездесетін орындаушылық қиындықтар, дыбысталу ерекшелігі. Бастысы шығарманы фортепианода ойнап көрсету (әуенді, штрихты, белгілерін), аудио жазу болса тыңдату, бір көргеннен айтқызу өте қолайлы.

Сольфеджиолау – шығармалармен жұмыс жасаудың басты формасы болып табылады. Сольфеджиомен айтқан барысында шығарма ладты-гармониялық, метроритмдік қиындықтыр тудырмаса, сол кезде бір көргеннен нотамен оқып, бірден сөзімен айтуға да болады [2, 47 б.].

Ұжымды жаңа шығармамен таныстырғанда дирижер оқытушылық деңгейінде рөл атқарады. Икемді хормейстерлер хор әншілерінің интонациясы таза болмаса да, ырғақты дұрыс ұстанбаса да жұмыс ережесін үзбей жұмыс істейді, яғни дирижердың басты мақсаты әншілерге еркіндік беру, тапсырманы орындағанда оларға сенімділік білдіру, түспеген, айтпаған кемшіліктерін өздеріне білдіру. Дирижер орындаушыларға сенімділігі хормейстермен орындаушы әншілер арасындағы кемшілік өте зор рөл атқарады. Хор әншілері нота мәтінімен танысқан соң, дирижер талаптарды көтеріп, нақты айтпағандарды бірден айтуы керек.

Кейбір дирижерлар дайындық уақытының көп бөлігін жаңа шығармаға арнайды, ал кейбірі шығарманы нотамен айтуға сәл уақыт бөліп келесіге қалдырады. Келесіде ол әншілерге таныс материал ретінде көрінеді. Шығарма жүрмей жатқанда әншілердің көңіліне қондыру үшін бас жағын іздестірген жөн. Шығарманы 1-ші рет талдау бүкіл хормен немесе топтармен де қаралады және дайындықтар барлық талаптарды тез орындауға әкеледі. Хор партиясында жеке ансамбль, құрлым мен жұмыс істеу – үйренудегі ең қолайлысы.

2. Шығарманы үйрену: жаңа шығарманы үйренгенде вокалды – ансамбль принципінің негіздері ұсталады. Сольфеджиодан әнді сөзімен айтуға көшкенде түрлі буындар қолданылады. Мысалы: ла, ля, ле, ма, ми, ди, т.б.

Дыбыс әдеби мәтінге сәйкес келуі керек. Дауыстарды ән айту қалпына келтіру барысында фортепиано аспабының көмегі зор, бірақ хорды сүйемелдеусіз үйреткен дұрыс.

Ақындық мәтінді айтып үйрену үшін - жеткізілуі нақты, дауыстылар нота ұзақтығына сәйкес, дауыссыздар қысқа, созылмай айтылуы тиіс.

Бір көргеннен тиісті ырғақта оқу; ырғақсыз оқу; жылдам екпінде оқу.

Ансамбль, құрлыммен жұмыс: жалпы дыбысталуды түзету; әнші регистрін жатқызу; тиісті орындарда «цезуралар» біркелкі тыныс алу.

Динамика қалыптылығы: фразировкаға ерекше мән беру. Келесі мақсат музыкалық фактура (әуен, ырғақ, екпін, динамика) және вокалды ерекшеліктермен жұмыс (дыбыс қалыптастыру, дыбыс жүргізу, штрих, тембр, жеткізу мәнерлігі).

3. Шығарманы әндету: хор - шығармалық үйренудегі қорытынды, оның көркемдігі, т.б. көркемдік ойды жеткізу үшін әншілерге актерлік қасиеттер кажет. Концертте орындау бүкіл дайындықтың шарықтау шыңы т.б. мысалы: М.Т.Климов хор әншілерінің мүмкіндігін ескере отырып, транспонирлеуді қолданған.

Концерт алды дайындық кезі – концертке жақын кезде тоқтаусыз қойылады. Икемді дирижерлар соңғы дайындықта орындалатын шығармалар жайында қосымша мағлұмат береді. Соңғы дайындықта сатыда тұрып, әндеткені жөн (мұнда вокалдық аппарат басқа режимде жұмыс жасайды, вокалдық тыныс сезіледі). Басты дайындық – киіммен, аз ғана тыңдаушылар алдында өткізілуі тиіс. Мұнда ұйымдастыру кезеңі, шығарманың трактовкасы, екпіні, динамикасы, сахнаға шығу, сахнадан кету, хор мен жеке орындаушылардың тұрысы, сүйемелдеушілердің орналасуы мен залдың акустикасы ескерілуі қажет. Көңіл аударылмай жүрген тағы бір мәселе – хор ұжымының эстрадағы анықтамасы. Концерттік дыбысталуы өз талабына сай болмай жатады. Сондықтан дирижер хор ұжымын эстраданың әр жеріне қойып, орындаушылықтарын көңіл қойып тыңдап, залға ең жақсы хор дыбысталуын белгілі хор бағдарламасымен айтқызу тиіс. Концерт алдындағы дайындық дауыстарды «қыздыруға» ғана қысқаша немесе қиын фразаларды айту, егер де орындалатын шығарма көлемді болса, бастапқы құрылымы ғана айтылады [3, 68 б.].

Репертуарлар: классикалық шығармалар, халық әндері, әлем композиторларының әндері, көпшілік әндер, ТМД елдері композиторларының шығармалары, орыс және шетел композиторларының хор шығармашылығы.

Хорға арналған шығармалар: А капелла (аспаптың сүйемелдеуінсіз айтылады) және ***аспаптық сүйемелдеумен*** – болып бөлінеді. Орындалатын хор шығармалары өңделген халық әндері, күйлер және авторлық әндер, сюиталар, романстар, жеткіншек жасөспірімдер әндері.

А капелла - хор айтудың ең жоғары сатысы. Хор ұжымының түрлеріне:

- халық хорлары; капелла типтес хорлар; ән-би ансамбльдері; театр хорлары; жалпы типтегі хорлар жатады.

Хормен айту дыбыс жүргізу мәнеріне қарай ***«академиялық»*** және ***«халықтық»*** болып бөлінеді. Халықтық бағыттағы хорлар шығарманы халықтық мақамда, яғни төменгі, ортаңғы, жоғары тесситуралық қатарларын тегістемей-ақ, әнді «табиғи» ашық дауыспен айтады. Хордағы ерлер мен әйелдер саны белгілі бір межемен шектелмейді. Орындалатын шығармалардағы дауыс саны да тұрақсыз, өзгеріп отырады. Себебі, әншілер қолма-қол суырып салып айтып, жаңа дауыстар қосып жіберуі мүмкін. Ән - би қимылдарымен астасып, толыға түседі. Концерт кезінде шығармаларды дирижердың басқаруынсыз, баян немесе халық оркестрінің сүйемелдеуінсіз орындайды.

Академиялық хорлар бұрынғы академиялық хорлар бұрынғы академиялық хорлар ұсынған дәстүрлі дыбыс жүргізу бағыттарын қолданады. Олардың қатарына капеллалар жатады. ***«Капелла»*** деп бұрын шіркеуде әншілер тобы тұратын орынды айтқан. Бұл – хормен айтудың қыры мен сырын, ән айту теориясын жетік меңгерген, әншілерінің музыкалық сауаты жоғары кәсіпқой хор коллективі. ***Опера театрының хоры*** - қойылатын спектакльдердегі хор шығармаларын орындайды. Ол көбінесе операдағы басты кейіпкер – халықтың рөлін орындайды. Академиялық хор ұжымдарына консерваториялар мен музыка колледждерінің, педагогикалық институттарының музыка факультеттерінің және мәдениет институттарының хор дирижеры бөлімдерінің студенттік хорлары жатады. Болашақ хор мамандары мен музыка пәнінің оқытушылары үшін оқу хорларының атқаратын қызметі де аса маңызды. Өйткені, олар әйгілі композиторлардың тамаша хор шығармаларының үлгісімен осында танысып, хор жүргізудің әдіс-тәсілдерін, амал жолдарын меңгереді.

Хор шығармасын орындау кезінде әр түрлі нюанстарды қолдану нәтижесінде вокалды-хор техникасын толық меңгерген хор ұжымы шығарманың көркемдік-идеялық мәнін жеткізе отырып, ерекше мәнерлілікпен орындаушылық шыңы мен мақсатына жетеді.

Тәжірибеден көріп жүргендей, кейбір хорлардың вокалды-хор техникасы төмен дәрежеде болуы, қиын шығармаларды орындағанда оны нақтылай шығаруға шамалары келмей қиналады. Мұндай жайттарды жиі кездестіруге болады. Хор тіпті белгілі шығарманы орындай алмайтынын, хордың ансамблі, құрылымы мен дикциясының нюанстарының жоқ екенін, яғни вокалды-хор техникасының жоқ екенін сезіп, біле тұрса да шығарманы жақсы көргендіктен оны орындағысы келеді. Мұндай ұжым жақсы ансамбльді қажет етеді, әншілердің орындауында көркем мәнерлеудің жетіспеуін анық аңғаруға болады [1, 71 б.].

Шығарманы терең сезіммен, ынталана жан дүниесімен, көркем мәнерлікпен, беріле жүректен өткізу керек. Тек техникалық жағынан дұрыс орындаудың өзі де жеткіліксіз, сонымен қатар шығарманың көркемдік жағынан әдемі болуы, мәнерлі де әсерлі орындалуы әрі шығарманың мазмұны мен сипаты сәйкестеніп, бірін-бірі толықтыра түскені абзал.

Дирижер-хормейстер орындаудың ансамбльдік үйлесімділігі мен техникалық жетілдірілуін қамтамасыз етеді, орындаушылар ұжымына өзінің көркемдік ниетін, шығарманы түсінуін жеткізуге тырысады, өйткені хор ән айту өнері толығымен шығармашылық бастамаға, хормейстер-дирижердің өз ісіне деген ерекше бейімділігіне, жүйелі еңбекке, педагогикалық, ұйымдастырушылық, ерік-жігер мен музыканттың талантына байланысты. Тұтас бейнелеу қабілеті тек өте талантты адамдардың қасиеті емес, әр музыкант әр түрлі дәлдік пен күшке ие.

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CHEMICAL SCIENCES

PHYSICAL-CHEMICAL INVESTIGATION OF PHASE EQUILIBRIUM IN THE $Cu_3As_4Te_9$-$CrAsTe_3$ SYSTEM

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https://doi.org/10.5281/zenodo.10974947

Abstract

The phase equilibrium in the $Cu_3As_4Te_9$-$CrAsTe_3$ system was studied by methods of physicochemical analysis: differential thermal analysis (DTA), X-ray diffraction analysis (XRD), microstructural analysis (MSA), determination of density and microhardness, and a T-x phase diagram of the system was constructed. As a result, it was established that the phase diagram of the $Cu_3As_4Te_9$-$CrAsTe_3$ system is a non-quasi-binary section of the quasi-ternary Cr_2Te_3-As_2Te_3-CuTe system. In the system at room temperature, solid solutions based on the $Cu_3As_4Te_9$ compound extends to 5 mol % $CrAsTe_3$. The peritectic compound $CrAsTe_3$ decomposes as follows: $CrAsTe \leftrightarrow M+Cr_2Te_3$.

Keywords: system, phase equilibrium, non-quasi-binary, diagram, density.

The components of the $Cu_3As_4Te_9$-$CrAsTe_3$ system consist of As_2Te_3, Cr_2Te_3 and CuTe compounds. Now let's look at each component. The As_2Te_3 compound and solid solutions based on it are thermoelectric and photosensitive materials [1-5]. A number of ternary and quaternary systems involving the As_2Te_3 compound have been studied [6-10]. Alloys based on chromium chalcogenides are magnetic materials. Ternary chromium and copper chalcogenides are being studied as materials with ferromagnetic properties [11-14]. Superionic semiconductors based on copper chalcogenides are energy generators, and at the same time, electrochemical sensors, recorders and selective ion electrodes are widely used in optical ion devices as a source of chemical electricity based on them [15-19]. From this point of view, obtaining composite phases of complex composition by studying the phase equilibrium of $Cu_3As_4Te_9$-$CrAsTe_3$ is of scientific and practical importance.

The purpose of the work is a physicochemical study of phase equilibrium in the $Cu_3As_4Te_9$-$CrAsTe_3$ system and its alloys.

Experimental part

Before the synthesis of alloys of the $Cu_3As_4Te_9$-$CrAsTe_3$ system, the $Cu_3As_4Te_9$ compound was synthesized from CuTe and As_2Te_3 compounds. The $CrAsTe_3$ compound is synthesized from high purity elements. Since the $CrAsTe_3$ compound is peritectic in nature, it was heat treated for 240 hours below the peritectic temperature to homogenize after synthesis. Equilibrium alloys were studied using methods (DTA, XRF, MSA, as well as microhardness and density assessment) of physicochemical analysis.

Differential thermal analysis (DTA) of the alloys was carried out on a TERMOSCAN-2 pyrometer. Chromel-alumel was used as a thermocouple; heating rate was 5°C/min.

X-ray phase analysis (XPA) was carried out on a D2 PHASER X-ray diffractometer. In this case, CuKα radiation and a Ni filter were used. The microstructure of the samples was analyzed using a MIM-8 microscope. In well-polished samples, a chromium solution was used as a mordant to separate the phases. The microhardness of the alloys was measured using a PMT-3 metallographic microscope. The density of the samples was determined by the pycnometric method; Toluene was used as a working solution.

Results and its discussion

After obtaining the complete composition of the main components, the alloys of the $Cu_3As_4Te_9$-$CrAsTe_3$ system were synthesized by the ampoule method from the $Cu_3As_4Te_9$ and CrAsTe3 components in a wide range of concentrations. Rich in $Cu_3As_4Te_9$, they looked like a compact mass and were bright gray substances. With an increase in the amount of $CrAsTe_3$ compound, the alloys acquire a silvery color.

The alloys of the system are resistant to air, water and organic solvents. It dissolves well in strong mineral acids (HNO_3, H_2SO_4). After homogenization of the

samples was completed, a physical and chemical analysis of the alloys of the system was carried out. The results of differential thermal analysis of alloys of the $Cu_3As_4Te_9$-$CrAsTe_3$ system show that up to four endothermic effects are observed in the thermograms of the alloys of the system. A large number of thermal effects in the system indicates a multiphase, complex interaction of components.

After heat treatment, the microstructure of the alloys of the system was analyzed and it was found that the system contains single-phase, two- and three-phase regions. The solid solution region in the system was determined based on the $Cu_3As_4Te_9$ compound.

To confirm the results of DTA and microstructural analysis used in constructing the state diagram of the $Cu_3As_4Te_9$-$CrAsTe_3$ system, X-ray phase analysis of alloys from different parts of the system was carried out (Fig. 1).

As a result of X-ray phase analysis of alloys with compositions of 30 and 80 mol. % CrAsTe3 it was established that in the diffraction patterns of these alloys of the system, in addition to the diffraction lines of the main components, there are diffraction lines of other phases. Based on the results, we can say that there are three phases in the system.

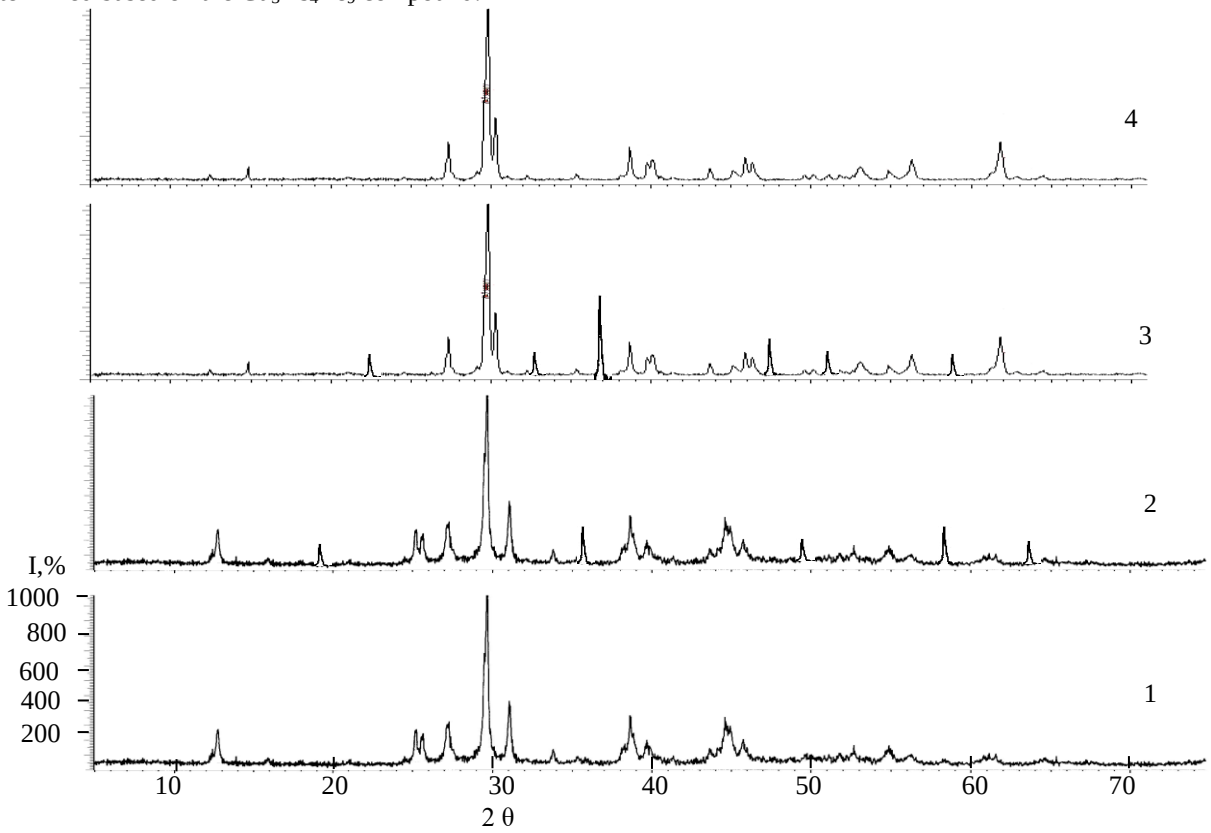

Fig. 1. Diffraction patterns of alloys of the $Cu_3As_4Te_9$-$CrAsTe_3$ system. 1- $Cu_3As_4Te_9$, 2-30 mol %, 3-80 mol %, 4-100 mol % $CrAsTe_3$.

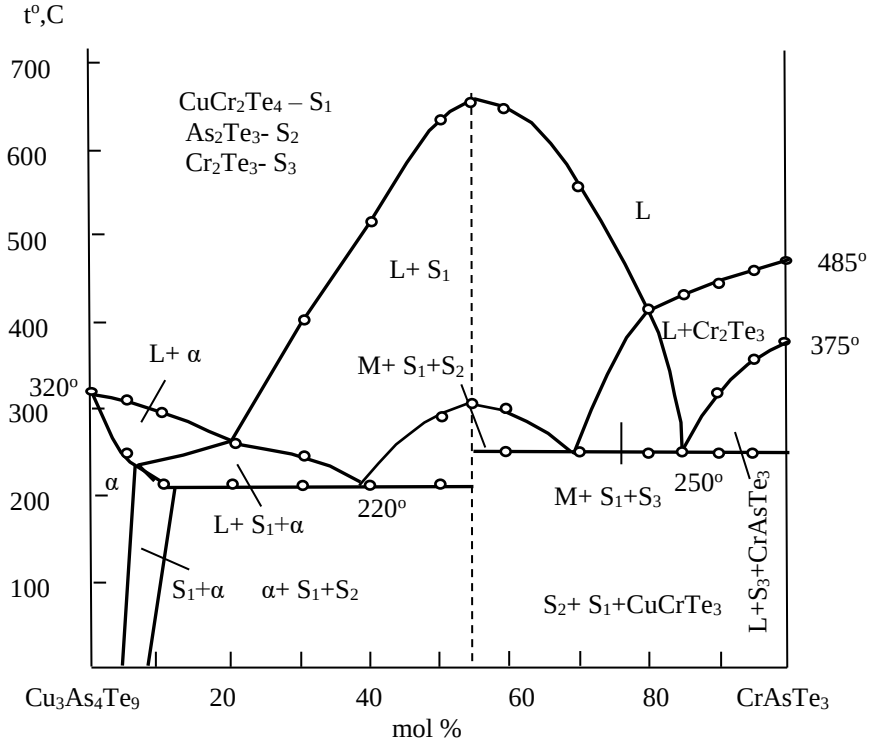

Fig.2. Phase diagram of the $Cu_3As_4Te_9$-$CrAsTe_3$ system/

The phase diagram of the $Cu_3As_4Te_9$-$CrAsTe_3$ system was constructed based on the results of the indicated methods of physicochemical analysis (Fig. 2). The phase diagram of the $Cu_3As_4Te_9$-$CrAsTe_3$ system is a non-quasi-binary section of the quasi-ternary As_2Te_3-Cr_2Te_3-CuTe system. The $Cu_3As_4Te_9$-$CrAsTe_3$ section, since it passes through the region of independent triangles As_2Te_3-$CuCr_2Te_4$-$Cu_3As_4Te_9$ and As_2Te_3-$CuCr_2Te_4$-$CrAsTe_3$, therefore the section is nonquasi-binary. At the liquidus intersection point it is in the range of 0–55 mol. % $CrAsTe_3$ is surrounded by monovariant liquidus curves of an α-solid solution based on $Cu_3As_4Te_9$ and the $CuCr_2Te_4$ and As_2Te_3 phases. The liquidus cross section of the α phase and the $CuCr_2Te_4$ compound is 20 mol. % $CrAsTe_3$, temperature 260°C. At this moment, a three-phase equilibrium L↔ α+ $CuCr_2Te_4$ is formed. When the temperature reaches 220°C, a ternary eutectic and a four-phase equilibrium L↔ α+$CuCr_2Te_4$+As_2Te_3 are formed. In the concentration range in the system 55-100 mol % $CrAsTe_3$ is limited by the monovariant equilibrium curves of the $CuCr_2Te_4$ and Cr_2Te_3 phases. The liquidus intersection of the $CuCr_2Te_4$ and Cr_2Te_3 phases is 20 mol %, temperature 325°C. At this moment, there is a three-phase equilibrium L↔$CuCr_2Te_4$+Cr_2Te_3. Four-phase equilibrium occurs at the triple point of peritectic L+Cr_2Te_3↔As_2Te_3+$CrAsTe_3$. Contents 25 mol %, temperature 250°C.

Table 1.

Composition, DTA, density and microhardness of alloys of the $Cu_3As_4Te_9$-$CrAsTe_3$ system depending on the composition

Composition, mol %		Thermal effects, °C	Density, q/sm^3	Microhardness, MPa			
$Cu_3As_4Te_9$	CrAsTe			α	As_2Te_3	$CuCr_2Te_4$	$CrAsTe_3$
				P=0,15 N			P=0,10 N
100	0,0	320	6,96	1960		-	-
95	5,0	250,320	6,98	1980	-	-	-
90	10	225, 295	6,90	1990	-	-	-
80	20	220,265	6,88	1990	1650	1850	-
70	30	220,245,400	6,84	1990	1650	1860	-
60	40	220,515	6,80	1990	1650	1870	-
50	50	220,280,635	6,76	-	1650	1870	-
45	55	220,290,650	6,74	-	1650	1870	
40	60	250,285,640	6,70	-	-	1870	-
30	70	250,555	6,69	-	-	1880	-
20	80	250,430	6,67	-	-	-	-
15	85	250,440	6,65	-	-	-	880
10	90	250,290,450	6,62	-	-	-	880
5,0	95	250,360,475	6,59	-	-	-	870
0,0	100	375,485	6,57	-	-	-	850

Three-phase alloys, consisting of single-phase α, two-phase α+$CuCr_2Te_4$ and three-phase α+$CuCr_2Te_4$+As_2Te_3, crystallize below the solidus line in the range of 0–55 mol % $CrAsTe_3$. Below the solidus line in the range of 55–100 mol % $CrAsTe_3$ three-phase alloys As_2Te_3+$CuCr_2Te_4$+$CrAsTe_3$ are present. The results of measuring the microhardness of alloys of the $Cu_3As_4Te_9$-$CrAsTe_3$ system are given in Table 1. As can be seen from the table, four microhardness values were obtained. The microhardness value (1960-1990) MPa corresponds to the microhardness of the α-solid solution formed on the basis of $Cu_3As_4Te_9$, the microhardness value of 1650 MPa corresponds to As_2Te_3, the value of 1850 MPa corresponds to $CuAs_2Te_4$, and the value (850 -880) MPa corresponds to the microhardness of the $CrAsTe_3$ compound.

Conclusion

Thus, the chemical interaction in the $Cu_3As_4Te_9$-$CrAsTe_3$ system was studied and its phase diagram was constructed. It has been established that the phase diagram of the system is nonquasibinary. The $Cu_3As_4Te_9$-$CrAsTe_3$ cross section passes through the region of independent triangles As_2Te_3-$CuCr_2Te_4$-$Cu_3As_4Te_9$ and As_2Te_3-$CuCr_2Te_4$-$CrAsTe_3$, so the system is nonquasibinary. Liquidus of the $Cu_3As_4Te_9$-$CrAsTe_3$ system in the concentration range of 0-55 mol % $CrAsTe_3$ consists of monovariant equilibrium curves of an α-solid solution based on the $Cu_3As_4Te_9$ compound, $CuCr_2Te_4$ and As_2Te_3 phases. The joint intersection of the liquidus of the α-phase and the $CuCr_2Te_4$ compound is 20 mol % $CrAsTe_3$, temperature 260°C and is accompanied by a three-phase equilibrium reaction L↔α+$CuCr_2Te_4$. A ternary eutectic is formed in the system and a four-phase equilibrium L↔α+$CuCr_2Te_4$+As_2Te_3 is established. The system has 5 mol. % $CrAsTe_3$ are soluble at room temperature based on the $Cu_3As_4Te_9$ compound. The dependences of microhardness and density of alloys of the $Cu_3As_4Te_9$-$CrAsTe_3$ system on composition have been studied.

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EFFECT OF MODİFİED ZEOLİTE CATALYSTS ON YİELD AND SELECTİVİTY OF ETHYLBENZENE

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Abstract

Catalytic properties of ZSM-5 zeolite-based catalysts modified with cerium, magnesium, and yttrium were studied in a flow-through installation at atmospheric pressure in the temperature range of 350-500 °C. It is established that the nature of the modifier significantly affects the output and selectivity of the formation of ethylbenzene. Modification of HZSM-5 with modifiers reduces the yield of by-products and increases the yield and selectivity for ethylbenzene. The maximum yield and selectivity for ethylbenzene is achieved on the catalyst 4% Ce-HZSM-5, which is 38.3% and 58.8%, respectively.

Keywords: Alkylation, benzene, ethanol, ethylbenzene, HZSM-5, modification, selectivity.

Introduction

Among the numerous processes of petrochemical synthesis, the production of ethylbenzene occupies one of the leading places. Currently, about 90% of ethylbenzene, the global production capacity of which is estimated at 50 million tons/year is used in the production of styrene [1,2]. In industry, ethylbenzene is mainly produced by liquid alkylation of benzene with ethylene. in the presence of catalysts Friedel-Crafts, as well as gas-phase alkylation in the presence of heterogeneous zeolite-containing catalysts [3-7]. In developed countries, catalysts based on high-silica zeolites of the ZSM-5 type [8-12] are widely used. Due to the increase bioethanol resources obtained by fermentation from biomass are large of interest are studies aimed at developing a selective catalyst based on ZSM-5 type zeolite for the production environmentally friendly ethylbenzene by alkylation of benzene with ethanol [13]. The purpose of this work was to study the effect of modification of ZSM-5 zeolite by magnesium,cerium and yttrium on its catalytic properties in the alkylation reaction of benzene with ethanol.

Experimental Part

To obtain the catalysts, there was used ZSM-5 zeolite with a silicate feed equal to 45, synthesized at the "Nizhny Novgorod Sorbents" (Russia). H-form of zeolite was prepared by ion exchange of zeolite in an aqueous solution of ammonium nitrate at 80 °C according to the method described in [14]. Catalysts modified with 1.0-5.0 wt% magnesium,cerium and yttrium prepared by impregnating H-ZSM with 5 solutions of magnesium,cerium and yttrium nitrates at 80 °C for 4 hours. The modified zeolites were dried in air for 6 hours, then dried at a temperature of 110 °C for 4 hours and calcined at 350 °C and 500 °C for 2 hours, respectively. Catalytic experiments were carried out in a flow-type installation with a stationary layer of catalyst with a volume of 3.0 cm^3 in a quartz reactor at atmospheric pressure in the temperature range of 300-500°C, a volumetric feed rate of 2 h-1 and a molar ratio of benzene: ethanol = 2:1. The reaction products were analyzed by gas-liquid chromatography according to the methods described in [15]. The acid characteristics of the catalysts were determined using ammonia TPD methods.

Results and Discussion

Modification of HZSM 5 zeolite with metals has a significant effect on its activity and selectivity. From Table 1, it is clear that as a result of modifying the zeolite with Mg, Ce and Y there is an increase in both the selectivity of the process and the yield of ethylbenzene.

Table 1: Effect of modification on the catalytic properties of HZSM-5 zeolite in the alkylation reaction of benzene by bioethanol.

Conditions: T = 450 °C; V=1,02^{-1}; C_6H_6 : C_2H_5OH= 2:1

Catalyst	Yield EB %	Selectivity EB %
HZSM-5	**30.1**	**47.8**
4% Mg-HZSM-5	**34.2**	**53.2**
4% Y-HZSM-5	**36.4**	**56.4**
4% Ce-HZSM-5	**38.3**	**58.8**

Modification of HZSM-5 with modifiers in an amount of 4.0 wt% leads to an increase in the yield of ethylbenzene from 30.1 wt% to 38.3 wt% and selectivity from 47.8% to 58.8%. The highest yield of ethylbenzene (38.3 wt%) and selectivity for ethylbenzene (58.8%) is achieved on the catalysts modified with cerium. According to activity and selectivity, the catalysts are arranged in the following order:

Ce-HZSM-5 > Y-HZSM-5 > Mg-HZSM-5 > HZSM-5

Thus, the yield and selectivity of ethylbenzene formation is determined by the nature of the metal modification.

The figure shows the dependence of the yield and selectivity of ethylbenzene formation on the concentration of cerium in the zeolite.

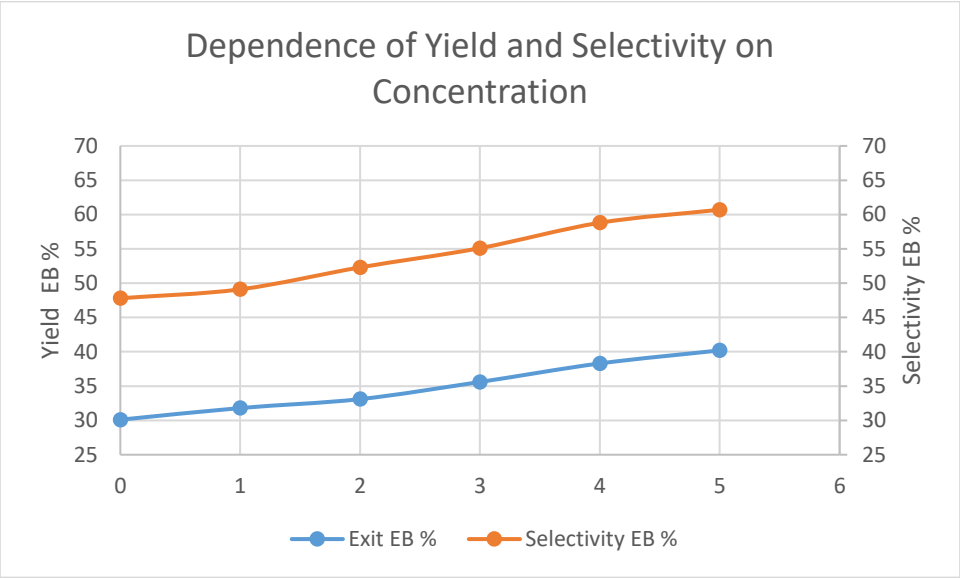

Figure 1: Dependence of the yield and EB selectivity on the concentration of zeolite in the catalyst

From Figure 1 it is clear that unmodified HZSM-5 zeolite, compared to modified samples, has lower activity and selectivity in the process of benzene alkylation with ethanol. A noticeable increase in the yield and selectivity for ethylbenzene is observed at a content of 2.0 wt% modifier in the zeolite composition. The yield of ethylbenzene increases from 30.1 wt% to 33.1 wt%, and the selectivity for ethylbenzene increases from 47.8% to 52.3%. The highest yield and selectivity for ethylbenzene is achieved on samples containing 4.0-5.0 wt% cerium. On these samples, the yield and selectivity for ethylbenzene is 38.3 -40.2 wt% and 58.8-60.7%. Figure 2 shows the dependence of the yield of ethylbenzene on the operating time of the unmodified and modified catalyst.

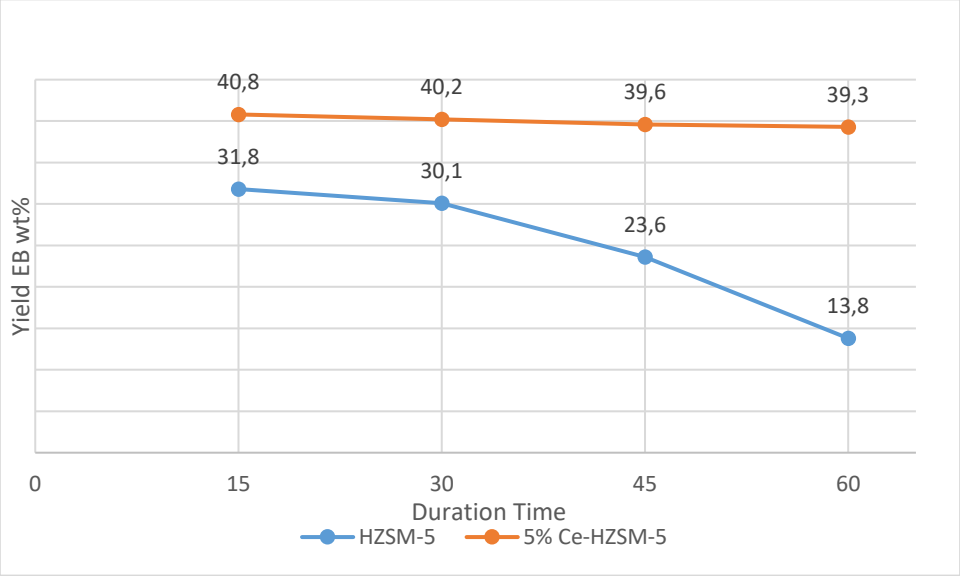

Figure 2: Yield of Ethylbenzene for two types of catalyst based on duration time

It can be seen that HZSM-5 works stably for only 30 minutes, after which its stability sharply decreases. After 60 minutes of operation of the HZSM-5 catalyst, the yield of ethylbenzene decreases from 31.8 wt% to 13.8 wt%, that is, approximately 2.3 times. Catalyst modified with cerium in an amount of 5.0 wt% for 60 minutes of operation practically retains its original activity. The yield of ethylbenzene decreases by only 1.5 wt%.

Obviously, the decrease in the activity of unmodified HZSM-5 zeolite during the alkylation of benzene with bioethanol is due to the presence of strong Bronsted acid sites. On strong Bronsted acid sites localized in channels and on the surface of the zeolite, in addition to the target reaction, oligomerization and polymerization of unsaturated intermediates occurs, which leads to a decrease in activity and deactivation of unmodified HZSM-5 zeolite. Indeed, as can be seen from the figure, with increasing duration of catalyst operation, the coke content increases. When the operating time of the HZSM-5 catalyst increases to 60 minutes, the coke content increases to 9.2 wt%.

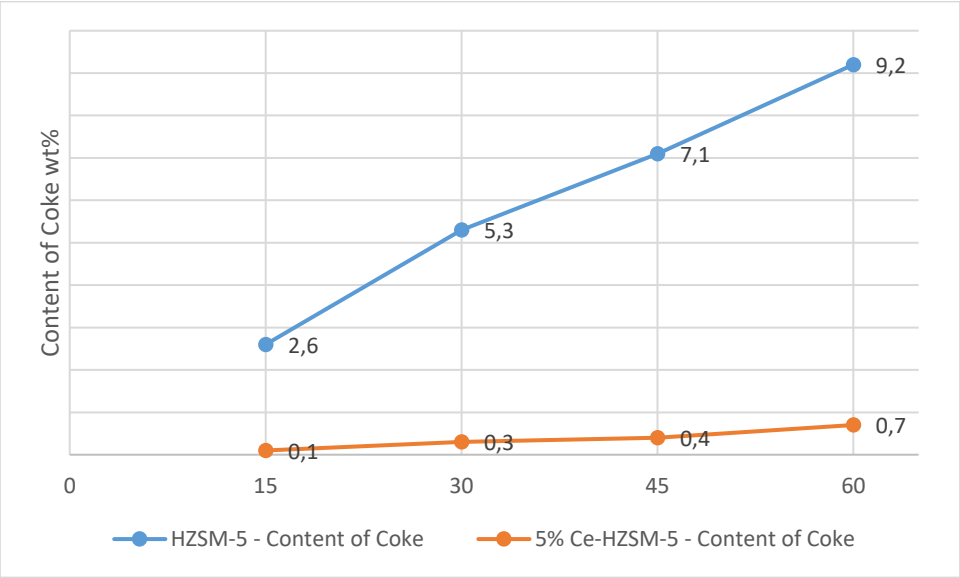

Figure 3: influence of catalyst operating time HZSM-5 and 5% Ce-HZSM-5 for coke content

Unlike HZSM-5 catalyst 5% Ce-HZSM-5 shows stable activity within 60 minutes, which is associated with a very low coke content (0.7 wt%) in the channels and on the surface of the zeolite. Stability of the modified catalyst 5% Ce-HZSM-5, coke formation is associated with a decrease in the concentration of strong Bronsted acid sites and an increase in the concentration of medium Bronsted acid sites as a result of modification.

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EARTH SCIENCES

METHOD FOR DETERMINING THE LEVEL OF ENVIRONMENTAL HAZARD OF INDUSTRIAL ENTERPRISES

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МЕТОД ВИЗНАЧЕННЯ РІВНЯ ЕКОЛОГІЧНОЇ НЕБЕЗПЕКИ ДІЯЛЬНОСТІ ПРОМИСЛОВИХ ПІДПРИЄМСТВ

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Abstract

The paper presents a new method of comprehensive assessment of the level of environmental hazard of industrial enterprises' impact on the environment, which includes a methodology for determining the level of environmental hazard of pollutant emissions from industrial enterprises on the state of atmospheric air; a methodology for determining the level of environmental hazard of wastewater discharge by industrial enterprises on the state of surface waters; a methodology for determining the level of environmental hazard of waste management systems at industrial enterprises. The new method was used to assess the level of environmental hazard of the environmental impact of Pyriatyn Cheese Plant CJSC. The assessment of the impact of pollutant emissions on the state of the atmospheric air corresponds to the average level of danger ($_{EPA}$ = 57.50). Pyriatyn Cheese Plant produces 41 types of waste. The indicator of the impact of industrial waste on the environment is equal to ($_{EPV}$ = 116.25), which corresponds to a high level of danger. The use of the method of comprehensive assessment of the level of environmental hazard of the impact of industrial enterprises on the environment is aimed at improving the efficiency of management decision-making in the field of environmental protection.

Анотація

В роботі представлено новий метод комплексної оцінки рівня екологічної небезпеки впливу промислових підприємств на стан довкілля, який містить методику визначення рівня екологічної небезпеки впливу викидів забруднюючих речовин промисловими підприємствами на стан атмосферного повітря; методику визначення рівня екологічної небезпеки впливу скидання стічних вод промисловими підприємствами на стан поверхневих вод; методику визначення рівня екологічної небезпеки системи поводження з відходами на промислових підприємствах. За новим методом дана оцінка рівня екологічної небезпеки

впливу підприємства ЗАТ «Пирятинський сирзавод» на довкілля. Визначення впливу викидів забруднюючих речовин на стан атмосферного повітря відповідає середньому рівню небезпеки ($ЕР_А$ =57,50). На підприємстві ЗАТ «Пирятинський сирзавод» утворюється 41 вид відходів. Показник впливу промислових відходів на стан довкілля дорівнює ($ЕР_V$ =116,25), що відповідає високому рівню небезпеки. Використання методу комплексної оцінки рівня екологічної небезпеки впливу промислових підприємств на стан довкілля спрямовано на підвищення ефективності прийняття управлінських рішень в галузі охорони навколишнього природного середовища.

Keywords: environmental hazard, integrated assessment, industrial enterprise, pollutant emissions, atmospheric air, wastewater, surface water, waste

Ключові слова: екологічна небезпека, комплексна оцінка, промислове підприємство, викиди забруднюючих речовин, атмосферне повітря, стічні води, поверхневі води, відходи.

Основними пріоритетами державної політики у сфері цивільного захисту є забезпечення техногенної та природної безпеки на території України, комфортних і безпечних умов життєдіяльності населення, збереження природного середовища. Впровадження заходів щодо зменшення ризиків виникнення надзвичайних ситуацій природного та техногенного характеру є важливим завданням забезпечення національної безпеки держави і потребує наукового підходу до всебічного аналізу причин їх виникнення та розробки методологічного інструментарію щодо комплексної оцінки наслідків впливу промислових підприємств на навколишнє природне середовище і здоров'я населення.

Розробка методики комплексної оцінки екологічної небезпеки промислових підприємств є надзвичайно актуальним питанням і може бути застосована в сфері управління природоохоронною діяльністю, цивільного захисту та техногенно-екологічної безпеки.

Закон України "Про охорону навколишнього природного середовища" проголошує: «Охорона навколишнього природного середовища, раціональне використання природних ресурсів, забезпечення екологічної безпеки життєдіяльності людини – невід'ємна умова сталого економічного та соціального розвитку України» [1].

Забезпечення стабільного суспільного розвитку викликає, зокрема, необхідність розроблення інструментарію для вимірювання величини, що характеризує ступінь екологічної безпеки з метою визначення допустимого антропогенного навантаження, що не повинно порушувати рівноваги природного середовища з забезпеченням відтворення основних її компонентів, а також не повинно викликати збільшення захворюваності населення [2].

Аналіз державних нормативних документів в галузі техногенно-екологічної безпеки впливу промислових підприємств на навколишнє природне середовище і здоров'я населення показав їх недосконалість та потребу адаптації до вимог Європейського екологічного законодавства. Впровадження методу комплексної оцінки екологічної небезпеки промислових підприємств спрямована на зближення державного законодавства України в екологічної безпеки до законодавства країн ЄС.

Запропонований метод дасть змогу визначити рівень техногенно-екологічної безпеки діяльності підприємств і провести аналіз причин забруднення навколишнього природного середовища з метою прийняття управлінських рішень щодо зменшення виникнення надзвичайних ситуацій природного характеру, забезпечення екологічної стійкості природних екосистем і безпечних умов життєдіяльності населення. Тому дослідження представленої роботи є дуже актуальними.

Метод визначення показника екологічної безпеки підприємства складається з декількох етапів:

– комплексна оцінка ступеню забрудненості території впливу промислового підприємства, що інтегрує показники забруднення атмосферного повітря, поверхневих вод і ґрунтів;

– комплексна оцінка впливу промислового підприємства на стан навколишнього природного середовища, яка складається з показників впливу скиду стічних вод на поверхневі водні об'єкти, викидів забруднюючих речовин в атмосферне повітря та промислових відходів на стан довкілля.

Показник екологічної безпеки підприємства визначається як середньо геометрична величина показника забрудненості території і показника впливу промислового підприємства на навколишнє природне середовище [3].

Вплив скидів стічних вод на стан поверхневих вод залежить від технічного стану і надійності очисних споруд та їх ефективності, а також від складу стічних вод та кратності перевищення затверджених нормативів гранично допустимих скидів (ГДС). Тому пропонується визначати показник впливу скидів стічних вод на стан поверхневих вод за формулою:

$$ЕР_W = н \times е \times \sum_n \left(4 \times \sum \frac{M^w_1}{ГДС_1} \right) + \sum_n \left(3 \times \sum \frac{M^w_2}{ГДС_2} \right) + \sum_n \left(2 \times \sum \frac{M^w_3}{ГДС_3} \right) + \sum_n \left(\frac{M^w_4}{ГДС_4} \right), \quad (1)$$

де $ЕР_w$ – показник впливу скиду стічних вод на стан поверхневих вод, безрозмірна величина; н – коефіцієнт надійності експлуатації очисних споруд, який дорівнює наступним значенням: н = 1,5 – перевищено термін експлуатації очисних споруд більш ніж в 2 рази; н = 1,25 – перевищено термін експлуатації очисних споруд більш ніж в 1,1 – 1,9 рази; н = 1 – термін експлуатації очисних споруд не перевищено; е – коефіцієнт ефективності очисних споруд, який дорівнює наступним значенням: е = 1,5 – очисні споруди малоефективні (ефективність очисних споруд ≤ 75%); е = 1,25 – очисні споруди

ефективні (ефективність очисних споруд складає 75% - 90%); e = 1 – очисні споруди високоефективні (ефективність очисних споруд ≥ 90%); n – кількість забруднюючих речовин, що прийнято для розрахунку; M^w_1 – маса скиду забруднюючих речовин 1 класу небезпеки, г/год; M^w_2 – маса скиду забруднюючих речовин 2 класу небезпеки, г/год; M^w_3 – маса скиду забруднюючих речовин 3 класу небезпеки, г/год; M^w_4 – маса скиду забруднюючих речовин 4 класу небезпеки, г/год; $ГДС_1$ – гранично допустимий скид забруднюючих речовин 1 класу небезпеки, г/год; $ГДС_2$ – гранично допустимий скид забруднюючих речовин 2 класу небезпеки, г/год; $ГДС_3$ – гранично допустимий скид забруднюючих речовин 3 класу небезпеки, г/год; $ГДС_4$ – гранично допустимий скид забруднюючих речовин 4 класу небезпеки, г/год.

Таким чином, при визначенні показника впливу скиду стічних вод на стан поверхневих вод враховується клас небезпеки забруднюючих речовин, які потрапляють до водних об'єктів, а також ступінь надійності очисних споруд, що впливає на можливість виникнення надзвичайних ситуацій.

Аналогічно пропонується визначати показник впливу викидів забруднюючих речовин на стан атмосферного повітря за формулою:

$$EP_A = н \times e \times \sum_n \left(4 \times \sum \frac{M^A_1}{ГДВ_1} \right) + \sum_n \left(3 \times \sum \frac{M^A_2}{ГДВ_2} \right) + \sum_n \left(2 \times \sum \frac{M^A_3}{ГДВ_3} \right) + \sum_n \left(\frac{M^A_4}{ГДВ_4} \right), \quad (2)$$

де EP_A – показник впливу викидів забруднюючих речовин на стан атмосферного повітря, безрозмірна величина; M^A_1 – маса викиду забруднюючих речовин 1 класу небезпеки, г/с; M^A_2 – маса викиду забруднюючих речовин 2 класу небезпеки, г/с; M^A_3 – маса викиду забруднюючих речовин 3 класу небезпеки, г/с; M^A_4 – маса викиду забруднюючих речовин 4 класу небезпеки, г/с; $ГДВ_1$ – гранично-допустимий викид забруднюючих речовин 1 класу небезпеки, г/с; $ГДВ_2$ – гранично-допустимий викид забруднюючих речовин 2 класу небезпеки, г/с; $ГДВ_3$ – гранично-допустимий викид забруднюючих речовин 3 класу небезпеки, г/с; $ГДВ_4$ – гранично-допустимий викид забруднюючих речовин 4 класу небезпеки, г/с.

Показник впливу промислових відходів на стан довкілля також визначається з урахуванням класу небезпеки відходів та надійності і ефективності природоохоронних заходів за формулою:

$$EP_V = s^v \mathring{a}^v \times \sum_n \left(4 \times \sum \frac{M^v 1}{L_1} \right) + \sum_n \left(3 \times \sum \frac{M^v 2}{L_2} \right) + \sum_n \left(2 \times \sum \frac{M^v 3}{L_3} \right) + \sum_n \left(\frac{M^v 4}{L_4} \right), \quad (3)$$

де EP_V – показник впливу промислових відходів на стан довкілля, безрозмірна величина; s^V – коефіцієнт впливу розміщення промислових відходів на стан довкілля, який визначається за даними табл. 1, безрозмірна величина; e^V – коефіцієнт ефективності природоохоронних заходів зберігання відходів, визначається за даними табл. 2, безрозмірна величина; n – кількість відходів, що прийнято для розрахунку; M^v_1 – обсяг накопичення відходів 1 класу небезпеки, т/рік; M^v_2 – обсяг накопичення відходів 2 класу небезпеки, т/рік; M^v_3 – обсяг накопичення відходів 3 класу небезпеки, т/рік; M^v_4 – обсяг накопичення відходів 4 класу небезпеки, т/рік; L_1 – нормативно допустимий обсяг накопичення відходів 1 класу небезпеки, т/рік; L_2 – нормативно допустимий обсяг накопичення відходів 2 класу небезпеки, т/рік; L_3 – нормативно допустимий обсяг накопичення відходів 3 класу небезпеки, т/рік; L_4 – нормативно допустимий обсяг накопичення відходів 4 класу небезпеки, т/рік.

Інтенсивність негативного впливу промислових відходів на навколишнє природне середовище залежить від типу та розміру об'єктів розміщення відходів і визначається за даними табл.1. Коефіцієнт впливу розміщення промислових відходів на стан довкілля приймається за максимальним значенням параметрів, наведених в табл. 1.

Таблиця 1.

Показники впливу розміщення промислових відходів

Показники впливу розміщення промислових відходів	Високий ступень впливу $s^V = 1,5$	Середній ступень впливу $s^V = 1,25$	Низький ступень впливу $s^V = 1,0$
Тип об'єкту розміщення відходів	Несанкціоновані місця розміщення відходів; котловани, кар'єри, вироблені шахти, штольні, підземні порожнини; нагромадження відходів на промисловому майданчику	Санкціоновані смітники; відвали, терикони; шламонакопичувачі. Розміщення на тривалий строк на об'єктах, розташованих на території підприємств	Полігони по знешкодженню й похованню промислових і побутових відходів; штучні збірники, бункери, контейнери та ін.
Площа зберігання відходів, га	Більше 5	1-5	Менш 1
Обсяг сховища відходів, $м^3$	Більше 250000	10000 - 250000	Менш 10000
Рельєф місцевості	Височина	Рівна територія, пологий схил	Пониження рельєфу

При розміщенні промислових відходів необхідно вживати заходи по захисту атмосферного повітря, підземних вод, ґрунтів та поверхневих вод з врахуванням природної захищеності компонентів навколишнього природного середовища та умов розташування промислового підприємства і споруджень по зберіганню відходів. При визначенні коефіцієнту ефективності природоохоронних заходів зберігання відходів необхідно користуватися табл. 2, причому з перелічених показників вибирається той, що відповідає найбільшому значенню коефіцієнта e^{V}.

Нажаль, відсоток утилізації промислових і побутових відходів на промислових підприємствах України дуже низький. На більшості підприємств відходи зберігаються на території промислових майданчиків або вивозяться на сміттєзвалища. Застосування запропонованої методики спрямовано на підвищення екологічної безпеки поводження з промисловими відходами.

Таблиця 2

Показники ефективності природоохоронних заходів по зберіганню відходів

Показники ефективності природоохоронних заходів	Високий ступень впливу $e^{V} = 1,5$	Середній ступень впливу $e^{V} = 1,25$	Низький ступень впливу $e^{V} = 1,0$
Термін перевищення експлуатації споруди зберігання відходів	більше ніж в 2 рази	більш ніж в 1,1 - 2 рази	не перевищено
Заповнення сховища, %	Більше 90	50 – 90	Менш 50
Термін безаварійної експлуатації	Менш 1 року	1 – 5 років	Більше 5 років
Заходи, спрямовані на запобігання забруднення атмосферного повітря	Відсутні	Проводяться технологічні заходи щодо зниження пилу	Створено штучні екрани, покриття або споруди, що запобігають забрудненню атмосферного повітря
Заходи, спрямовані на запобігання забруднення поверхневих вод	Відсутні	Ефективність системи збору й очищення поталих і дощових вод з поверхні сховища відходів складає менш 75%	Ефективність системи збору й очищення поталих і дощових вод з поверхні сховища відходів складає більше 75%
Заходи, спрямовані на запобігання забруднення підземних вод	Відсутні	Одношаровий екран ґрунтовий або бетонний потужністю більше 0,3 - 0,8 м	Двошаровий екран, асфальтобетонний або бетонний з полімерним покриттям потужністю більше 0,8 м
Заходи, спрямовані на запобігання забруднення ґрунтів	Відсутні	Проводяться технологічні заходи щодо зниження пилу	Створено штучні екрани, покриття або споруди, що запобігають забрудненню ґрунтів

Показник екологічної безпеки підприємства (ЕР) представляє собою середнє геометричне значень показника впливу скиду стічних вод на стан поверхневих вод (EP_w), показника впливу викидів забруднюючих речовин на стан атмосферного повітря (EP_A), показник впливу промислових відходів на стан довкілля (EP_V) і визначається за формулою:

$$EP = \sqrt[3]{EP_w} \times EP_A \times EP_v \quad (4)$$

Запропонований підхід до визначення екологічної безпеки підприємства враховує ступінь виконання екологічних нормативів і стандартів, ефективність природоохоронних заходів, зношеність технологічного обладнання, особливості розташування промислового майданчика і сучасний стан навколишнього природного середовища. Цей методичний підхід може бути використаний не тільки для визначення екологічної безпеки промислового підприємства, але також для підприємств житлово – комунального і сільського господарств з метою прийняття управлінських рішень щодо зменшення негативного антропогенного навантаження на стан навколишнього природного середовища.

Для апробації представленого методу визначення рівня екологічної небезпеки промислового підприємства обрано ЗАТ «Пирятинський сирзавод», що розташоване в Полтавській області.

Головною сферою діяльності підприємства є організація закупки молока у сільгоспвиробників і населення та подальша ефективна переробка всіх його складових на високоякісний продукт. Асортимент продукції, яку сьогодні виробляє підприємство, складає понад 110 найменувань, із них сирів твердих понад 25 найменувань. На ЗАТ «Пирятинський сирзавод» діє система менеджменту якості згідно стандарту ISO 9001:2000.

Підприємство скидає стічні води в міську каналізаційну мережу, тобто не створює негативного впливу на стан поверхневих вод. Тому показник екологічної безпеки підприємства (ЕР) визначено як середнє геометричне значень показника впливу

викидів забруднюючих речовин на стан атмосферного повітря ($ЕР_А$) і показника впливу промислових відходів на стан довкілля ($ЕР_V$).

В цілому по підприємству встановлені величини викидів для 21 організованого та 4 неорганізованих стаціонарних джерел викидів забруднюючих речовин в атмосферне повітря. Валовий викид шкідливих речовин по підприємству складає 23,82123 т/рік.

Найбільший обсяг викидів забруднюючих речовин від виробництва теплової енергій (19,73 т/рік), на другому місці – виробництво сухої сировотки (8,48 т/рік), на третьому місці – виробництво олії (1,23 т/рік), інші виробництва викидають в атмосферне повітря незначну кількість забруднюючих речовин.

Всього по підприємству в атмосферне повітря викидається 22 забруднюючі речовини: оксиди азоту, аміак, кислота сірчана, ангідрид сірчистий, вуглецю оксид, кислота о-фосфорна, спирт аліловий, спирт етиловий, фенол, акролеїн, формальдегід, кислота оцтова, бензин, вуглеводні граничні, суспендовані частинки, зола сланцева; пил деревини; пил борошна; пил лушпиння соняшника; пил шроту соняшника та пил насіння сої.

Найбільший обсяг викидів азоту діоксид у (56%) і вуглецю оксиду (24 %) (рис.1).

Термін експлуатації очисних споруд не перевищено, тому коефіцієнт надійності експлуатації очисних споруд н = 1. Ефективність очисних споруд на підприємстві складає від 75% до 90%, тому коефіцієнт ефективності очисних споруд е = 1,25.

Значення показника впливу викидів забруднюючих речовин на стан атмосферного повітря відповідає середньому рівню небезпеки ($ЕР_А$ = 57,50).

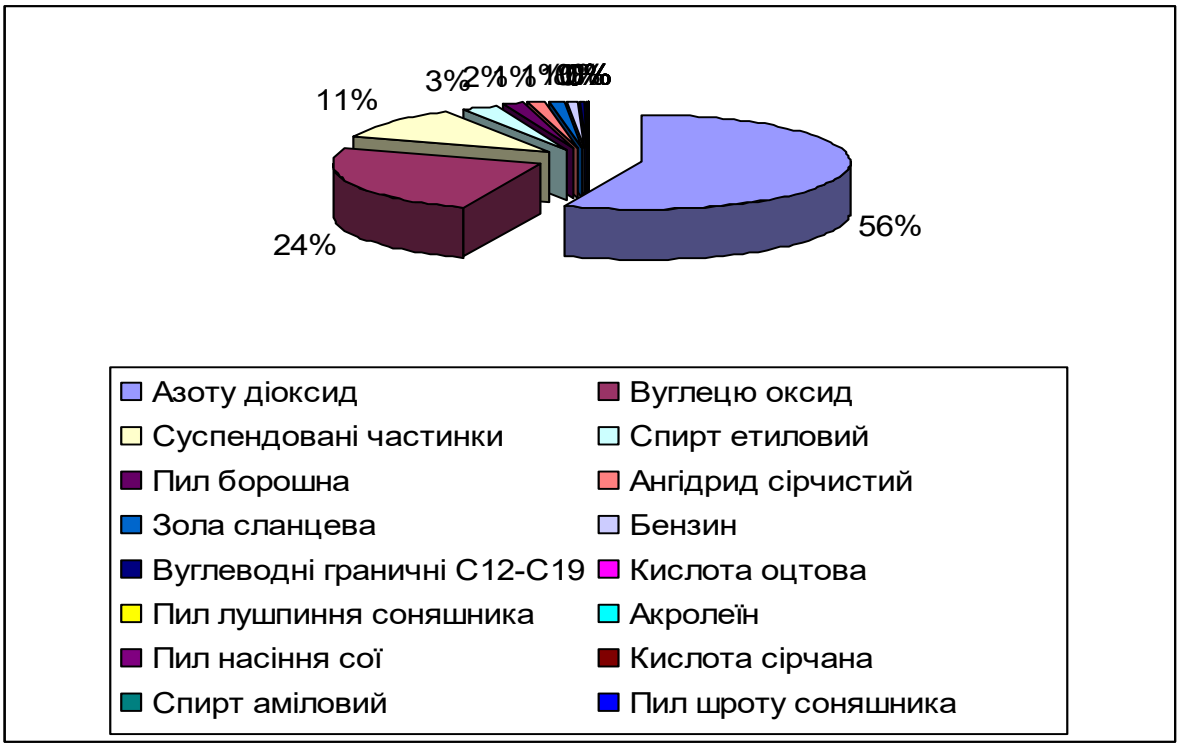

Рисунок 1.
Викиди забруднюючих речовин в атмосферне повітря підприємством ЗАТ «Пирятинський сирзавод»

На території промислової площадки ЗАТ «Пирятинський сирзавод» утворюється 41 вид відходів, з них 1 класу небезпеки 2 виду відходів – 284 шт. люмінесцентних ламп, 1,138 т. відпрацьованих акумуляторних батарей; 2 класу небезпеки 2 виду відходів – 6 т., 3 класу небезпеки 11 видів відходів – 15,945 т., 4 класу небезпеки 26 видів відходів – 76441,501 Відходи зберігаються в підсобних приміщеннях з бетонованою підлогою, металевих ємностях з кришкою, в контейнерах для сміття, на складах підприємства. Коефіцієнт впливу розміщення промислових відходів на стан довкілля, який визначається за даними табл. 1. s^V =1,25 .

Заходи, що спрямовані на запобігання забруднення атмосферного повітря, поверхневих і підземних вод та ґрунтів відсутні. Коефіцієнт ефективності природоохоронних заходів зберігання відходів e^V = 1,5. Перевищення нормативно допустимого обсягу утворення відходів не спостерігається.

Значення показника впливу промислових відходів підприємства на стан довкілля дорівнює ($ЕР_V$ =116,25), що відповідає високому рівню небезпеки. Найбільший вплив на стан довкілля мають відходи транспорту і ремонту та монтажу обладнання, що означає необхідність впровадження заходів саме на цих ділянках виробництва.

Визначення показника екологічної безпеки підприємства з виробництва сиру відповідає середньому рівню впливу на стан навколишнього природного середовища (ЕР=81,76), але розрахунки показали, що при розробці природоохоронної політики підприємства необхідно в першу чергу звернути увагу на проблему поводження з промисловими відходами.

Відсутність комплексного системного підходу до оцінки впливу, як діючих, так і планованих до будівництва підприємств на стан навколишнього природного середовища обумовили актуальність і необхідність розробки методу комплексної оцінки впливу промислових підприємств на довкілля, яка представлена в цій роботі.

Запропонований підхід до визначення екологічної безпеки підприємства враховує ступінь виконання екологічних нормативів і стандартів, ефективність природоохоронних заходів, зношеність технологічного обладнання, особливості розташування промислового майданчика і сучасний стан навколишнього природного середовища. Цей методичний підхід може бути використаний не тільки для визначення екологічної безпеки промислового підприємства, але також для підприємств житлово-комунального і сільського господарств при проведенні ОВНС та екологічного аудиту з метою прийняття управлінських рішень щодо зменшення негативного антропогенного навантаження на стан навколишнього природного середовища.

Представлений новий підхід до оцінки рівня екологічної небезпеки промислового підприємства дозволяє визначити пріоритетність природоохоронних заходів і розробити екологічну політику підприємства спрямовану на мінімізацію погіршення стану навколишнього природного середовища.

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ECONOMIC SCIENCES

WAYS TO FURTHER REGULATE THE PROCESS OF ECONOMIC RECOVERY IN UKRAINE IN THE POST-WAR PERIOD

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Abstract

The article reveals ways to further regulate the process of economic recovery in Ukraine in the post-war period. The article examines the process of planning the post-war restoration and development of Ukraine, its methodological foundations and specifics. Attention is focused on the importance of using elements of global experience (including the Marshall Plan), ensuring food security of Ukraine in accordance with the historical experience of the post-war restoration of French agriculture, taking into account the role of large-scale business in the post-war restoration and technical modernization of the country's production, the need to include in the plans for the restoration the state policy of import substitution and export promotion in the system of post-war restoration measures.

Planning is an important first step for the reconstruction of Ukraine after the war and the implementation of its strategic goals, subject to the use of global experience of restoring post-war economies, with its creative development and adaptation to Ukrainian realities.

Keywords: planning, state authorities, economic recovery of Ukraine, modernization of production, food security, import substitution, export promotion.

Introduction. The process of planning for the post-war reconstruction and development of Ukraine actually began in the first months of Russia's large-scale aggression. It should include both covering material damage caused by the war, as well as restoring destroyed infrastructure capacities and structural modernization of the Ukrainian economy, as well as the return and re-adaptation of both participants in the Russian-Ukrainian war (combatants) and internally displaced persons (IDPs) who are now located outside the country [3].

The planning process itself is already an element of state regulation of the process of economic recovery in Ukraine in the post-war period since it includes such aspects as defining goals, choosing strategies and determining actions required to achieve these goals within the limited (in our case) resources available to the organization. Planning is one of the main functions of administrative management, which enables the state to determine the direction of development and ways to achieve success in the long term.

Goal of the article. To investigate ways to further regulate the process of economic recovery in Ukraine in the post-war period and the role of planning in this process.

Analysis of recent research and publications. The problems of studying the ways of further regulation of the process of economic recovery of Ukraine in the post-war period and the use of foreign experience of post-war reconstruction of the country, the development and transformation of its economy as a modern state, and the paradigm of "post-war economic modernization of the state" are now quite vividly discussed in foreign and domestic scientific, practical and socio-political discourse. Over the last two years alone, dozens of publications related to public administration and economics, political science and sociology, legal science and communication studies have joined this discourse field. Nevertheless, the topic remains relevant and understudied, given the constant tense dynamics of geopolitical changes during the Russian-Ukrainian war.

Research methodology. Planning of state and local government bodies (*especially large millionaire cities*) includes the development of strategic and operational plans [2].

The strategic plan defines the long-term goals of the state for the recovery of its economy and ways to achieve them, while the operational plan defines specific step-by-step steps (short-term in the time interval of program implementation) required to achieve these goals in the near future of the country.

Planning also includes determining the appropriate budget (*or finding the required finances*), resources, and distributing them between different projects and tasks. State planning helps the current authorities (central authorities, in particular) to make informed decisions, focus on the projected prospects for future development, and improve the coordination of actions of contractors within the country and investors outside to achieve the goal [6].

The planning process involves predicting future events in the state. This helps to reduce uncertainty in its development caused by political and geopolitical factors, changes in technology and the conjuncture of a globalized global market, etc. Plans can provide for sufficient conditions to eliminate these uncertainties or

measures to reduce their negative impact on development.

In planning, management control involves maintaining the right direction of activity by limiting deviations from plans or standards. It is during the planning process that management sets standards for work. They are benchmarks for evaluating actual performance. In other words, planning and control are similar to the inseparable twins of management, including controlling planning objects [6].

An important role is played by the search for alternative plans or actions in the implementation of specific and important projects. Without resorting to the search for alternative approaches to solving problematic issues, government officials are likely to be guided by their limited imagination in a certain way. To prevent this from happening, it is essential to contact scientific, research, and public structures for information that will provide information and suggestions, and be aware of foreign experience on this issue. As a rule, there are always several alternative ways to solve any problem. The manager should be able to find, know them, and filter out the most untenable alternatives in order to get a small number of alternatives for the final choice in making a decision, while reducing the risks of making wrong decisions.

For operational planning, which takes place at a lower level, as it revolves around the basic details of how any particular goal or task can be achieved using available resources, the level of managerial governance in regional and local authorities is important. It is usually performed to find the right marketing plans, the most appropriate production methods, various organizational tools and actions for executing project processes [6].

Tactical planning usually takes place at the regional level. Tactical planning is responsible for the planning from which the mission can be achieved at the regional level of the state, as follows from their specification [2]. At the planning level, decisions are made related to the services or products that need to be added, as well as pricing, equipment, systems, amount of capital investment, etc.

Presentation of the main material. Strategic planning takes place at the top management level, where senior management tries to achieve long-term goals using the resources available at the moment or in the future. Strategic revolves around defining the mission of the state (government), clarifying all financial requirements, allocating resources, ensuring power relations in the organization, etc. While planning is crucial to achieving more favorable outcomes, it also includes some internal and hidden limitations.

It is expedient to consider certain features of the processes of strategic and operational planning in the recovery of the Ukrainian economy in the post-war period, which should be included in the plan for the restoration of Ukraine from the point of view of leading scientists.

The country's economic recovery plans that have been implemented in Finland, Japan, Vietnam, Korea, Bosnia, Herzegovina, Germany, Rwanda, the United Kingdom and other countries cannot be fully scrupulously implemented in detail as a plan for the restoration of Ukraine, and only its individual provisions or fragments are possible. For Ukraine, the very essence of planning the process of restoring the country's economic complex, its education and culture is of vital importance.

We have noted that in the process of planning the country's reconstruction, the government should receive information advice from its scientific, analytical, and research institutions. The National Institute for Strategic Studies has a strong say here. The Deputy Director of the National Institute for Strategic Studies Doctor of Economics, Senior Researcher Ya. Zhalilo investigating the Marshall Plan for Ukraine has identified false historical analogies and real needs of Ukraine [1, p. 27]. He notes that the practice of identifying the government's draft national plan for the restoration of Ukraine with the historical Marshall Plan as the basis for the restoration of Western Europe after the Second World War has become widespread in Ukraine, which is incorrect.

At the same time, in his opinion, the idealization of the influence of the Marshal Plan (MP 2.0) is often combined with a superficial understanding of its essence. Drawing historical analogies of the European Marshal Plan with the situation in Ukraine, it is important to realize that the key task of the Marshal Plan 2.0 for post-war Ukraine should be to form an economic basis for accelerated European integration. Therefore, MP 2.0 may be narrower in terms of content, scope and prospects for direct funding, but it should focus on the multi-level rapid reintegration of Ukraine and its subjects into pan-European processes, support and promote reforms essential for the implementation of the tasks of candidates and dynamic acquisition of EU membership.

Therefore, MP 2.0 for Ukraine, as noted by Ya. Zhalilo, should include the following processes:

- "to articulate the mutually beneficial implementation of the Plan for Ukraine and European partners – that is, to cover not only Ukraine, but also the EU countries;
- to guarantee the formation of a stable predictable space and effective partners for the work of European partners in the Ukrainian market, their participation in the implementation of restoration projects;
- to provide for the formation of high-quality financial mechanisms for channeling the resources of international financial assistance to Ukraine for recovery through the budget and banking systems;
- to formulate a vision of Ukraine's promising place in the European Union (EU), including solving global problems – multi-vector security (including food), demography, climate change, the digital revolution, etc.;
- to determine ways to implement all types of common European policy in Ukraine, in particular, agricultural, competitive, regional, transport, environmental, energy, etc.;
- to determine the directions of industrial (agricultural) cooperation within the framework of the restoration goals;

- to determine the directions of strengthening logistics ties between Ukraine and the EU;

- to establish directions of technical assistance to state and local government bodies in the implementation of European practices" and experience [4. p. 28].

The scientist-economist T. Bodnarchuk, from the Economic History Unit of the Institute of Economics and Forecasting of the National Academy of Sciences of Ukraine State-owned University, emphasizes the need to include in the plans for the restoration of Ukraine the policy of import substitution and export promotion in the system of measures for the post-war recovery of the economy and economy of the country as a whole. This is the post-war experience of Western European countries, which should be used in planning restoration and modernization in Ukraine [1. c. 41].

"Further European integration and active trade and economic cooperation should become a determinant of the post-war economic recovery of Ukraine, but today there are risks of increasing the country's import dependence and losing its competitive positions in international markets. This actualizes the issue of developing an effective trade and economic policy that would contribute to the protection of national interests and structural transformation of the domestic economic system, which, in turn, determines the importance of studying the historical practice of state regulation of export-import activities. From this point of view, the experience of Western European countries is of particular value.

In the post-war years, the foreign trade policy of Western European countries was aimed at restricting imports and strengthening national exports, which provided for the application of customs-tariff, financial, tax, and administrative measures. In particular, high rates of customs tariffs on imports of certain groups of finished products were maintained, domestic taxation for foreign producers was tightened, and export was supported through export lending and subsidies. In order to stimulate exports, European currencies were devalued, which also prevented the outflow of gold abroad, eased the burden of external debt and created favorable conditions for the inflow of direct investment.

The development of exports required direct government support for national production, which was carried out ***through the nationalization of certain industries***, the establishment of public-private partnerships, production subsidies, preferential taxation, direct financing and foreign investment. Levers of state economic influence and enormous financial support within the framework of the Marshall Plan were aimed at the development of strategic industries of industrial production – mechanical engineering, automotive, chemical and pharmaceutical industries, energy, radio and electrical industries, etc., which eventually became the basis for the intensification of technological exports, diversification of vectors of commodity flows, creation of favorable conditions for trade and economic integration of the countries of the Western European region. Taking into account the experience of Western European countries, the main priorities of Ukraine's economic development in the post-war period are the restoration and promotion of strategic production sectors on an innovative basis" [1, p. 41].

To ensure Ukraine's food security, it is important to take advantage of the historical experience of the post-war restoration of French agriculture. The scientist L. Didkovska actualizes the historical and economic assessment of the process of restoring French agriculture after World War II to extrapolate this experience during the post-war revival of the agricultural sector of the Ukrainian economy.

The agrarian reform in France after the Second World War ensured the elimination of the inefficient system of large-scale land ownership in agriculture, the redistribution of land ownership in favor of small producers, the social development of rural areas and the strengthening of food security. The model of development of family-type farming was chosen as the basis of the country's agricultural structure.

The French National Institute of Agricultural Research has stimulated the transition from traditional forms of management to market-based business farms, scientifically justified ways to increase agricultural yields, prospects for the production and use of agricultural machinery. Thanks to SAFER's efforts, the market turnover of agricultural land has become tightly regulated, focused on protecting the national agricultural producer. The success of the policy of forming a stable private capital market in French agriculture was ensured by innovations in the lease of agricultural land (1946), encouraging farmers by regulating the land market to expand farms, combining farmers into cooperatives, a high level of budget support for farmers, stimulating capital investment through subsidies, and forming an organized agricultural market at the pan-European level.

To solve the problems of the agricultural sector, a transparent procurement and sales infrastructure has been created based on cooperation and integration with trade, food and processing industry enterprises. Thanks to a purposeful and consistent policy in the agricultural sector, France not only ensured the food security of its own country in the few post-war years, but also became a global exporter of agricultural products. The concept of agrarian transformation was legalized in the Law On Agrarian Policy (1960), which contributed to increasing agricultural productivity; introduction of technical innovations in agricultural production; development of markets for agricultural products; preservation of undeveloped land; support for family farms and rural development; ensuring social protection of farmers and persons employed in agriculture; regional development of agriculture, taking into account the specifics of the area. Of particular interest in the process of post-war restoration of agriculture in Ukraine is the French experience of forming a stable private capital market in agriculture; state support for cooperatives; redistribution of land between different forms of management, taking into account national interests and priorities, etc. [1, p. 42].

It is impossible to underestimate the role of large-scale business in the post-war restoration and technical modernization of Ukrainian production. It is worth us-

ing the experience of post-war Germany. The researcher T. Slyvka states that after the end of World War II, large industrial concerns became the technological basis of the German "economic miracle". The rapid and successful post-war resumption of production in the concerns is due to a number of factors successfully combined, in particular:

• A significant part of industrial facilities and equipment remained intact after the bombing and could start working as soon as possible. Industrial equipment was relatively new: in 1945, the service life of 34% of industrial equipment was five years.

• Already in the late 1940s and early 1950s, patents exported in particular to the United States were returned, and control over research was relaxed and restrictions on technological development were lifted.

• Successful management of the corporate sector was able to successfully reorient itself to new markets in the United States and

• Extensive use of advanced pre-war and wartime technology when entering new markets and, as a result, strong positions in negotiations in the process of concluding agreements on joint activities with American and British companies (for example, German *BASF* and American *Shell*, German *Bayer* and UK *British Petroleum*).

• West German companies gradually invested Revenues from domestic sales and export supplies in new technology. Volkswagen, for example, only after successful sales at home and abroad in the late 1940s and early 1950s, using pre-war and military factories and technology, began to invest significant resources in new factory and technical improvements. The innovations implemented at Volkswagen before were mainly organizational.

• American and British companies were extremely interested in technological cooperation with German industrial giants.

Thus, as the historical experience of Germany shows, the following measures are necessary for the successful post-war reconstruction of Ukraine:

1) support and development of the existing research base in order to activate scientific, scientific, technical and innovative activities together with ensuring the transfer of technology from the inventor to the manufacturer;

2) state stimulation of innovative activity of corporations, creation of motivation for financial support of small and medium-sized innovative businesses (startups, venture enterprises, etc.), implementation of a policy of professional development of employees, creation of their own research laboratories and development on this basis of high-tech production networks that can quickly respond to changes in global market conditions [4, p.43].

In Ukraine, back in 2022, immediately after the large-scale invasion of Russia, the Government and the Office of the President launched a plan for the restoration of Ukraine, based on 5 basic principles:

1. Immediate start and gradual development: the Plan aims to accelerate sustainable economic growth.

2. Building fair prosperity: the goal is for Ukraine to become a strong European country that attracts foreign investment.

3. EU integration: the Plan promotes rapprochement with the European Union.

4. Restoration of better than it has been on a national and regional scale: focused on improving the lives of citizens and developing regions.

5. Stimulation of private investment: the Plan helps attract capital for the project implementation [5].

The Plan includes national programs such as:

- Strengthening institutional capacity
- Digital State
- Strengthening defense and security
- Striving for EU integration
- Restoring a clean and protected environment
- Energy independence and a green course
- And many others [5].

Conclusion. The Country Recovery Plan is an important step for Ukraine's recovery after the war and the implementation of the country's strategic goals, but only if the global experience of recovering post–war economies is used in this case - its creative development and adaptation to Ukrainian realities and in conditions of proper planning, which includes such important links as defining goals, choosing strategies and determining actions that are required to achieve these goals with the limited (in our exceptional case) resources available to donor organizations. It is worth noting that the population itself can be a fairly powerful investor in the reconstruction of the country through the mechanism of internal borrowing, but this is possible in a democracy only with proper trust in the current government.

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HISTORICAL SCIENCES

SILK PRODUCTS OF AZERBAIJAN IN INTERNATIONAL TRANSIT TRADE (XVII-XVIII CENTURIES)

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https://doi.org/10.5281/zenodo.10975046

Abstract

Azerbaijani cities, located on an important transit trade route between Europe and Asia, have long played an important role in the political and economic life of the countries of Europe and the Middle East. The trade route in the southern region of Azerbaijan (Tabriz–Marend-Julfa-Nakhchivan–Turkiye–Europe) was one of the main routes of transit trade between Europe and Asia. In the eastern direction, the roads led to Isfahan–Bandar Abbas (Hormuz), and from there by sea to India. Medieval documents confirm the transportation of raw silk from Shamakhi to the Ottoman state, Baghdad and Basra, and from there to England. The silk industry, established in Russia during the reign of Peter the Great, was largely dependent on raw materials imported from the Caspian countries.

Shamakhi, Sheki, Aresh, Karabakh, and Ganja played an important role in the raw silk trade. High-quality Azerbaijani silk was supplied to the Ottoman Empire, Russia, Poland, and Western European countries through these territories.

Keywords: International trade, cities of Azerbaijan, trade in the Middle Ages, European-Asian trade, Eastern trade

The modern world economic system is accompanied by the intensification of trade relations between countries. The expansion and deepening of trade relations between countries encourages the conclusion of trade agreements. The participation of States in international integration processes undoubtedly has a positive impact on the development of the national economy. In this regard, the study of the history of international trade does not lose its relevance.

Information about the economic situation, domestic and foreign trade of Azerbaijani cities in the Middle Ages is reflected to a certain extent in the works of many researchers. Many researchers interested in the history of the East cite in their works interesting facts about the Volga-Caspian trade route, about the cities of Azerbaijan playing an intermediary role between Europe and the countries of the East. Researchers of N.Kukanova, S.Burnashev, V.Yakovtsevsky, A. Huseynov, E.Zevakin in their works also focus on the production and trade of silk [11;5;27;8;9]. The scientific work of M.Heydarov, the author of several research papers on the domestic and foreign trade of Azerbaijan in the period under study, can be particularly noted. In his works, he attaches great importance to the trade of Azerbaijan with many countries, the organization of the customs and tax system [7]. Trade issues of the XVII-XVIII centuries also took place in the scientific works of Ch. Kurbanova, A. Semenov, T. Mustafazade [12;22;15].

Azerbaijan, located on the transit trade route from Europe to Asia, has long played an important role in the political and economic life of the countries of Europe and the Middle East. It is for this reason that the Persians, Arabs, Turks, and Mongols who occupied Azerbaijani cities did not destroy bridges on trade routes, did not interfere with the restoration and construction of caravanserais in the right places. In the XVI-early XVII century, Azerbaijani raw silk was one of the most important products of international trade. In the 30s of the XVII century, a small state, Holstein, joined the struggle for Azerbaijani (as well as Gilan) raw silk. Weak in comparison with Dutch, English, and French trading companies, the German company sought to streamline its trade with the countries of the East using the Volga-Caspian route. The Holstein representative office, which included A. Oleari and A. Mendelson, appealed to the rulers of the Russian and Safavid states with a statement of intentions to import raw silk from Azerbaijan and Iran through the Volga and the Caspian Sea to Moscow, and from there through the Baltic Sea to their countries. [23, pp.150-154]. However, a number of economic and political factors do not allow this plan to be implemented.

During this period, the Ottoman state received large customs revenues from the main product of international transit trade, raw cotton. For this reason, the trade in raw silk was accompanied by the Ottoman-Safavid struggle, and these wars destroyed Azerbaijani cities that had received significant development due to trade. This product, sold locally for 8 shillings per pound, was sold on the London market for 12, and sometimes 26-27 shillings [12**,** pp.59-60]. During the reign of Shah Abbas I, the Ottoman-Safavid struggle for the main routes of international transit trade became more fierce. Shah Abbas I sought to deprive Ottoman Turkiye of these revenues, redirect the main route of international trade from the Ottoman territory to the south of Iran–to the Persian Gulf, and from there to Hormuz and European countries. Indeed, at the beginning of the XVII century, Shah Abbas I ensured that

Iranian and Azerbaijani raw silk was sent to Europe by this route [16, p.278]. Undoubtedly, an important role in achieving Shah Abbas's goal was played by his protection by the British and Dutch East India Companies. In turn, Shah Abbas I, by his decree of 1621, granted significant privileges to British merchants. [7, p.71]. After that, they could buy raw silk first-hand. It should be noted that this right was granted to local merchants only after the death of Shah Abbas I in 1629, by Shah Safi I [2, p.77].

Based on the data from sources on the state of transit routes, it can be said that the result achieved by Shah Abbas I did not remain stable. The easing of political tensions and the establishment of long-term peace between the Safavid state and the Ottoman Empire contributed to the return of the importance of the trade route in the southern region of Azerbaijan in the 30-40s of the XVII century. This road (from Tabriz–Marend-Julfa-Nakhchivan–Turkiye–Europe) has again become the main route of transit trade Europe-Asia [7, p.57]. In the West, the main departure points of the European-Asian caravan trade were Istanbul, Izmir and Aleppo. In the city of Togat of the Ottoman Empire, roads from Izmir and Istanbul converged, from here they diverged in different directions. The main line of the transit route to the East was as follows: Erzurum-Иrevan - Nakhichevan - Azadabad - Marand - Tabriz - Ardabil - Qazvin - Qom – Kashan - Isfahan-Bandar Abbas (Hormuz), and from there by sea to India [2, p.78].

Since trade was one of the most profitable areas of activity in the Middle Ages, the warring states agreed not to interfere with the movement of trade caravans. J. Hanway wrote that the Iranians and Turks received such income from trade that they even made an agreement that they should not attack trade caravans even during wars [26, p.17]. This shows how trade occupies an important place in the economic life of countries. The cessation of trade during the war, although temporary, had a negative impact on the income of the parties concerned. The establishment of long-term peaceful relations between the Safavids and the Ottomans (from the 30s of the XVII century to the beginning of the XVIII century) created favorable conditions for the development of the economy of Azerbaijan in the XVII century. The Azerbaijani city of Shamakhi attracted merchants not only by the presence of a large amount of raw silk and silk products. The Shirvan raw silk was of high quality. A. Juvaini, Quatremère de Quincy and others report a large amount of raw silk and silk fabrics imported from Shirvan [4, pp. 52-55]. The traveler of the XV century I.Schildberg also wrote that the best silk is in Shirvan [18, p.52]. C. Forster also confirmed the great importance of silk production in Shirvan [24]. Shirvan silk was exported not only to the eastern countries and cities of the Russian state, even to Venice, where "excellent velvet" was produced from raw silk.

The cities of Azerbaijan, Arash and Shaky, were major centers of silk trade, and their economic importance was confirmed by many medieval travelers [25, pp.23-24]. Raw silk, produced in large quantities in Sheki since ancient times, has been the main export commodity. Based on the data of I.Schildberg, Professor I.Petrushevsky writes that during this period Shaki was a prosperous city producing high-quality silk for export. Referring to E.Chelebi, he writes that after Shamakhi, Sheki and Arash, the city of Ganja was a major center of silk trade [18, p.100].

Many Western European authors mention a type of silk that is called "Seta Gangia" in foreign markets. Ganja silk was of high quality, and Volynsky wrote that “Ganja merchants sent 100 bundles of silk abroad per year" [2, p.84]. According to the data of 1653, the city of Ganja was still considered the center of trade and crafts, although in many respects it had lost its former importance [23, p.184].

E.Chelebi writes that the silk dresses of Tabriz became widely known, they actively participated in domestic and foreign trade [3, p. 254]. It can be said that the trade in fabrics, especially silk and raw silk, was the first among other handicrafts, since fabric production occupied the main place in the cities of Azerbaijan in the XVII century. From Shirvan, Karabakh and many other provinces of the country, raw silk was transported in large quantities to the Ottoman Empire, Russia and Poland, and through their territory to the countries of Western Europe.

Merchants from Azerbaijani cities brought raw silk to Russia, Russian merchants also came to Azerbaijan to buy and sell raw silk. A significant part of the raw silk exported to Moscow and Arkhangelsk was sold there to foreign merchants. In the middle of the XVII century, a pood of high-quality raw silk was sold in the markets of Shamakhi for 22-25 rubles, and in Moscow for 40 rubles [9, p. 137]. Raw silk, purchased in the cities of Azerbaijan for 15-16 rubles per pood in certain periods, brought great income to Russian and European merchants. Thus, in Yaroslavl, a pood of raw silk cost 50-60 rubles, in Arkhangelsk-70 rubles, and in Western European countries - more expensive [9, p.30]. According to the data for 1614, 1 safavid currency was equal to 6 rubles. According to the documents of 1624, 1 safavid currency was equal to 8 rubles [10, p. 20], and according to the data of 1666-1667, 1 safavid currency in Shamakhi was equal to 7 rubles [20, p.61]. At the end of the XVII-beginning of the XVIII century, the exchange rate changed in favor of the ruble. The data on the ratio of safavid currency and ruble cannot be considered accurate, as they are very different. In general, it is impossible to give accurate information about medieval Safavid monetary units, as well as about their units of measurement. The Safavid and European currencies were different depending on the location and period. This is often noted by European travelers.

Since the 70s of the XVII century, Russian-Azerbaijani relations have been developing more widely. Through Russia, trade with Western European countries is also activated. From a 1679 document it appears that the trade in raw silk was concentrated in the hands of certain merchants. An example is the appeal of Shamakhi merchant Mammad Yusif Gasimov and merchant Yeni Julfa Grigory liskov on behalf of their colleagues to the Russian ruler. This petition sought permission to transport 48,7,000 Poods of raw silk across Russia to Western Europe [2, p.96].

Moscow attached great importance to Azerbaijani cities in the raw silk trade. Therefore, during the XVI-

XVII centuries, Russia secretly, or even openly, fought against foreign (England, Holland, France) states that sought to take over Eastern trade. Tsarist and private merchants of Russia not only tried to conduct independent trade in the countries of the South Caucasus, but also "sought to become first-hand merchants in order to receive even more income [22**,** p. 31]. Russian merchants were very dissatisfied with the importation of European goods into eastern countries and eastern goods into Europe by the hands of foreign merchants. The Russians sought to concentrate Eastern trade in their hands, to become intermediaries between the East and Europe themselves. In the end, their struggle was crowned with success. Thus, the English "Moscow Company" in 1649 lost all its privileges and concessions and was forced to trade with Russia on a common basis [10, p.33]. It should be noted that in the 60-70s of the XVII century, inexpensive and high-quality cotton products of Azerbaijani, Iranian, and Central Asian origin successfully competed with Russian fabrics. Therefore, the Russian government prevented their import into Russia by creating a high customs barrier [17, p.120].

In the 80s and 90s of the XVII century, Indian merchants also intensified their activities on the Volga-Caspian route. At the same time, despite the weakening of the importance of transit routes through the Ottoman and Syrian territories, a significant part of Azerbaijani goods were sent to European countries by this route – through Istanbul-Izmir-Aleppo [7, p.76].

During the reign of Peter the Great, silk production was established in Russia and from 1714 to 1725, 14 manufactories were engaged in the production of silk. But the Russian silk industry was almost completely dependent on raw materials imported mainly from the Caspian countries [11, pp.31-56]. According to Peter I's plans, this valuable product, brought from Azerbaijani cities, was used as raw materials in new manufactories in Russia, and from there it was sent to European countries, mainly to England, the Netherlands, France and Poland [21, p.20**]**. The acceleration of the transportation of raw silk from Iran along the Volga-Caspian and Persian Gulf routes did not satisfy the Ottoman court. Transit through the territory of the Ottoman Empire has sharply decreased. The Sultan was worried about the active trade between Iran and the Christian country. The British merchant Bern, who was trading in Shamakhi at that time, writes that the sultan had not received gifts from the shah in the form of 40 bundles raw silks per year for a long time [15, p.29].

Representatives of the upper strata of Azerbaijan did not travel far, often selling their goods to more active Christian entrepreneurs. They used intermediaries in trading operations. Armenian merchants from different countries mostly acted as monopolists in trade operations. Suffice it to note that only in April 1792, Armenian merchants brought 2,600 pounds of Ganja raw silk to Astrakhan [13, p. 122].

The activity of Ottoman merchants in the export of raw silk from Iran and Azerbaijan can be particularly noted. There is information that Haji Mustafa from Bursa brought 42 bundles of raw silk from the territory of the Safavid state (1621). It is clear from the text of the document that the trader had considerable experience in exporting raw silk from the Safavid state to Bursa. Some Ottoman merchants transported and sold raw silk from the Ottoman Empire to other countries. For example, it is reported that 40 bundles of raw silk brought from Bursa were delivered to Venice. There are also reports of the appearance of Azerbaijani and Iranian traders in the markets of Istanbul, Erzurum and Bursa during this period. Sometimes Safavids, including Azerbaijani merchants, stayed in cities of the Ottoman Empire for so long that local judges demanded that they pay taxes levied on their subjects [7, p.78**,** p.69-81]. The economic ties of the Ottoman merchants with the cities of Azerbaijan continued in the XVIII century. A Russian official document dated 1768 reports on the transportation of raw silk from Shamakhi to Turkiye (Baghdad and Basra). From there, raw silk was also shipped to England [14, p. 106].

The importance of the raw silk trade in the economic development of European countries, including the Russian state, is confirmed by many Russian and Western European researchers [19]. Chardin reports on the export of a large amount of silk from Iran and Azerbaijan [8, p.161]. In general and special research works, "Oriental trade" is characterized as the most profitable and profitable [9, p.32]. In the second half of the XVIII century, Russian merchants actively participated in the intense competition for the raw silk market and sales in the Caspian region. In order to have a monopoly position of the Russian trading capital, they sought to exchange their goods mainly for raw silk [1, p.83]. Colonel Stepan Burnashev, who acted as a representative of the Russian Empire during the reign of Kartli-Kakheti Tsar Irakli II, also reports on the role of such areas as Arash, Gabala, and Ganja in silk production. Burnashev wrote about the commercial importance of the city of Ganja in the 80s of the XVIII century. Highly appreciating the role of Ganja in foreign trade, the author wrote that large-scale trade with Iran and India is carried out through Ganja [5, pp.15-21]. According to Bronevsky, the silk produced in Talysh (Lankaran), although in small quantities, was not inferior in quality to Gilan silk [6].

Until the beginning of the XVIII century, Shamakhi silk was transported in large quantities to Europe by the British through Russia and the Ottoman Empire. Since the 40s of the XVIII century, Russian merchants have been strengthening in their place. Azerbaijani silk occupied an important place in trade operations between Azerbaijan and Russia. In the middle of the XVIII century, there were 50 silk enterprises in Moscow, which used an average of 3 thousand pounds of raw silk [27, p.121]. Shamakhi lagged behind the cities of Northern Iran in silk production. Shamakhi, which has long been the center of Shirvan economic and political life, has played an important role in its economic life throughout the entire period of Azerbaijan's history. In the second half of the XVIII century, Azerbaijan remained the main raw material base for Russian manufactories. In return, Russia exported industrial products and handicrafts to Azerbaijan.

In exchange for the export of raw silk, as well as silk fabrics, medieval merchants, who conducted a very

large trade, supplied Azerbaijani cities with cotton fabrics, furs of various types, spices, pearls, colored precious stones. Numismatic data also confirm the trade relations of Azerbaijani cities during the period under study. Evidence of this connection is Safavid, Ottoman, and Indian money discovered in the cities of Ganja, Iravan, Nakhichevan, Tabriz, and Shamakhi and dating back to the XVII-XVIII centuries. Raw silk products were considered suitable for long-term transportation due to their low weight and high demand.

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MATHEMATICAL SCIENCES

FROM THE PHYSICAL REALITY OF IMAGINARY NUMBERS IT FOLLOWS THAT THE INVISIBLE AFTERLIFE WORLD PREDICTED BY ALL RELIGIONS ACTUALLY PHYSICALLY EXISTS.

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Abstract

The article proves that the generally accepted version of STR, which states that imaginary numbers are physically unreal, is incorrect. Experimental evidence is given of the general scientific principle of the physical reality of imaginary numbers, with the use of which a corrected version of the SRT was created. She argues that in addition to our visible universe, there are many other mutually invisible universes in nature. And they form the actually physically existing afterlife invisible world, predicted by all religions.

Keywords: imaginary numbers, special theory of relativity, invisible universes, afterlife invisible world

1. Introduction

Imaginary numbers, discovered about 500 years ago by Scipione Del Ferro, Niccolo Fontana Tartaglia, Gerolamo Cardano, Lodovico Ferrari and Raphael Bombelli [1], are known to everyone and are currently used in all exact sciences. They are even studied in school mathematics courses. But unlike other numbers that are understandable to everyone - integers and fractions, positive and negative, scalar and vector, etc. - their physical essence has not yet been explained. Indeed, what 2 kg., 3 m., 4 sec. is clear to everyone, but what is 2i kg., 3i m., 4i sec., where $i = \sqrt{-1}$, no one can explain. Nevertheless, no one cared about this, just as, for example, now no one cares that the phenomenon of ball lightning is not explained.

But at the beginning of the 20th century, Joseph Larmore [2], Nobel Prize winner Hendrik Anton Lorenz [3], Jules Henri Poincaré [4], Nobel Prize winner Albert Einstein [5] and other outstanding scientists created a special theory relativity (SRT), which is rightly considered to be an outstanding scientific achievement of physics of the 20th century, since it proposed the principle of relativism. And which is therefore now studied in all physics textbooks used in the educational process even at the most prestigious universities. However, in this theory, calculations using relativistic formulas, which were the final result of all reasoning, in some cases led to a result measured by imaginary numbers. And this result already needed to be explained. After all, no one would need a theory that even its creators could not explain. But the authors of SRT did not know how to do this. And the fate of the service station hung in the balance. But it was saved by the fact that an additional postulate was introduced into the SRT, called the principle of not exceeding the speed of light, from which it followed that quantities measured by imaginary numbers do not exist in nature. And therefore, there is no need to explain them.

This is the form in which SRT is still taught.

2. The physical reality of imaginary numbers.

But besides SRT there are other sciences. Including the theory of electrical circuits, which is used in radio engineering, electrical engineering and computer science. Fundamental to this theory is Ohm's law [6], [7], discovered in 1826 for DC electrical circuits, which is now studied even in school physics textbooks. And in 1893, Charles Proteus Steinmetz proposed its interpretation of Ohm's law for alternating current electrical circuits [8], which is now used daily by millions of engineers around the world in their work. In this theory of electrical circuits, the imaginary resistances of capacitors and inductors, which can be measured by instruments, were recognized as actually physically existing. And if these imaginary resistances were recognized as physically unreal, as follows from SRT, then neither radio engineering, nor electrical engineering, nor computers, nor radio measuring instruments should exist.

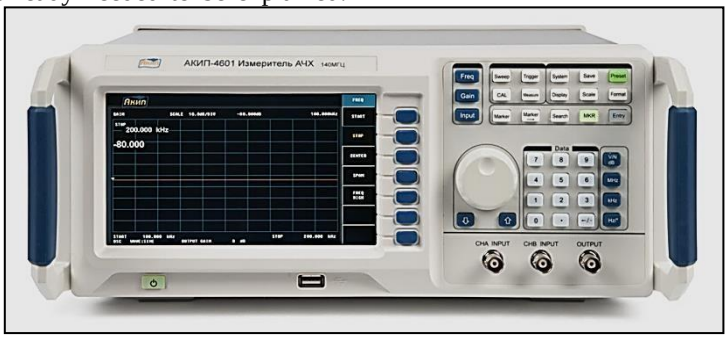

Fig. 1. In any radio-technical laboratory there are devices called frequency response meters, which prove the physical reality of imaginary and complex numbers by their mere existence

But they do exist. And thereby they prove the physical reality of imaginary numbers [9]-[33]. Consequently, by the existence of radio- and electrical engineering, the generally accepted version of SRT was refuted even before its creation. Other proofs of the physical reality of imaginary numbers have been published in [34]-[46]. Therefore, the logical conclusion is that the version of STR currently presented in all physics textbooks is incorrect [47]-[66].

3. Physical reality of invisible parallel universes

In the existing generally recognized version of STO from its relativistic formulas and the principle of non-exceeding the speed of light also follows that in nature there is only our visible universe in which everything is measured only by real numbers.

However, in the corrected version of STR [67]-[74], from its relativistic formulas it follows that in our Multiverse [75]-[85], in addition to our visible universe, there are also about twenty other mutually invisible parallel universes.

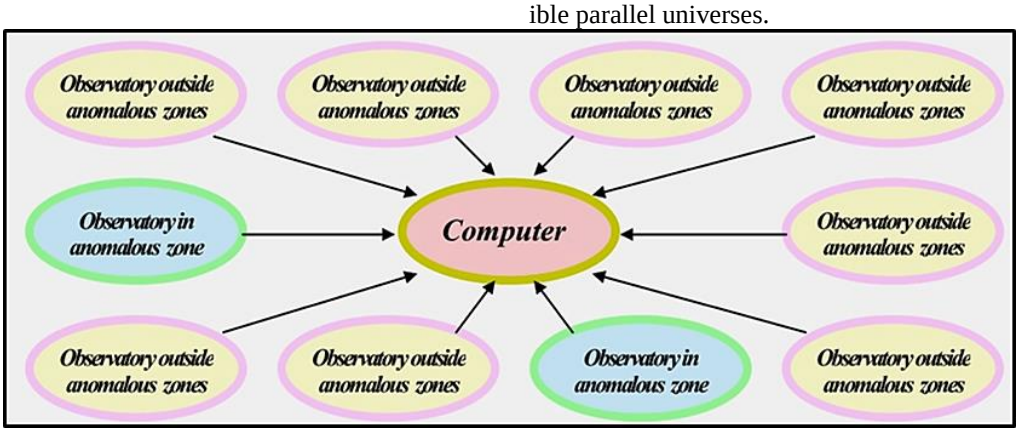

***Fig. 2**. Scheme of an astronomical experiment to detect invisible universes*

And one can be convinced of their existence [86]-[91]. as a result of astronomical observations of the starry sky in portals [92]-[94], since the constellations in them will differ - and the further into the portal one penetrates, the greater the differences will be - from the constellations observed at the same time in the same region outside the portals. And since there are a lot of anomalous zones [95]-[98] on Earth, presumably being entrances to portals, some observatories have already are located in such anomalous zones. Like, for example, the main astronomical observatory of the National Academy of Sciences of Ukraine, located in Goloseevsky forest 12 km from the center of Kyiv. Therefore, in order to verify the existence of neighboring invisible universes adjacent to our visible universe, it is enough to compare on a computer the observations of this observatory with the observations of neighboring observatories located outside the anomalous zones.

4. Why, despite all the refutations of the generally accepted version of SRT, set out in all physics textbooks, it continues to be taught.

But this simple and low-cost experiment, which in the most indisputable way will allow us to answer the question of whether there are invisible universes neighboring our visible universe, no one has done or is going to do. Obviously, because physicists do not need such an answer, since it will refute the version of STR studied in textbooks.

The corrected version of STR states that imaginary numbers are physically real and invisible universes exist. Therefore, having become convinced of the existence of invisible universes, we will have to admit that the corrected version of STR is correct and once again be convinced that imaginary numbers actually physically exist. And then it will inevitably be necessary to explain their physical meaning of imaginary numbers. And it is obvious - in addition to our visible world, there is an invisible world.

5. The existence of a physically real invisible world

However, the usefulness for science of the above experimental evidence of the physical reality of imaginary numbers goes beyond problems of correcting the version of SRT given in physics textbooks. From experimentally proven principle of the physical reality of imaginary numbers, one will inevitably have to conclude that the results of all studies described by imaginary numbers in all other exact sciences also are physically real.

Then many difficult questions will arise. For example, what exists in the looking glass when we see ourselves in the mirror? And therefore, in the end, we will have to admit that in ad-dition to our visible world, there is also a huge (most likely even much larger than our visible world) invisible world [99]-[107].

Indeed, in addition to the room in which we are now and which we see, there are a large number of other invisible to us rooms in other apartments, houses, cities and countries. The same situation is in space - in addition to our visible universe, in other dimensions there are about twenty other parallel universes of the hidden Multiverse that are invisible to us. And outside of our hidden Multiverse in the Hyperverse, there are many other Multiverses.

And the existence of such a world invisible to us, in which Gods and the souls of the dead live, was long predicted by all world religions. Consequently, what these religions say about the world order, about the afterlife, is true. And therefore, all of us, the inhabitants of planet Earth, will now have to believe in this and adjust our behavior accordingly.

6. Conclusion

The author hopes that the information presented in the article will be an incentive to unite the efforts of science and religions in their activities for the benefit of people.

Acknowledgments

The author is cordially grateful for the understanding, comments and help of his wife Olga Ilyinichna Antonova.

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DOI: 19.24412/9215-0365-2021-73-2-39-43

MATHEMATICAL METHODS OF MULTIDIMENSIONAL DATA INTELLIGENT ANALYSIS

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Abstract

The presented article is of an overview nature, the purpose of which is to describe the main methods that can be used to analyze and visualize the multidimensional and big data. Multidimensional data analysis provides a deeper and more complex analysis of the data, exploring the relationships and dependencies between different aspects of the data. There are a lot of mathematical methods, approaches and algorithms that can be used to provide the analysis of the multidimensional data. Mathematical methods and information technologies using allow to process big data and present them in a convenient form for making effective management decisions in different data domain. The results of the multidimensional data analysis also can be used to construct generalized strategies for effective decisions making process.

Keywords: intelligent analysis, mathematical methods, multidimensional data, data cube

Introduction. An integral part of the mankind existence is analysis. Nevertheless, the human brain is limited in the perception of big and multidimensional data, and the modern world dynamics of the processes is the cause of numerous problems. The impossibility of their trivial solution leads to use of mechanisms for processing big data and extracting meaningful information from data domain. For these reasons, some of the tasks can be executed with intelligent analysis methods and due to automation of the information processing processes. Particularly difficult to solve are the problems associated with the data domain, where the inputs have a large number of variable parameters and depend on the environmental conditions changing in an indeterminate way. This type of task includes making a decision on planning organization purchases and the budget, forecasting the change in payables and receivables, forecasting the exchange rate or even adapting the automatic transmission operation of the car. Therefore, the search for effective ways to apply intelligent methods of multidimensional data analysis is a modern scientific and practical task with a wide space for use.

The origins of intelligent data analysis can be traced back to the late 80s, when the term began to be used in the research community, although then there was no understanding covering the term. The sources for processing at that time were tabular data, and the main problem was the limitation in the calculation productivity and the amount of the databases queries. In addition, until the early 90s, data analysis was generally recognized as a sub-process in a knowledge mining process in databases [1]. Now with the growth of computing productivity, this is not a cause for concern. More important is a development and improvement of data processing methods and algorithms. It is possible to distinguish several algorithms among them, that are widespread when trying to intelligent analysis, namely: the k-mean clustering method developed by H. Steinhaus in the 50s, the decision tree construction algorithm created by R. Quinlan, the algorithm for associative rules searching in apriority data, which was proposed by R. Agrawal and R. Srikant a method of reference vectors used for classification and regression analysis, authored by V. Vapnik, a method for visualizing multidimensional data created by T. Kohonen, and other. Based on even this, a small list of approaches to data processing, it is possible to say that there is a well-developed set of available methods applied to an increasing variety of data. Another driver for research in the field, however, is the ever-growing size of the data, requiring new practices for data analysis. Therefore, despite the large number of works and scientists, this issue remains an actual scientific and practical task and needs further development.

Results. Multidimensional data is data consisting of one or more numbers or one or more variables. Analysis of such data combines basic methods of data mining with multidimensional analysis based on real-time analytical processing [2]. Multidimensional model construction can be provided for the different data domain. There are a lot of approaches, mathematical methods and algorithms that are used to analyze and visualize multidimensional data, namely [3]:

- multiple regression, that is used to predict events and involves creating a contingency table;

- multivariate analysis of variance (MANOVA), that allows to analyze the relationship between dependent and independent variables. The analysis performs regression and variance analysis for multiple dependent variables on one or more factor variables or covariates.

- discriminant analysis (DA), which is used for classification in homogeneous groups and for data analysis when the dependent variable is categorical and the predictors (independent variables) are interval. It helps to decide which variables discriminate between two or more emergent aggregates (groups).

- factor analysis that is used to identify dependencies between variables and determine which of them are

most significant and which do not affect the overall picture. There are some terms used in factor analysis: the factor is a kind of hidden variable that explains the relationship between the set of variables; factor load is a factor that shows how strongly each indicator affects a given factor; a factor space is a multidimensional space in which each variable is represented by a factor.

Multidimensional data analysis is a difficult task, since it becomes necessary to carry out multiple correlations or pairwise comparisons, also unnecessary predicts are appeared. Therefore, the problem of reducing the dimensionality of data is an integral part of solving the problem of multidimensional data analysis. Reducing the data dimension allows you to extract only the most significant of them, however, reducing the dimension leads to the partially data loss. The most popular mathematical methods of reducing data dimensionality are:

- principal component analysis (PCA) is one of the most commonly used methods of dimensionality reduction, which allows you to rotate the coordinate system of a multidimensional space so that the first axes describe the greatest data distribution, and the last ones – the smallest. In this case, the last axes can be discarded;

- exploratory factor analysis (EFA) is an unrestricted analysis, used to find factors that provide the best correlation between variables;

- confirmatory factor analysis (CFA) is used to separate errors from the true values when generating the measurement model;

- cluster analysis that is used to simplify objects and divide them into different sets and groups.

To improve the visibility of multidimensional data and the results of their analysis, specialized mathematical methods are also used, for example, the most famous of them:

1. Multidimensional scaling (MDS). The result of the multidimensional scaling method is to construct the data distribution so that the distance between objects corresponds to the values given in the distance matrix [4]. The coordinate axes that occur in this case can be interpreted as some factors which values determine the differences between objects. The main dimensions can be determined by the method of the main components. The multidimensional scaling method can be implemented as a linear and non-linear. Linear multidimensional scaling method uses the method of the main components not for the output distances matrix, but for the double-centered matrix, that has 0 value as an average in each row and column. Double-centered matrix is calculated using the output data. After that, it becomes possible to determine the dimension of the space, which provides accurate reproduction of the distances matrix of. In non-linear methods, the dimension of the space is first given and the quality functional is optimized using gradient methods, describing the measure of the error of the distances matrix. Mathematically the main idea of MDS can be described as follows [5]. Let's assume there are points $x_1,x_2,\ldots,x_n$ in the dimensions space k. The distance between points x_i and x_j is defined as $\delta_{i,j}$. Let's find points $y_1, y_2,\ldots, y_n$ in a space of smaller dimension so that the distance between them, specified as $d_{i,j}$, is found according to the $\delta_{i,j}$. The ideal situation is when there is a direct correspondence $d_{i,j} = \delta_{i,j}$, but in the non-trivial case, when moving to a space of smaller dimension, it is impossible to get such equality. The problem can be solved with method that find the dependence di,j on i,j as a minimization of some target function. Also it is possible to use minimization of the standard deviation using the formula:

$$J(y) = \frac{\sum_{i<j}(d_{i,j} - \delta_{i,j})^2}{\sum_{i<j}\delta_{i,j}^2}$$

In this case the gradient descent can be used. Multidimensional data scaling mapped to the plane does not solve all the issues of input data visualization. The actual task is to map not only the data points themselves to a two-dimensional or three-dimensional map, but also represent various information accompanying the initial data, for example:

- the positions of points in the original space;
- the number of different subsets;
- other continuously distributed values specified in the original feature space.

The main disadvantage of MDS is the complexity in data interpretation.

2. Method of t-Distributed Stochastic Neighbor Embedding (t-SNE), that is mostly used for visualization multidimensional data with the complex nonlinear relations between variables in the space with the lower dimension [6]. The t-SNE algorithm works by giving each data point a suitable location on a two-dimensional or three-dimensional maps. It does is good in fixing the local structure of multidimensional data and detecting global structures such as clusters at different scales. The t-SNE algorithm begins by transforming the distances between data points in multidimensional Euclidean space into conditional probabilities reflecting the degree of similarity [7]. The degree of similarity between the x_j data point and the x_i data point is expressed by the conditional probability $p_{j|i}$, which means that the x_i point selects the x_j point as its neighbor, proportional to their Gaussian density, centered at x_j. For near data points, the probability $p_{j|i}$ is high, whereas for separated data points, this probability is almost infinitesimal. Conditional probability, is defined as:

$$p_{j|i} = \frac{\exp(-||x_i - x_j||^2/2\sigma_i^2)}{\sum_{k\neq i}\exp(-||x_i - x_k||^2/2\sigma_i^2)}$$

where σ_i – is the variance of the Gaussian coefficient centered at data point x_i.

If the points on the map, marked as y_i and y_j, correctly reproduce the degree of similarity between high-dimensional data points x_i and x_j, then the conditional probabilities $p_{i|j}$ and $q_{i|j}$ will be the same. By this t-SNE attempts to find a low-dimensional data representation that minimizes the discrepancy between the $p_{i|j}$ and $q_{i|j}$.

In addition to mathematical methods that allow formalizing multidimensional analysis, information technologies and tools with built-in constructors are widely used for the purposes. For example, one modern way to conduct multidimensional analysis is the OLAP (online analytical processing) technology [8], that consists in preparing summary information based on large amounts of data structured according to a multidimensional principle. In this context, an OLAP cube is a

multidimensional data aggregate, and an OLAP system is a pivot table interface for examining a cube using a query language or graphical user interface. A multidimensional data model is usually organized from a given data domain that represented by a table of facts and dimension tables. Facts are numerical measures by which it is possible to analyze the relationships between dimensions, also it can be presented as the numerical data of a business. In general, dimensions can be characterized as points of view or entities within a given data domain. Tables of facts are used to store data domain numeric data [9].

Each dimension may have an associated table called a dimension table, which describes the dimension more detailed, with context and background information. In general, these data can be considered in the form of a cube, which allows to model, search, analyze, and present data in several dimensions. Although cubes usually presented as three-dimensional geometric structures, in a data storage the data cube is multidimensional [10].

In the paper there is the result of the multidimensional model development. The created multidimensional model contains data with the average results of an admission company in educational institutions of Ukraine with parameters: years, regions, exam subjects and specialties for applicants. Selected parameters allow to track changes in subjects scores, analyze data by regions and specialties.

For example, a dimension table for specialties can contain attributes: name, form of training, type of bid. Dimension tables can be defined by users or experts, or automatically generated and adjusted based on data distribution.

Tabular data representation has two-dimensional data, for example as it is shown in Table1.

Table 1.

Two-dimension tabular data representation

Dnipropetrovsk region				
Year (time dimension)	*Subject dimension*			
	Maths, average exam score	*Ukrainian language, average exam score*	*Foreign language, average exam score*	*Geography, average exam score*
2020	*167*	*158*	*132*	*144*
2021	*189*	*170*	*167*	*165*
2022	*167*	*140*	*155*	*163*
2023	*179*	*177*	*143*	*179*

Sourse: own work

Table 2 presents two-dimensional data with the average results of an admission company in educational institutions for Dnipropetrovsk region with using time and subject dimensions. Data can be presented two-dimensional tabular form, including the third dimension, for example regions, as it is shown in Table 2.

Table 2.

Three-dimensional tabular data representation

YYear	*Regions dimension*											
	Dnipropetrovsk region				*Ternopil region*				*Sumy region*			
	Subject dimension											
	Maths	*Ukrainian language*	*Foreign language*	*Geography*	*Maths*	*Ukrainian language*	*Foreign language*	*Geography*	*Maths*	*Ukrainian language*	*Foreign language*	*Geography*
2020	*167*	*158*	*132*	*144*	*143*	*179*	*133*	*145*	*167*	*169*	*143*	*187*
2021	*189*	*170*	*167*	*165*	*154*	*145*	*164*	*162*	*169*	*171*	*145*	*134*
2022	*167*	*140*	*155*	*163*	*144*	*166*	*159*	*153*	*147*	*155*	*167*	*176*
2023	*179*	*177*	*143*	*179*	*174*	*180*	*145*	*136*	*169*	*173*	*176*	*154*

Sourse: own work

The three-dimensional data in Table 2 is presented as a series of two-dimensional tables. It is also possible to represent the same data in the form of a three-dimensional data cube, as it is shown in Figure 1.

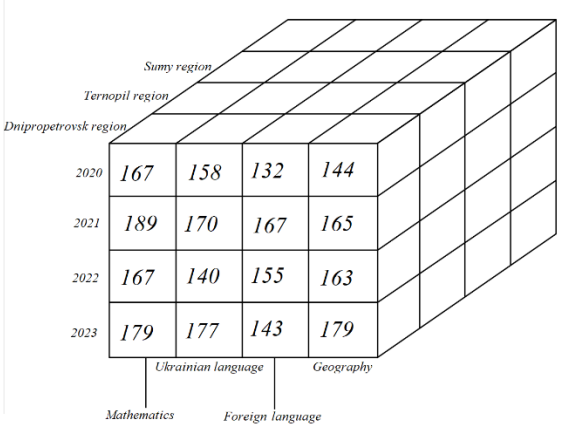

Figure 1. Three-dimensional graphical data representation using data cube

As data cube in the multidimensional data analysis may have more than three dimensions, it can be presented in the form of 4D data cube. For this purpose, it is possible to add one more dimension, for example «specialties». Graphical representation in such a case starts to be complex, but the data cube can be displayed as the set of 3D data cubes, as it is shown in Figure 2.

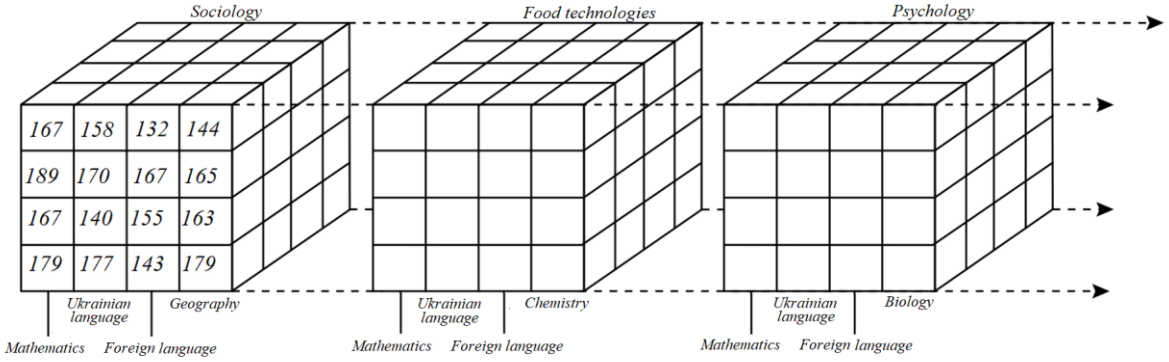

Figure 2. Four-dimensional graphical data representation using data cube

If to continue add dimensions, any n-dimensional data as a matrix of $(n-1)$ -dimensional cubes can be constructed. At the same time the actual physical storage of such data may differ from their logical graphical representation. Using a matrix of dimensions, a set of cubes or cuboids for each of the possible subsets of given dimensions can be built for the further analysis. The result forms an array of cuboids, each showing data at a different level of summation, aggregation or grouping.

Software implementation of the described OLAP cubes can be provided, for example, with Power BI Desktop using SQL Server Analysis Services or using Python and the framework cubes.

Conclusion. In the paper the task of the multidimensional analysis is discusses. Nowadays all data domains have complex, big, multidimensional data, that are used to ensure the effectiveness of the control operations and the decision making process. Mathematical methods are used to analyze data in different aspects. To simplify the perception of data multidimensionality and to increase the clarity of multidimensional analysis, mathematical methods can also be used, for example, such as: Multidimensional scaling or Method of t-Distributed Stochastic Neighbor Embedding. Online analytical processing technology is used to analyze and visualize the multidimensional data as well as the mathematical methods.

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MEDICAL SCIENCES

PHARMACOLOGİCAL EFFECTS OF MEDİCİNAL PLANTS İN MANAGİNG DİSEASES AND PATHOLOGİCAL CONDİTİONS ASSOCİATED WİTH ARTERİAL PRESSURE VARİATİONS

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Abstract

This article delves into the multifaceted nature of hypertension, a prevalent cardiovascular disorder characterized by persistently elevated arterial blood pressure. It underscores the significant health risks associated with untreated hypertension, including myocardial infarction, stroke, renal dysfunction, and vision impairment, which collectively can severely degrade quality of life and lead to disability. The pathogenesis of hypertension is explored, highlighting the pivotal roles of vascular tone dysregulation, cardiac rhythm abnormalities, alterations in blood volume and pressure, and imbalances in water-salt homeostasis. A distinction is made between essential arterial hypertension, which lacks a specific organ disease cause, and secondary hypertension, which results from underlying organ or systemic diseases.

Furthermore, the article addresses the symptomatic presentation of hypertension, emphasizing common manifestations such as persistent headaches, facial edema, chest pain, visual disturbances, and tinnitus. The severe implications of a hypertensive crisis are also discussed, noting its sudden onset and potential life-threatening symptoms.

The management strategy for hypertension is outlined, advocating for a progressive approach to normalize blood pressure levels. This includes both non-pharmacological interventions—like lifestyle modifications and dietary adjustments—and pharmacological treatments when necessary. Risk factors contributing to the development of hypertension, including genetic predispositions and lifestyle choices, are examined to provide a comprehensive understanding of its etiology.

Lastly, the article proposes the integration of medicinal plants alongside conventional medications in hypertension management, cautioning about the potential interactions and emphasizing the importance of selecting therapeutic plants compatible with pharmaceutical treatments. This holistic approach aims to offer a more nuanced perspective on hypertension management, blending traditional and modern medical practices for optimal patient care.

Keywords: Hypertension Management, Medicinal Plants, Pharmacological Properties

Hypertension, characterized by an elevated diastolic and systolic blood pressure, is a condition that correlates with age; an increment in arterial tension (AT) alongside aging is deemed physiological. Globally, 15-30% of the population is afflicted by hypertension, with its prevalence being notably lower in individuals below 40 years of age. Gender and age play significant roles in its occurrence: it is more prevalent in men under 50 and in women post-50. Despite the unclear etiology, racial and gender disparities in incidence rates are evident. Normal blood pressure is identified as 130/85 mmHg across all ages, with values starting from 140/90 mmHg indicative of arterial hypertension. This condition is not uncommon, affecting 10-30% of the elderly, with primary arterial hypertension representing 90% of cases as an idiopathic disorder. Secondary arterial hypertension, comprising the remaining 10%, arises due to underlying diseases, predominantly affecting kidneys, endocrine glands, and lungs. Furthermore, certain treatment regimens including corticosteroids, cyclosporine, MAO inhibitors, erythropoietin, and excessive fluid intake can induce drug-induced and transient hypertension.[2]

Overview of Hypertension and Its Comprehensive Management

Hypertension, if left unaddressed, can significantly impact various organs and systems within the body, potentially resulting in critical conditions such as myocardial infarction, stroke, renal impairment, and loss of vision, which may decrease quality of life, reduce work productivity, and lead to disability. The development of arterial hypertension involves several key mechanisms, including vascular tone dysregulation, cardiac rhythm and contractility abnormalities, changes in blood volume and pressure, and imbalances in the body's water-salt equilibrium. These factors, particularly the efficiency of the heart's pumping action and the regulation of vascular tone—often influenced by renal function—play crucial roles in the dynamics of blood pressure. [3]

Arterial hypertension is classified into two main types:

Essential Arterial Hypertension: This type pertains to high blood pressure that is not caused by any identifiable organ diseases.

Secondary (Symptomatic) Arterial Hypertension: This type refers to high blood pressure that arises as a consequence of specific diseases affecting organs or systems.

Additionally, episodic increases in blood pressure may be triggered by conditions such as obstructive sleep apnea syndrome, neuroses, improper use of certain medications, and the excessive intake of caffeine or other stimulants. [1]

Symptoms of Arterial Hypertension:

The condition often presents with persistent headaches, edema around the eyes or face, chest pain under various conditions, disturbances in vision, and ringing in the ears. A hypertensive crisis, marked by sudden, extreme elevations in blood pressure, can result from stress, physical exertion, or the abrupt discontinuation of antihypertensive drugs, and is characterized by severe symptoms including intense headache, visual problems, nausea or vomiting, facial flushing, chest discomfort, shortness of breath, and in some cases, seizures. [5]

Approaches to Managing Arterial Hypertension:

The primary goal in treating arterial hypertension is to normalize high blood pressure gradually and methodically, as advised by medical experts worldwide. The comprehensive management strategy includes:

- Adopting non-pharmacological measures in milder cases through lifestyle changes such as reducing salt intake, losing weight, participating in moderate exercise, quitting smoking, and using herbal sedatives.
- Initiating pharmacological treatment when lifestyle adjustments are insufficient. [4]

Risk Factors for Developing Arterial Hypertension:

The risk of developing hypertension can be influenced by aging, genetic predisposition to heart disorders, pre-existing coronary artery diseases or cardiac surgeries, obesity, diabetes, obstructive sleep apnea, and alcohol use. [6]

Lifestyle Modifications for Hypertension:

Patients are encouraged to embrace a healthier lifestyle that includes a nutritious diet, increased physical activity, avoidance of smoking and limiting caffeine and alcohol intake, stress management, and the preference for herbal teas. [7]

Seeking Medical Consultation:

Consulting with a healthcare provider is essential for effective hypertension management.

Incorporating Medicinal Plants in Hypertension Treatment:

In addition to conventional medication, the management of hypertension may benefit from the judicious use of herbal teas. It is essential to acknowledge that the chemical composition of certain herbal remedies may differ from pharmaceuticals, which could result in adverse interactions. Therefore, the selection of medicinal plants for treatment should consider their therapeutic properties and compatibility with standard medical therapies. [3]

Hawthorn (Crataegus):

Hawthorn, a plant with a rich history of medicinal use, is recognized for its therapeutic benefits, particularly in cardiac health. It thrives in various environments, including rocky terrains, thickets, mountainous areas, and forests. Hawthorn is lauded for its efficacy in lowering high blood pressure associated with arterial hypertension, aiding in the repair of vascular nodules and atherosclerotic thickenings, enhancing vascular elasticity, reducing the risk of myocardial infarction, facilitating the elimination of edema, and exerting anxiolytic effects. [2]

Hawthorn (Crataegus) Utilization in Medical Practice:

Hawthorn Flowers: Indicated for functional cardiovascular disorders, hypertension, angina pectoris, angioneuroses, climacteric neuroses, insomnia, and physical or mental exhaustion. Preparation involves steeping one tablespoon of the flowers in 200 ml of boiling water for 15 minutes in a water bath, then cooling and straining. The infusion is taken three times daily, consuming one-third of a cup 30 minutes prior to meals.

Hawthorn Fruits: Recognized for their rich content of antioxidant flavonoids and vitamins, particularly vitamin C, these fruits are beneficial in managing hypertension, angina, and atherosclerosis. One method of preparation involves boiling one tablespoon of dried hawthorn fruit in 200 ml of water, allowing it to steep for 10 minutes, straining, and then adding one teaspoon of honey before consumption. This tea may be consumed twice daily. Alternatively, seven tablespoons of dried berries may be steeped in a 2-liter thermos overnight, strained in the morning, and consumed daily with added honey for enhanced taste. [8]

Hawthorn Leaves: Used predominantly for cardiovascular and vascular conditions, including as a treatment to alleviate vein blockages. Leaves are steeped by removing boiling water from heat, adding the leaves, and allowing them to brew for 5-6 minutes.

Hawthorn Vinegar: Known for its vasodilatory properties, it can be consumed by adding one teaspoon of hawthorn vinegar to a glass of water, twice daily. Its benign nature facilitates ease of consumption.

Continued use of hawthorn fruits and leaves positively impacts blood pressure regulation, nerve calming, and sleep improvement.

Leonurus cardiaca (Motherwort) in Phytotherapy:

Leonurus cardiaca, commonly known as motherwort, holds a distinctive place in herbal medicine due to its broad therapeutic effects. Of the 25 known species, only three are extensively used in phytotherapy. Motherwort is a resilient wild herb, with several species cultivated for medicinal purposes. [1]

This herb is rich in vitamins, minerals, bioactive compounds, and essential oils. Its bioflavonoids, notably quercetin and rutin, diminish capillary fragility and safeguard against damage, enhancing capillary circulation and normalizing blood clotting. The saponins present confer diuretic and sedative properties, beneficial in alleviating severe coughs. The vitamins in motherwort, particularly tocopherol and carotenoids, bolster the immune system, augmenting disease resistance and offering antioxidant protection against free radical damage and aging. Quindarin, found in motherwort, diminishes reflex wakefulness in the central nervous system, aiding in stress and tension relief. Oleuropein regulates cardiac muscle contraction, stabilizes heart rhythm, and maintains arterial pressure. The plant's richness in calcium, sodium, and potassium renders it invaluable in cardiovascular disease management. [4]

Motherwort's glycosides and organic acids provide cardioprotective and vasculoprotective benefits, combating peripheral edema associated with cardiovascular system ailments. Its spasmolytic and diuretic effects enhance heart function and normalize arterial pressure, while also managing plasma glucose levels and lowering cholesterol and triglycerides.

Overall, motherwort is beneficial for insomnia, sleep disorders, headaches, migraines, tachycardia, arrhythmias, cardiovascular issues, hypertension, atherosclerosis, bronchitis, tracheitis, laryngitis, menopause, and climacteric syndrome. However, its use is not recommended for pregnant women, children, individuals with arterial hypotension, hyperacid gastritis, gastric ulcers, or bradycardia. [6]

Usage: A standard preparation involves steeping two tablespoons of the herb in 200 ml of boiling water for 15 minutes in a water bath, cooling, and straining. Consumption is advised twice daily, half a cup an hour before meals. Alternatively, 30 grams of motherwort can be macerated in 70% alcohol for two weeks; the resultant tincture, taken four times a day at one teaspoon each time half an hour before meals, can alleviate neuroses, palpitations, pressure, cardiopathies, and dyspnea. Those with bradycardia, thrombosis, thrombophlebitis, and arterial hypotension should consult a healthcare provider before use, as excessive intake may lead to fainting or cardiac arrest.

Melissa officinalis (Lemon Balm) in Pharmacotherapy:

Melissa officinalis, commonly known as lemon balm, is a medicinal herb recognized in the pharmacopoeia for its multifaceted therapeutic properties. It exerts a calming, antispasmodic, analgesic, and hypnotic effect. The bioflavonoids and other organic compounds present in lemon balm contribute to the normalization of heart rhythm. It is employed in the treatment of neuroses, hypertension, tachycardia, insomnia, premenstrual and climacteric syndromes, chronic fatigue syndrome, headaches, gastrointestinal discomfort such as flatulence and intestinal cramps, rheumatism, gout, and neuritis. Additionally, it is associated with a reduced risk of Alzheimer's disease. [7]

Usage: To prepare, one tablespoon of the herb is steeped in 200 ml of boiling water for 15 minutes in a water bath, then cooled and strained. Enhancing the infusion with half a teaspoon of honey may increase its benefits. It is recommended to consume one-third of a cup three times daily, 30 minutes prior to meals.

The efficacy of complex herbal teas lies in their ability to soothe the nervous system, alleviate internal spasms, stabilize arterial pressure, improve the function of vital organs, and detoxify the body. Their intake can enhance kidney and heart functions, reduce leg edema, and facilitate the elimination of toxins. It is crucial to adhere to the recommended dosage for optimal outcomes.

When crafting complex herbal teas, it is vital to grind or finely chop the herbs for uniform mixing. The constituents should be measured by weight, combined, and stored in a dry, dark place. Medicinal plants used in these mixtures can be obtained from pharmacies or specialized centers, although many can also be self-sourced.

Anti-Stress Herbal Complex: A formulation comprising catnip, eggplant, and blackberry extracts is noted for its rapid and sustained calming effects. A specific blend might include 60 grams of watermelon herb, 80 grams of hawthorn flower, 50 grams each of corn fringe and sorrel flower, 90 grams of damotu herb, 50 grams of blackberry leaves and flowers, 60 grams each of myrtle leaf and Ginkgo biloba leaf. This mix can be prepared with 1 liter of boiled water, including additional components like 10 grams of medicinal lemon leaves, 20 grams of daz dried flowers, and 10 grams of dried hawthorn fruits. [3]

Hypericum perforatum (St. John's Wort) in Medical Use:

St. John's Wort, utilized predominantly for its aerial parts including leaves and flowers, is rich in hypericin, flavonoids (quercetin, rutin), hyperoside, xanthones, and other compounds. Its constituents, hyperforin and adhyperforin, enhance neurotransmitter levels (serotonin, noradrenaline, dopamine), making it widely used for depression treatment. The aqueous infusion's activation of the CYP 3A4 enzyme facilitates the breakdown of chemical drugs, preventing their accumulation in tissues, thereby supporting its co-administration with various pharmaceuticals.

Indications: St. John's Wort is recommended for various forms of depression, tachycardia, menopausal symptoms, attention deficit and hyperactivity disorders, conditions of weakness, fatigue, asthenia, fibromyomas, pain reduction, adjunctive tumor treatment, vitiligo, neuritis and nerve pain, gout, diarrhea, and the healing of wounds and burns.

Usage: An infusion can be made by steeping 3 tablespoons of the herb in 3 cups of water, consumed one cup thrice daily before meals. Alternatively, 2.5-3 teaspoons of dried herb can be boiled in 1 cup of boiling water for 10 minutes, then strained for use. Fresh plant tea is also possible; however, the water should not be boiled, and the fresh plant only needs to be left in boiling water for a few minutes. [4]

Hibiscus Sabdariffa (Hibiscus) Utilization in Herbal Medicine:

Hibiscus tea, derived from the petals of the Hibiscus sabdariffa plant, is distinguished by its sour taste and vibrant red hue. It contains 13 organic acids, alongside a plethora of microelements, vitamins, and biologically active substances. The drink, known historically as the "Egyptian Pharaoh" beverage, offers several health benefits due to its rich antioxidant content. It aids in rejuvenating the body, protecting against the effects of free radicals, and potentially preventing the development of both benign and malignant tumors.

Hibiscus Applications: Hibiscus is employed for its diuretic, choleretic, and antiseptic properties. Its consumption is associated with numerous health advantages, including alleviation of nervous tension, facilitation of digestion, detoxification of the kidneys and gallbladder, enhancement of liver function, bolstering of bodily resistance, reduction of blood pressure, elimination of toxins, and contribution to weight loss. [5]

Preparation and Consumption: To prepare hibiscus tea, steep 1 teaspoon of hibiscus flowers in 200 ml of boiling water for 3-5 minutes. The tea can be enjoyed hot or cold, consumed 2-3 times daily in 1-cup servings. Sweeteners such as sugar or honey may be added to taste. It is advisable not to exceed a steeping time of 15 minutes or to use a metal container for brewing.

The therapeutic significance of complex herbal teas lies in their comprehensive health benefits. These blends calm the nervous system, alleviate internal spasms, stabilize arterial pressure, enhance organ functionality, and promote body detoxification. Proper dosage is critical for achieving the desired therapeutic outcomes. [6]

Preparation of Complex Herbal Teas: For effective preparation, it is crucial to finely grind or chop the herbs for uniform mixing. Ingredients should be accurately measured by weight, combined, and stored in a dry, dark place. These medicinal plants can often be sourced from pharmacies or specialized centers, though many can also be collected personally.

Anti-Stress Herbal Complex: A specific formulation comprising catnip, eggplant, and blackberry extracts is recognized for its rapid and sustained calming effects. Additional blends may include 60 grams of watermelon herb, 80 grams of hawthorn flower, 50 grams of corn fringe, 50 grams of sorrel flower, 90 grams of damotu herb, 50 grams of blackberry leaves and flowers, 60 grams of myrtle leaf, and 60 grams of Ginkgo biloba leaf. Another recipe calls for 10 grams of watermelon or medicinal lemongrass leaves, 20 grams of yarrow flowers, and 10 grams of dried hawthorn fruits to be infused in 1 liter of boiled water.

Conclusion

In conclusion, this article has comprehensively explored the significant role of medicinal plants in the pharmacological landscape, particularly in the context of managing diseases and pathological processes associated with changes in arterial pressure. Through a detailed examination of the pathogenesis of hypertension and the risk factors contributing to its development, we have underscored the necessity for a multifaceted treatment approach that integrates conventional pharmacological interventions with the therapeutic benefits of medicinal plants. The pharmacological properties of these plants offer promising avenues for supporting cardiovascular health, regulating arterial pressure, and mitigating the adverse outcomes associated with hypertension.

Moreover, the discussion has illuminated the importance of understanding the interactions between medicinal plants and conventional medications, highlighting the need for healthcare professionals to consider these factors in treatment planning. This ensures the safe and effective use of herbal remedies in conjunction with pharmacological treatments.

Future research should continue to investigate the pharmacological effects of medicinal plants, with an emphasis on clinical trials and pharmacokinetic studies to better understand their efficacy, safety, and potential interactions with standard medications. This will enable the medical community to harness the full potential of these natural resources in a manner that enhances patient care and outcomes in hypertension management. In essence, the integration of medicinal plants into the therapeutic landscape represents a pivotal step towards a more holistic and personalized approach to healthcare, particularly in the realm of cardiovascular disease and hypertension management.

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PRINCIPLES AND MATERIALS USED IN PROSTHETIC TREATMENT OVER DENTAL IMPLANTS

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https://doi.org/10.5281/zenodo.10975106

Abstract

Prosthetic treatment with dental implants was first introduced in the 1970s when the concept of implant osseointegration was formulated. The positive outcomes achieved led to their widespread use, and implant therapy became a standard protocol for rehabilitation following partial or complete tooth loss. The development of modern technologies and the creation of new materials have resulted in the evolution of various treatment methods. This article analyzes the fundamental principles of implantological treatment, the advantages and disadvantages of the materials used, as well as the indications for their application.

Keywords: dental implants, prosthetic treatment, dentistry, dental materials, CAD/CAM

Introduction

Studies indicate that the primary approach in implant placement relies on the presence of adequate bone structure to ensure their stable fixation. For the normal progression of osseointegration, most authors recommend loading implants within 4-6 months after placement [1]. However, others do not adhere to this idea and advocate for immediate prosthetic loading with guided tissue regeneration [2, 3, 4]. There exist divergent perspectives on the type, design, and processing of the superstructure, leading to the development of numerous treatment methods. In all cases, the establishment of a stable connection between the implant and the superstructure is crucial for treatment efficacy.

The aim of this literature review is to observe different types of materials, used in prosthetic treatment over dental implants.

Implant-Superstructure Connection

The connection between the implant body and the superstructure plays a pivotal role in the successful outcome of prosthetic treatment. According to Pita et al. [5], the type of connection between the implant and the prosthetic superstructure is closely associated with its mechanical stability, aesthetics, and longevity. Its relevance has been demonstrated in the development of inflammatory processes in peri-implant soft tissues [6].

Various types of prosthetic platforms have been extensively described in the literature, including external and internal hexagons, the Morse cone connection, and the platform-switching concept. Historically, Branemark initially introduced implants with an external hexagon configuration. Their main drawbacks are associated with reduced mechanical stability and loosening of the connecting screw due to an increased risk of rotation caused by lateral forces during the masticatory process [2, 7, 8, 9].

A large part of research on this type of connection documents bacterial accumulation and growth, which can lead to [10, 11, 12, 13, 14, 15]. Most contemporary implant systems possess an internal hexagon. Y. Liu and J. Wang [16] identify micro-movement of the implant superstructure as the most common cause of technical complications, such as fracture, loosening of the connecting screw, and stress distribution resulting in bone loss. To eliminate these detrimental factors, some implant systems feature a "friction fit" technology, which creates tight friction based on the principle of cold welding of metals and a difference in diameter between the implant and the implant abutment. According to Mangano et al. [17] and Vetromilla et al. [18], implants with a Morse cone provide good mechanical stability and minimal micro-gaps at the connection. Velez et al. [19] establish better accuracy of the Morse cone connection compared to the external hexagon. Other authors report that platform-switching systems create a safe zone around the alveolar bone by "moving" the connection. This reduces stress transmission, improves stability of the bone tissues, and decreases complications arising from bacterial accumulation, micro-leakage, and micro-movement [20, 21, 22, 23, 24]. Further studies indicate minimal bone loss around implants with platform switching compared to systems with an external hexagon [25, 26, 27, 28].

In their systematic review, Vetromilla et al. [29] identify the internal hexagon as the optimal choice for application in the esthetic zone, a finding corroborated by the studies of Lemos et al. [30] and Grasis et al. [31]a. Prosthetic restoration, in cases of partial edentulism, poses numerous challenges, for instance significant defects, where masticatory and speech function, as well as aesthetics is compromised [32].

Treatment of single tooth defects with implants and superstructures may represent an optimal therapeutic choice, but the restoration of such sites requires careful clinical planning and management of both hard and soft tissues. Prosthetic restoration of the implant is performed through the so-called implant superstructure (IS). This is a comprehensive concept encompassing the elements positioned above the implant platform - the implant prosthesis and the abutment [34, 35, 36, 37, 38, 39, 40].

Materials Used in Prosthetic Treatment over Dental Implants

Advancements in technology have facilitated the incorporation of a wide variety of restorative materials used in implantology. Computer-aided design and manufacturing (CAD/CAM systems) have streamlined the

utilization of various materials such as metals, ceramics, and some modified polymer materials, enabling their successful integration into the fabrication of implant superstructures.

Metals

Metals and their alloys have been the most commonly used materials in dental prosthetic treatment for decades. The classic technology for manufacturing definitive prosthetic constructions utilizes two main types of metal alloys - noble and non-noble.

Non-noble alloys are based on cobalt-chromium, while noble alloys consist mainly of gold with added palladium, platinum, and others.

Titanium possesses several advantages that establish it as a classic material for the fabrication of implants, superstructures, and other components. It exhibits biocompatibility, optimal physical and chemical characteristics (hardness and mechanical strength, modulus of elasticity, relatively low density, low risk of corrosion), and is relatively lightweight [41, 42, 43]. However, its colour may lead to unsatisfactory results in the aesthetic zone [44, 45]. Currently, titanium alloys with aluminum and vanadium are used in implantology to improve its mechanical properties. Titanium serves as the primary material for all prosthetic and connecting components.

Some highly aesthetic ceramic restorative materials can compensate for the aesthetic drawback. They demonstrate relatively predictable behaviour as prosthetic constructions, but their application as implant superstructures is still debatable [44, 46, 76].

Ceramics

The application of ceramic components in implant prosthetics was first introduced by Andersson et al., K. Henriksson et al. [48, 49] in an attempt to use materials with higher aesthetic qualities to replace titanium. The authors used sintered aluminum oxide ceramics, and the components were manufactured in only one size. Glass ceramics are considered materials with excellent aesthetic qualities [50, 51, 83].

Lithium disilicate exhibits high optical and mechanical properties. Its flexural strength is 350–400 MPa, and its fracture toughness of 3.5-4.5 MPa·m^0.5 makes it a suitable material for the fabrication of highly aesthetic monolithic restorations [44, 50, 53, 55, 76]. It is considered a more aesthetic material than zirconium dioxide, which, due to its low translucency, often cannot meet aesthetic requirements [54, 55, 59].

Zirconium dioxide

Similar to titanium, it has good biocompatibility and response [56]. It was introduced by Piconi and Maccauro for the first time in 1999, and later Holst and M. Blatz [57] affirmed that yttria-stabilized zirconium dioxide has high biocompatibility and mechanical properties. Its flexural strength (900–1200 MPa), compressive strength (2000 MPa), and fracture toughness (6 MPa·m^0.5) [54, 58, 59, 60] define it as exceptionally hard. The authors compare zirconium dioxide with titanium and report similar values of fracture resistance for both materials (281 N as opposed to 305 N). The type of cements used also plays an important role in ensuring a stable and durable connection with the implant superstructure [61, 62, 63].

This material has some limitations in its application, such as inherent opacity and high value [64]. Bone loss around the implant is a serious problem that can lead to its poor prognosis. The forces acting on the superstructure are transmitted through the implant to the bone [65, 66, 67]. Some authors argue that ceramics are hard materials and may transmit excessive load to the prosthetic restoration-implant complex, which can lead to biological or functional complications [68, 69].

On the contrary, other authors [70] argue that the latest generations of zirconia materials have very good biological and mechanical qualities.

Modified Polymer Materials

In 1980, PEEK materials (polyetheretherketones) were introduced in medicine, and due to their biological and mechanical characteristics, they expanded their application [71, 72]. Modified composite materials such as HPP (hybrid polyetheretherketones, reinforced with ceramic particles high-strength polymers) and ceramic-reinforced polyetheretherketones can be an alternative choice to zirconia dioxide-based hybrid superstructures according to Atsu [73, 74]. The authors specify that additional clinical studies would be of great value in determining their long-term survival.

Several studies report good mechanical and biological behaviour of HPP [73, 75, 76, 79]. According to some authors, the lower modulus of elasticity of HPP compared to ceramics, close to that of human bone, makes it a suitable material for implant components. They believe that it can reduce the large occlusal forces transmitted to the implant [77, 78, 79].

The choice of an optimal restorative material should be coordinated with its interactions with tissues and other structures in the oral cavity. The study by Rimondini et al. [80] indicates that zirconia surfaces retain fewer bacteria than titanium. Abrahamsson et al. and Rasperini et al. [81, 82] establish a direct correlation between the quality and quantity of peri-implant soft tissues (PIMT) and the material of the superstructure. Yogesh Kumar et al. [83] found a greater degree of soft tissue modelling around titanium superstructures compared to zirconium dioxide.

Conclusion:

Prosthetic treatment on dental implants relies on the principles of biological compatibility, mechanical stability, aesthetics, durability, and tissue compatibility. The selection and application of appropriate materials in accordance with these principles are crucial for achieving successful and long-lasting prosthetic restorations on dental implants. The choice of material for dental implant prosthetics is not dictated solely by structural principles but must be consistent with the different mechanical and biological characteristics of the materials, as well as their interactions with other structures in the oral cavity.

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MICROBIOLOGICAL PICTURE OF THE ORAL CAVITY IN THE PRESENCE OF VARIOUS FIXED DENTURES

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Abstract

It is known that the oral cavity is a unique ecological system, closely connected with the internal environment of the body and its external environment. The high incidence of damage to the oral cavity is largely due to the peculiarities of its structure and function, constant contact with the external environment, the presence of microflora, and a variety of loads [1,2,5,7]. When making a denture, it is necessary to take into account the characteristics of the dental and somatic status, as well as the microecology of the oral cavity of patients [3,4,b,8]. The choice of construction material is carried out based not only on its physicochemical characteristics, but also on the biological effect on the surrounding tissues of the oral cavity. In recent years, there has been a significant increase in the number of diseases of the oral mucosa caused by the use of various dentures.

Keywords: metal-ceramic bridges, stainless steel alloys, microecology of the oral cavity.

The purpose of the study is to study the quantitative and qualitative indicators of microflora and oral cavity protection factors in patients using dentures of various designs.

Material and methods We observed 35 patients aged from 28 to 60 years, average age 38.3±2.79 years. The examination was carried out using a set of dental instruments, and the data obtained was entered into a special card. All patients underwent X-ray examinations: orthopantomograms and, if indicated, dental photographs. Before orthopedic dental treatment, oral sanitation was performed. Depending on the method of prosthetics, patients were divided into three groups: group 1 - 12 (34.3%) patients with fixed dentures made of stainless steel with titanium nigrid coating, group 2 - 13 (37.1%) patients with fixed dentures made of metal-plastic, group 3 - 10 (28.6%) patients with fixed dentures made of metal-ceramics. Along with clinical and dental methods, all patients underwent microbiological and immunological studies. Before and after prosthetics, oral fluid was collected from patients in a sterile tube. In the laboratory, serial dilutions were prepared from the obtained material and inoculated onto the surface of differential diagnostic nutrient media. All crops were incubated for 24-72 hours in a thermostat at a temperature of 37°C. After a certain time of cultivation, the Petri dishes were removed and the number of colonies was counted. The number of bacteria of each species was expressed in 1g CFU/ml. In these same patients, nonspecific factors of oral fluid protection were studied. To determine the phagocytic activity of neutrophils in saliva, collection and processing of saliva was carried out according to the method of MA Timurbaev (1989). Lysozyme activity was determined according to the method of Sh.R. Alieva et al. (1996), the level of secretory immunoglobulin A - in the gel precipitation reaction according to the method of Mancini (1964). Microbiological and immunological studies of oral fluid were also carried out in 10 healthy faces with intact dentition. Statistical processing of the research results was carried out using the Student's variation statistics method with the calculation of the arithmetic mean (M), errors of the standard deviation (t), and the degree of reliability (p) according to the Student's T-criterion. Results and discussion Data on the quantitative and qualitative composition of the microflora of the oral fluid are given in the table. The table shows that the oral microflora in healthy people is quite significant and diverse. Thus, the total number of anaerobes, in which lactobacilli predominate, is 1g 5.69±0.15 CFU/ml. At the same time, the number of the optional group is significantly lower. It is mainly represented by streptococci and staphylococci, that is, strains with weak enzymatic properties. The picture is completely different in patients before prosthetics. Thus, the table shows that the number of anaerobes is significantly reduced by 1.6 times, their total number was lg 3.60±0.13 CFU/ml. Among anaerobic microorganisms, the number of lactobacilli decreases by 2 times, as a result of which the ability to regulate pH in the oral cavity is lost, which leads to its change in the neutral direction, and, consequently, to the growth of opportunistic microbes. It should be noted that among anaerobes the number of peptostreptococci increased by 16%, which apparently indicates a compensatory-adaptive reaction of the macroorganism. The facultative group of microbes behaves differently. Firstly, their number reliably exceeds the quantitative indicators of anaerobes. In the facultative group of microbes, there is an increase in both coccal flora and rod-shaped microbes. Microbes belonging to the genus Protea, Klebsiella and fungi of the genus Candida are sown in the highest quantities. Also, strains of microbes are found in the oral cavity that were not

found in healthy individuals, for example, Staphylococcus aureus. It is known that microbes belonging to pathogenic cocci have a large set of pathogenicity enzymes, which, apparently, influence the course of pathological processes in the oral cavity. The number of microbes such as Proteus and Klebsiella is increasing, which, in turn, have high enzymatic activity, especially proteases that cause the breakdown of proteins into final products, that is, hydrogen sulfide, ammonia, indole, etc. (H2S, NH3). In our opinion, it is this process that stimulates one of the clinical symptoms of this disease - the presence of bad odor in the mouth. Analysis of the results of microbiological studies after prosthetics showed that all types of prosthetics in general had a beneficial effect on the state of the microflora of the oral cavity. In patients of three groups, the number of anaerobes, especially lactobacilli, increased by 15.3, 24.2 and 34.2%, respectively, amounting to 2 .60+0.11; 2.90±0.11 and 3.34+0.27 CFU/ml. The facultative group of microbes has also undergone a significant positive shift. Thus, the quantitative indicators for all studied groups of microorganisms, both gram-positive and gram-negative, decreased slightly. Against this background, the number of fungi of the genus Candida decreased, which in patients of the 1st group was 3.00+0.17 1g CFU/ml, in the 2nd group - 2.80+0.14 1g CFU/ml, in the 3rd group - 2.47+0.15 1g CFU/ml. Thus, based on these studies, it can be stated that the use of prostheses made of stainless steel, titanium nitride coating and metal-plastic somewhat improves the severity of dysbiosis, but there is no need to talk about a complete improvement in the microbiological picture. Along with quantitative and qualitative analysis of the microecology of the oral cavity, in patients with fixed dentures made of various materials, we studied the state of local protective factors: lysozyme titer, phagocytic index and the level of secretory immunoglobulin class A (sigA). In the oral cavity, patients have immunodeficiency in all studied parameters . Thus, before prosthetics, the lysozyme titer was 12.3+0.3 mg/% (normally 18.0+0.5 mg/%), the phagocytosis rate was 40.0+2.1% (normally 55.3+2 .5%), slgA level 1.0+0.1 g/l (normal 2.0+0.1 g/l). It can be assumed that of all the studied parameters, the greatest deficit is indices of phagocytosis. Apparently, in the examined patients, local protective factors are primarily disrupted in the oral cavity, which undoubtedly entails the uncontrolled growth of opportunistic and pathogenic microorganisms in the oral cavity and leads to the formation of dysbiosis. We studied the dynamics of local factors protecting the oral cavity in patients. From the data obtained it is clear that patients of all three groups have positive dynamics, however, the most positive changes are recorded in patients of the 3rd group. Their lysozyme level and phagocytosis rate improve, but the content of secretory immunoglobulin remains at the same level. Thus, the content of lysozyme in patients of the 1st group increased by 5.4%, the 2nd - by 12.6, 3rd - by 21.7% and amounted to 13.0 + 0.67, respectively; 13.9+0.68 and 15.7+0.78 mg%. The same dynamics were observed in relation to the phagocytosis index, which in patients of the 1st, 2nd and 3rd groups was equal to 45.1 ± 2.67, respectively; 47.1+2.66 and 50.3+3.46%. Thus, in patients of group 3, the lysozyme titer and phagocytosis index approached control values. The study of factors of local protection of the mouth allows us to conclude that prosthetics for patients with fixed dentures made of metal-ceramics has a more positive effect on the indicators of local protection of the oral cavity. In the early stages (3-6 months) of wearing fixed dentures, patients of groups 1 and 2 showed minor signs of dysbiosis in the oral cavity.

Conclusions

1. The use of prostheses made of stainless steel, titanium nitride coating and metal-plastic somewhat reduces the severity of dysbiosis, but there is no talk of a complete improvement in the microbiological picture.

2. Prosthetics for patients with fixed dentures made of metal-ceramics has a positive effect on the microflora and local protection of the oral cavity.

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INHALATION WITH DIOXIDIN SOLUTION IN THE TREATMENT OF CHRONIC SINUSITIS

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ЛЕЧЕНИЕ ХРОНИЧЕСКОГО СИНУСИТА С ПОМОЩЬЮ ИНГАЛЯЦИЙ РАСТВОРОМ ДИОКСИДИНА

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Abstract

To increase the effectiveness of the treatment of chronic sinusitis, a 1% solution of Dioxidin was used in the form of inhalation. In parallel, the second group of patients received oral antibiotics. Edema and hyperemia decreased in patients of both groups 20 days after treatment, however, after inhalation with Dioxidin the indicators of these symptoms were slightly higher.

Аннотация

Для повышения эффективности лечения хронического синусита применяли 1% раствор Диоксидина в виде ингаляции. Параллельно вторая группа больных получали перорально антибиотики. Через 20 дней после лечения у пациентов обеих групп уменьшились отеки и гиперимия, однако после ингаляции с Диоксидином показатели данных симптомов были несколько выше.

Keywords: chronic sinusitis, 1% Dioxidin solution, inhalations, rhinitis symptoms, nasal congestion, nasal microflora.

Ключевые слова: хронический синусит, 1% раствор Диоксидина, ингаляции, симптомы ринита, заложенность носа, микрофлора носа.

Хронический риносинусит (ХРС) – распространенное заболевание, на лечение которого расходуются значительные денежные средства из госбюджета и которое значительно влияет на качество жизни [1]. Эпидемиологические исследования, выполненные более чем в 30 странах, указывают на увеличение заболеваемости синуситом в 3 раза за последние десятилетия [2]. Причина ХРС в основном риногенная, но близкое расположение корней зубов верхней челюсти ко дну пазухи способствует распространению одонтогенной инфекции в верхнечелюстную пазуху. Одонтогенный верхнечелюстной синусит (ОВС) (код по МКБ-10 J32.0) составляет 10–40% от числа всех хронических верхнечелюстных риносинуситов и до 75%от числа всех односторонних поражений верхнечелюстных пазух [3].

Вопрос о роли микроорганизмов в патогенезе ХРС в настоящее время является особенно актуальным. По данным литературы, среди основных

аэробных микроорганизмов у пациентов с ХРС высеваются S. aureus (SA), S. pneumoniae [4]. SA – одна из наиболее распространенных патогенных аэробных бактерий у пациентов с ХРС [9]. Существует гипотеза, что ХРС развивается, когда в условиях снижения парциального давления кислорода и изменения pH среды в кислую сторону, аэробная микрофлора ОНП постепенно замещается анаэробами.

Было высказано предположение, что воспаление слизистой оболочки носа и придаточных пазух может быть связано с иммунологической реакцией на энтеротоксины выделяемые Staphylococcus aureus (SA), заселяющими полость носа. SA обнаруживается в полости носа у 40% населения [5]. Длительная персистенция SA связана с ее внутриклеточным нахождением. Внутриклеточный резервуар SA был обнаружен в биоптатах слизистой оболочки среднего носового хода пациентов с ХРС [6]. Присутствие внутриклеточного S. aureus в эпителиальных клетках слизистой оболочки носа, является значительным фактором риска повторных эпизодов риносинусита из-за резистентности бактериальных колоний к антимикробной терапии и хирургическому лечению (даже после полного удаления воспаленной слизистой оболочки) [7]. Более того, внутриклеточное расположение микроорганизмов обеспечивает защиту от фагоцитов и других противомикробных механизмов защиты, действие которых в основном является внеклеточным [8]. Пока нет данных о лечении ХРС у пациентов с внутриклеточным носительством SA. Важная роль в патогенезе ХРС отводится формированию биопленок – это поверхностно-ассоциированные микробные сообщества, окруженные экстрацеллюлярной полимерной матриксной субстанцией собственного производства. Основными их характеристиками являются: плохая проницаемость антибактериальных препаратов, сниженные потребности в питательных веществах и кислороде, повышенная экспрессия генов устойчивости (например, бета -лактамаза) и дистанционные взаимодействия между микроорганизмами биопленки. Эти взаимодействия включают в себя межклеточную передачу молекул и генетической информации, которая позволяет быстро реагировать на изменения условий окружающей среды (т. е. макроорганизма). Уникальной особенностью биопленок является так называемое пассивное (планктонное) распространение бактерий, их формирующих, в окружающее пространство, распространяя инфекцию в отдаленные участки организма. Все эти свойства способствуют антибиотикорезистентности и устойчивости к механизмам иммунной защиты макроорганизма [9-10].

Бактерии внутри биопленок активно метаболизируют и продуцируют эндотоксины и другие продукты жизнедеятельности, что запускает классический путь воспалительного ответа и способствует дальнейшему поддержанию воспалительного процесса.

В биоптатах слизистой оболочки ОНП, полученных при эндоскопических операциях по поводу ХРС, биопленки были выявлены в 80–100% случаев. Бактерии составляют 5–35% массы биопленки, остальная часть – это межклеточный матрикс. В составе бактерий, образующих биопленки, представлены различные штаммы стафилококков, H. infl uenzae и P. Aeruginosa [11].

У пациентов с ХСО может быть высеяна как монофлора (до 60%), так и смешанная аэробно-анаэробная флора (до 30%), обычно состоящая из 2–3 микроорганизмов, а в 11% случаев флора отсутствует [12-13].

По одним данным, аэробная флора выделяется в 60,3%, а анаэробная – в 38,2%, по другим – на анаэробную флору приходится от 20 до 50% выделяемых изолятов. Основным микроорганизмом среди аэробов является Pseudomonas aeruginosa, высеваемая изолированно в31,1–98%, вторым по значимости является Staphylococcus aureus, высеваемый в15–30% случаев. Во многих случаях обнаруживается коагулазонегативный стафилококк. Среди анаэробов чаще высеиваются анаэробные грамположительные кокки (Peptococcus и Peptostreptococcus в 17,2%), реже Bacteroides (в 12,4%); грамотрицательные Klebsiella и Proteus выделяются в 10–20% случаев. Анаэробы чаще сопутствуют холестеатомному процессу [14-15]. Изоляты, встречающиеся как монокультура, чаще приводят к развитию тяжелых осложнений ХСО (мастоидит, внутричерепные осложнения). От 1,4 до 20% случаев приходится на грибковую флору, чаще рода Aspergillus и Candida spp. Особенностью ХСО является то, что флора, выделяемая у данных пациентов, склонна к образованию биопленок (особенно Pseudomonas aeruginosa и Staphylococcus aureus) [16-17]. Пациенты с патологией верхних дыхательных путей и нарушенным клиренсом слизистой оболочки чаще подвержены формированию биопленок на патологически измененных слизистых. Лечение ХСО эффективно только после тщательного удаления патологического содержимого из среднего уха с помощью аспирации или ирригации [18].

В связи с этим для эффективного очищения полости носа при хроническом синусите требуется использование растворов, эффективных в отношении бактерий и грибов, а также в отношении микроорганизмов, образующих биопленки.

Основными требованиями к «идеальному» ирригационному раствору являются:

1) широкий спектр антимикробной и противогрибковой активности;

2) воздействие на микроорганизмы биопленок;

3) отсутствие токсического действия на ткани организма;

4) низкая себестоимость, доступность, достаточный срок годности.

Раствор Диоксидина 1% – хорошо известный антибактериальный препарат широкого спектра действия из группы производных хиноксалина, обладает химиотерапевтической активностью при инфекциях, вызванных протеем, дизентерийной палочкой, клебсиеллой, синегнойной палочкой, сальмонеллами, стафилококками, стрептококками,

патогенными анаэробами (в т.ч. возбудителями газовой гангрены), действует на штаммы бактерий, устойчивых к другим химиопрепаратам, включая антибиотики [19-20].

Применяли ингаляцию небулайзером с 1%. раствором Диоксидина Раствор готовится следующим образом: 2мл. препарата 0,5 к 4 мл. физраствора. Процедура проводится 2-3 минуты с последующим увелечением до 5-7 минут. Ингаляция повторяется каждый день на протяжении 10 суток.

Материалы и методы. В исследование были включены 38 пациентов (22 мужчины и 16 женщин) средний возраст 15 лет с диагнозом хронический синусит. Пациенты были разделены на две группы:

I группа (n = 19), получали лечение набулайзером с 1% раствором Диоксидина

II группа (n = 19), которые получали лечение антибиотиками перорально.

Проведено сравнительное исследование Диоксидина 1% у пациентов (n=20) носителей SA и с множественными рецидивами инфекции, несмотря на эффективную системную антибактериальную терапию. Каждый пациент использовал ингаляцию раствором Диоксимидин в течение 3 месяцев по 10 дней.

Ингаляция Диоксидином хорошо переносилась, значительно уменьшились обструкция носа (p=0,002), затекание слизи по задней стенке глотки (p=0,016), улучшилось обоняние (p=0,009) и уменьшились головные боли (p=0,010). Значительное улучшение отмечалось по данным эндоскопической оценки полости носа: уменьшились отек гиперемия (p=0,001), гнойные выделения из носа (p=0,003) и образование корок в носу (p=0,004), а также улучшилось носовое дыхание (p=0,06) по данным риноманометрии. Данные исследования подтверждают, что Диоксидин 1 % в физиологическом растворе подходит для длительного использования и является хорошей альтернативой длительной пероральной антибактериальной терапии.

РЕЗУЛЬТАТЫ И ОБСУЖДЕНИЕ. Таким образом, статистически значимые отличия при использовании 1% Диоксидина физиологическим раствором наблюдались по признакам: заложенность носа, затекание слизи по задней стенке глотки, неприятный запах выделений из носа.

В динамике во время лечения отмечались положительные изменения. Так, че-

рез 3 месяца после лечения 1% раствором Диоксидина у пациентов обеих групп уменьшились отек и гиперемия, показатели улучшения данных симптомов были несколько выше.

ВЫВОДЫ. 1. Применение 1% раствора Диоксидина при хроническом синусите является эффективным патогенетически обоснованным методом лечения.

2. Использование 1% раствора Диоксидина 1 раз в день в течение 10 дней при хроническом синусите улучшает течение болезни.

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PEDAGOGICAL SCIENCES

REPRESENTATION OF THE AXIOLOGEM *LIFE I*N THE LANGUAGE OF B. KAIRBEKOV'S POETRY

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РЕПРЕЗЕНТАЦИЯ АКСИОЛОГЕМЫ *ЖИЗНЬ* В ЯЗЫКЕ ПОЭЗИИ Б.КАИРБЕКОВА

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Abstract
This article was carried out in line with axiological research devoted to the verbalization of specific axiologems on various factual materials. In this regard, the source of analysis is the poetic text of the modern Kazakh poet B. Kairbekov, a bilingual Kazakh who writes in Russian. The uniqueness of the language of his poetry lies in the fact that it reflects the contaminated linguistic picture of the world, Kazakh and Russian. The dynamic and very expressive language of his poetry contains philosophical reflections on life in all its manifestations through the ethnic prism of worldview. The purpose of the article is to identify linguistic means that represent the axiologeme life.

Аннотация
Данная статья выполнена в русле аксиологических исследований, посвященных вербализации конкретных аксиологем на различном фактическом материале. В связи с этим в качестве источника фактического материала для анализа выступает поэтический текст современного казахстанского поэта Б.Каирбекова, казаха-билингва, пишущего на русском языке. Уникальность языка его поэзии состоит в том, что в нем находит отражение контаминированная языковая картина мира, казахской и русской. Динамичный и очень выразительный язык его поэзии содержит философские размышления о жизни во всех ипостасях ее проявления сквозь этническую призму мировосприятия. Цель статьи - выявление языковых средств, репрезентирующих аксиологему *жизнь.*

Keywords: representation, axiologeme, values, assessment, life, language, linguistic means, mentality.
Ключевые слова: репрезентация, аксиологема, ценности, оценка, жизнь, язык, языковые средства, менталитет.

В настоящее время понятия *ценность* и *оценка* являются объектом исследования не только философии, о чем свидетельствует наличие различных новых отраслей научного знания, одной из которых является антропологически и социально ориентированная аксиологическая лингвистика. Как отмечает Е.Ф. Серебренникова, все большую актуальность приобретает «…необходимость определения закономерностей и особенностей эволюции ценностных смыслов общества в их «вечной» антропологической, культурологической континуальности и феноменологической дискретности; значимости языковой культуры в процессах социализации личности, воздействующего потенциала дискурсивной, особенно медийной деятельности на информационное и духовно-нравственное состояние общества» [1, с. 4].

На протяжении развития философской мысли разные дефиниции понятия «ценность» предлагались как зарубежными философами (Айер А. Дж., Гартман Н., Гильдебранд Д., Дьюи Дж., Ингарден Р., Лотце Г., Перри Р.Б., Стычень Т., Шелер М.), так и отечественными (Анисимов С.Ф., Василенко В.А., Каган М.С., Столович Л.Н., В. П. Тугаринов и др.).

Лингвистический анализ аксиологем осуществлялся в работах таких лингвистов, как Н.Н. Казыдуб, В.И. Карасик, Н.Д. Арутюнова и др.

Как отмечает Н.О. Лосский, аксиологему целесообразно трактовать как вербальную номинацию ценности, являющейся базовой для индивида, для социальной группы, для национальной лингвокультуры в целом. В речи отдельные слова, словосочетания, являющиеся аксиологемами, могут приобретать аксиологическую маркированность. Важная задача – разработка собственно аксиологических словарных помет. Благодаря совокупности аксиологем формируется аксиологический лексикон. Исходя из этого, автор разграничивает первичные, вторичные ценности и, соответственно, первичные и вторичные, в том числе метафорические, аксиологемы [2, с. 64].

Поскольку существует множество определений данного термина, представим некоторые из них в табличной форме (см. Табл. №1).

Таблица 1

Дефиниции термина *аксиологема*

	ОПРЕДЕЛЕНИЕ АКСИОЛОГЕМ	Литература
Н.Н.Казыдуб	Языковые репрезентанты аксиологических смыслов [Казыдуб, 2009, 134].	Казыдуб Н. Н. Аксиологические системы в языке и речи // Вестник Иркутского государственного лингвистического университета. 2009. № 2. - С. 134
С.Н.Кочеров	Единицы языка, обладающие ценностным смыслом, различным для представителей отдельного культурного общества [Кочеров, 2011, 2]	Кочеров С. Н. «Аксиологема» как проблема теории ценностей // Credo New. 2011. №4. - С. 2.
Е. Е.Ф. Серебренникова	Аксиологемы представляют собой так называемые «вечные» ценности, имеющие наибольшее значение для человека [Серебренникова, 2011, с. 17]	Серебренникова Е. Ф. Лингвистика и аксиология: этносемиометрия ценностных смыслов. М.: ТЕЗАУРУС, 2011. 352 с.
Т.В. Романова	Аксиологема обладает ценностно-оценочными коннотациями и может актуализировать положительный, отрицательный или смешанный аксиологический модус [Романова, 2019, с. 29]	Романова Т.В. Идеологемы и аксиологемы русского языкового сознания как отражение констант и динамики национальной ментальности: монография. Нижний Новгород: ДЕКОМ, 2019. - 120 с
В.А.Маслова	Ценность как «универсальный регулятор социального поведения, они отражают социальное и культурное значение определенных явлений действительности и закрепляются на уровне общественного сознания в установках и оценках, императивах, табу и целях [Маслова 2011, с. 383].	Маслова, В.А. Концепты и ценности: содержание понятий, языковая репрезентация / В.А. Маслова // Уч. зап. Таврич. нац. ун-та им. В.И. Вернадского. Сер.: Филология. Социальные коммуникации. – 2011. – Т. 24. – № 2–3 (63). – Ч. 1. – С. 383-387
Н. А Купина, Ю.Б. Пикулева	…концепт, который воспринимается носителями языка (точнее лингвокультуры) как абсолютная ценность [Купина, Пикулева 2020: 87].	Купина Н. А., Пикулева Ю. Б. Аксиологическое содержание внутрисемейных разговоров о политике // Политическая лингвистика. 2020. № 3 (81). С. 84–93
Е.В. Долбилова, А.А. Кретов	Назовём систему ценностей, присущую народу, аксиосферой. Элементы аксиосферы назовём аксиологемами [Долбилова, Кретов 2010 : 269].	Долбилова Е.В. Парадигматическая стратификация каталанской лексики и аксиологемы каталанской ментальности / Е.В. Долбилова, А.А. Кретов // Лінгвістичні студії. – Донецьк, 2010. – Вип. 21. – С. 267-273.
А.С. Нусупбекова	Аксиологема - любые языковые единицы, выражающие понятие оценки в мире дискурса. Это, прежде всего, оценочные мнения, устойчивые словосочетания, существительные, обозначающие квалификацию.	Аксиологический компонент школьных учебников по русскому языку и литературе/ Дисс…PhD/ -Алматы, 2023 – 163с.

Прежде всего следует отметить, что ценности и оценка являются центральными единицами философской аксиологической теории, которые получили новый импульс в целом ряде гуманитарных дисциплин, в том числе филологических. Если в современном литературоведении рассматриваются эти проблемы через призму идейного содержания и других особенностей жанра, то в лингвистике они репрезентируются посредством анализа языковых единиц. Благодаря активным исследованиям аксиологических проблем на различном фактическом материале, извлеченном из разных источников (художественной литературы, прессы, лексикографических произведений и др.), стало возможным формирование таких направлений, как аксиологическая лингвистика, аксиологическая лингвокультурология, аксиологическое литературоведение и др. Каждое из них имеет свои предмет и методы исследования.

Согласно аксиологической теории, в качестве объекта ценностного отношения являются предметы природного мира и продукты социальной деятельности, нормы поведения и творения духа, межличностные и общественные отношения. Соответственно представляет важность изучение того, насколько эти объекты соответствуют потребностям и роли в жизнедеятельности отдельно взятой личности сквозь призму ее мировосприятия и мироощущения, а также социума в целом. Ценно все, что представляется важным для бытования человека во временно-пространственном континууме. Безусловно, ценность как для отдельной личности и социума – это не догма, это развивающаяся категория в соответствии с развитием общества. Относительно стабильными и универсальными для всего человечества являются духовно-нравственные ценности, а более динамичными – морально-этические. Значимость объекта способна возрастать или падать в зависимости от колебаний человеческих интересов и потребностей. Гегель утверждал, что «ценность вещи может быть очень различной в отношении к потребности» [3, с. 119].

Поскольку данная статья выполнена на материале поэтических произведений казахстанского поэта Б.Каирбекова, нашей задачей является исследование того, как в языке его поэзии репрезентируется аксиологема *жизнь*. Жизнь сама по себе представляет огромную ценность, поэтому в разных лингвистических научных дисциплинах она изучается с разных позиций: в когнитивной лингвистике как лингвокогнитивный концепт, в лингвокультурологии – лингвокультурный концепт, в лингвоаксиологии как лингвоаксиологема.

Язык поэзии Б.Каирбекова всецело отражает национальную духовную культуру посредством образов, метафор и символов сквозь призму индивидуальной языковой картины мира. Как отмечалось выше, поэт- билингв, казах по этнической принадлежности, пишущий на русском языке.. Несмотря на то, что его произведения написаны на русском языке, ощутимо казахское мировосприятие и миропонимание. В его стихах можно увидеть проникновение в самые тонкие и глубокие аспекты человеческой сущности.

В поэзии Б. Каирбекова аксиологема *жизнь* репрезентируется языковыми средствами, выражающими различные чувства и эмоции. Исходя из мудрой жизненной позиции своего этноса, поэт подчеркивает важность настоящего, сущего, а не прошедшего, которое уже не вернется и не будущего, которое ирреально. имплицитно обращает внимание на важность настоящего момента и необходимость полной отдачи жизни, чтобы жить настоящей и насыщенной жизнью. Поэт берет на себя роль наблюдателя и зрителя жизни, который переживает ее с радостью и грустью одновременно. Жизнь в его поэзии представлена как нечто уникальное и неповторимое. Поэт подчеркивает ее ценность и уникальность, обращая внимание на то, что жизнь имеет свои особенности и трудности. В своих стихах он говорит о том, что *жизнь* – это непрерывное движение и развитие, и мы должны ценить и беречь ее. Обратимся к его стихотворению «Очарованный странник» [4, с. 53] (см.Табл. 2).

Таблица 2

Способы и средства репрезентации аксиологемы *жизнь* в стихотворении «Очарованный странник»

Текст стихотворения	Образные и языковые средства вербализации
Почему мы выходим в *дорогу,* Все дела на потом отложив, Потому что всегда *за порогом* Начинается *взрослая жизнь.* Мы взрослеем *в дороге незримой* И не зря ее *жизнью* зовем, Так выходят в свой путь *пилигримы*, Ведь дорога для них – и отчизна, и дом. Потому мы выходим в дорогу, Все дела на потом отложив… Потому как всегда *запорожье* Обещает нам *новую жизнь*. Улытау, Гора Аулие. 23.09.12	Дорога, незримая дорога, порог, путь, пилигрим, запорожье, выходить в дорогу

Само название стихотворения «*Очарованный странник*» олицетворяет любого человека пришедшего в этот мир и познающего все его перипетии. Поэт образно передает, что человек – лишь гость в этой жизни, путник, на протяжении всего пути, длиною в жизнь, открывает для себя все радости, дарованного ему свыше чуда под названием *жизнь.*

Жизнь поэт сравнивает с *дорогой,* идя по которой, человек сходен с *пилигримом* (*паломник, путешественник).* В данном случае любой человек – это паломник по жизни во времени и пространстве.

За порогом – *взрослая жизнь,* т.е. новорожденный, покидая утробу матери, вступает в реальную жизнь со всеми его радостями и горестями..

Дорога – *отчизна, дом.* В данном случае дорога олицетворяет большую (отчизну) и малую (отчий дом, родной очаг) родину человека

З*апорожье* - пространство жизни, в котором человек проводит время, отпущенное ему для бытования, т.е. за порогом – *новая жизнь.*

Порог – *начало чего-либо.*

Обратимся к еще одному его стихотворению «Древо жизни» [4, с. 8] (см.Табл. 3)

Таблица 3

Способы и средства репрезентации аксиологемы *жизнь* в стихотворении «Древо жизни»

Текст стихотворения	Образные и языковые средства вербализации
Доверюсь *саженцу* – упрямому *ростку*, На ощупь он обнимет почву… Представить этот опыт я рискну – В подземные проникну ночи. Я, как и он, на ощупь *в жизнь вникаю*, Спасаюсь влагой слез и жадно пью *Нектар любви*, что дарит мне *людская* Слепая *вера* в то, что я всего добьюсь. Так верю я ростку земного Древа, Что крону обретет, и *принесет плоды*… Я к влаге слез добавлю мощь напева И к небу поднимусь *моей судьбы*. 09.04.12	Саженец-росток, обнимет почву подземные ночи в жизнь вникаю, нектар любви, влагой слез, людская слепая вера, росток земного Древа, мощь напева, принесет плоды, к небу моей судьбы

Человек, появившись на этот свет (саженец), противостоит всем сложным перипетиям жизни, что олицетворяется в сравнении с упрямым ростком.

Глагольный ряд *доверюсь, рискну, проникну, вникаю, спасаюсь, пью, добьюсь, поднимусь* свидетельствует о силе духа человека и его оптимизме.

Человек, как росток произрастает, нуждается в любви и заботе.

Спасением является людская вера, точнее нектар любви – вера в меня.

Вера – основа успеха.

Жизнь дарована судьбой, она состоит из испытаний и слез, но проходя их человек возвышается.

Итак, аксиологема *жизнь* в языке поэзии Бахыта Каирбекова представлена как непреходящая уникальная ценность. Сквозь призму рассуждений поэт имплицитно дает ненавязчивое наставление о необходимости дорожить этой ценностью, осознать и прожить ее должным образом.

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FIGURES ATTRACT ATTENTION TO THE ISSUE OF INTERNET ADDICTION

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https://doi.org/10.5281/zenodo.10975184

Abstract
The article by Polumeeva I.N. considers the issue of the internet-addicted behavior and recognizing the pattern of internet-addiction, on the base on Chen Internet Addiction Scale, indicates the need to monitor and identify the components of behavior inherent in Internet addiction, draws attention to taking into consideration the importance of feedback from student's position.

Keywords: internet-addicted behavior, compulsive symptoms, withdrawal symptoms, tolerance scale, time management, feedback.

According to the International Telecommunication Union (ITU), approximately 67% of the world's population is connected to the Internet by 2023. [1] The Internet has brought comfort and interest to our lives. Many of us do not notice how many times a day we turn to the Internet for various issues: from weather forecasting and route planning to searching for scientific literature. The research conducted by the Russian Public Opinion Research Center (VCIOM), showed that 74% of respondents under the age of 25 log into the global network every day, one in three spends more than four hours on the Internet daily, one in four believes that you need to be online all the time, so in 2018 it was 19%, in 2020 – 24%, and in 2023 – 25%. [2]

A group of students were asked to take a test aimed at identifying a pattern of Internet addiction with the help of Chen Internet Addiction Scale (CIAS). This technique reliably measured the severity of Internet addiction, the main advantage of this test is a symptomological and integrating structure that allows to identify the components of behavior typical for Internet–addicted behavior. CIAS includes five diagnostic scales:

1) The scale of compulsive symptoms (Com) – the feeling of being forced to stay in the Internet space, the desire to "enter the network";
2) The scale of withdrawal symptoms (Wit) – the level of discomfort that occurs during a long absence from the Internet;
3) Tolerance scale (Tol) – the level of stability of a person's connections with the Internet;
4) The scale of intrapersonal and health-related problems (IH);
5) Time management Scale (TM) – the influence of the Internet on a daily routine.

There are also two types of supra-scale criteria – key symptoms of Internet addiction (IA-Sym), which include the first three scales (Com, Wit, Tol) and the criterion of negative consequences of Internet use (IA-RP), consisting of a scale of intrapersonal and health-related problems and a time management scale (IH, TM). The sum of all scales is an integral indicator of the presence of Internet-addicted behavior (CIAS Scale). CIAS = Com + Wit + Tol + IH + TM

The assessment according to the general indicator of the methodology:

from 27 points to 42 – the absence of Internet-addicted behavior;

from 43 points to 64 – propensity to develop Internet-addicted behavior/pre-addictive stage;

from 65 points and above, it is reasonably possible to state the presence of Internet–addicted behavior (behavior with a component of Internet abuse). [3] Due to the presence of five scales in this technique, it is possible not only to diagnose the presence or absence of Internet-addicted behavior, but also to determine the severity of symptoms characterizing the pattern of addicted behavior. As a result of the tests analysis, the respondents were divided into three groups: a group with a minimal risk of Internet-addicted behavior, let's call it Group A, with 13% according to the diagram; a group with a tendency to Internet-addicted behavior – Group B, with 68% and with a clearly defined pattern of Internet-addicted behavior Group C– 19%, the percentage is shown in Figure 1.

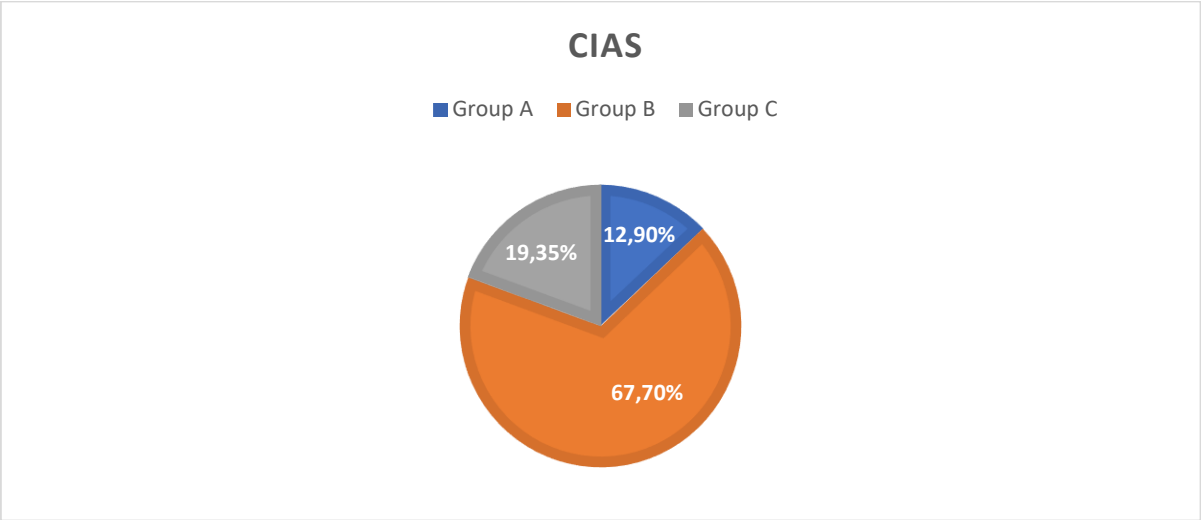

Figure 1. Total CIAS assessment

Let's look at the indicators of the evaluation scales in each group. Figure 2 shows data in the group with the lowest risk of Internet- addicted behavior, group A.

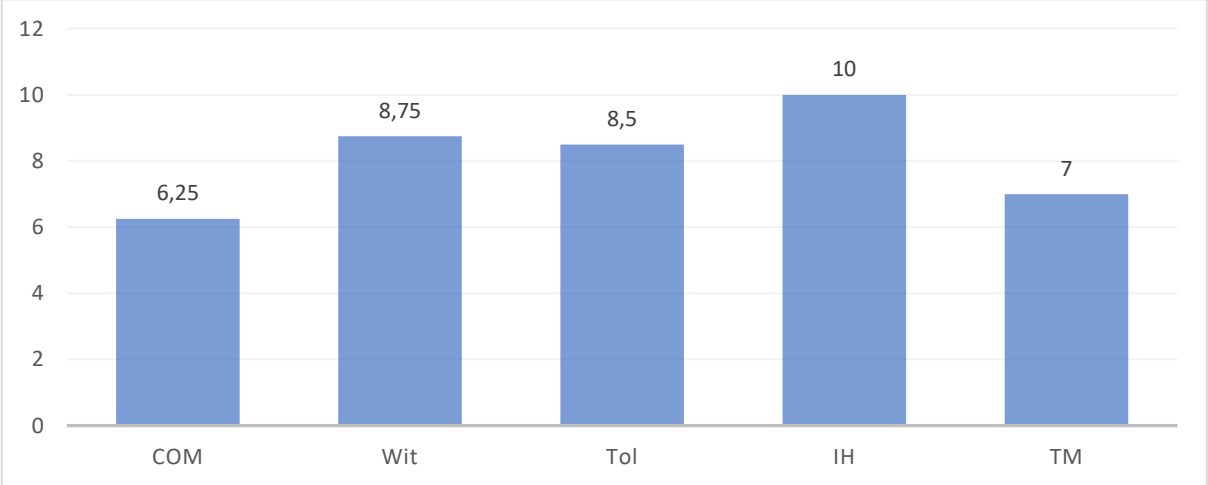

Figure 2. Data in Group A.

Key symptoms of Internet addiction (IA-Sym): 23,5
Negative consequences of Internet addiction (IA-RP): 17
Total CIAS assessment: from 37 to 42

Analyzing the test data in group A, it can be concluded that the respondents have high scores on the intrapersonal and health-related problems (IH) scale, withdrawal symptoms scale (Wit), tolerance scale (Tol), compulsive symptoms scale (Com) and these scores are higher than the average values of the Chen scale. The highest indicator on the scale of intrapersonal and health-related problems (IH), therefore, it is possible that if a difficult life situation arises, this group of respondents has a risk of moving to group B. To prevent the occurrence of Internet addiction, correction of the coping strategy, timely seeking help, and maintaining a healthy lifestyle may be recommended.

Consider the values of the indicators on the main scales in group B (assessment of averages):

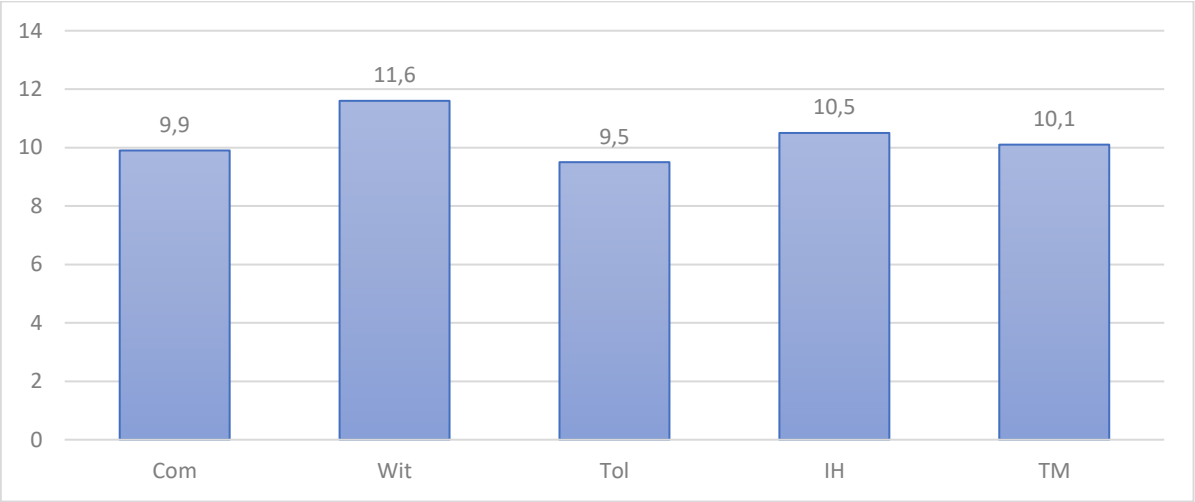

Figure 3. Data in Group B.

Key symptoms of Internet addiction (IA-Sym): 31,5
Negative consequences of Internet addiction (IA-RP): 20,7
Total CIAS assessment: от 43 до 64

This group turned out to be the largest. Analyzing the data in group B, we see that the respondents have indicators on the scale of intrapersonal and health-related problems (IH), the scale of withdrawal symptoms (Wit) and the scale of compulsive symptoms (Com), the time management scale (TM) corresponding to the average values of the Chen scale for the group with a tendency to Internet addiction behavior. The index on the tolerance scale (Tol) exceeds the average on the Chen scale (9.5; 7.9). The value of this scale (Tol) indicates the presence of an already established stable connection of the respondent with the Internet. High figures on the withdrawal symptoms scale (Wit) indicate a decrease in the respondents' ability to control time on the Internet. The combination of such indicators (Tol + Wit) prevents a decrease in consumption, increases the risk of moving to group C, which necessitates specialized care.

Move on to the indicators in group C (assessment of averages).

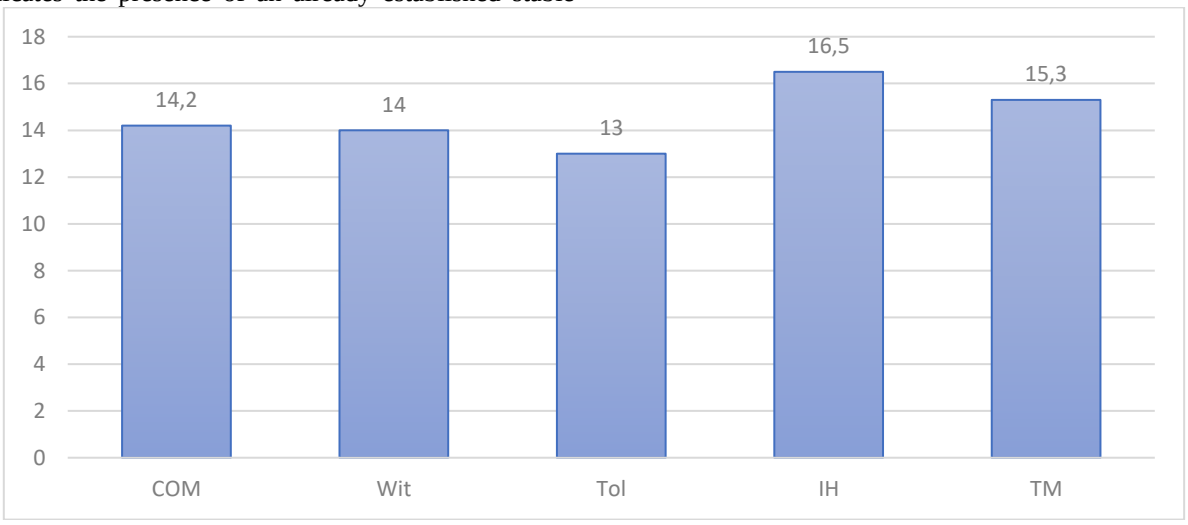

Figure 3. Data in Group C.

Key symptoms of Internet addiction (IA-Sym): 41,1
Negative consequences of Internet addiction (IA-RP): 31,8
Total CIAS assessment: from 65 and above.

The analysis of the data in group C showed that the values on the scale of intrapersonal and health-related problems (IH), the scale of withdrawal symptoms (Wit), and the time management scale (TM) correspond to the average values of the Chen scale for the group with a clearly defined and stable pattern of Internet-addicted behavior. Indicators on the compulsive symptoms scale (Com) and on the tolerance scale (Tol) exceed the average value on the Chen scale (14.2; 13.5 and 13;11.7). Respondents in this group have the highest score on the scale of intrapersonal and health-related problems (IH). Thus, the respondents in group C are characterized by reduced control over Internet-addicted behavior. The combination of scales of compulsive behavior and tolerance form maladaptive copping, in the form of withdrawal from reality and distancing via the Internet with an increase in psycho-emotional tension.

Such maladaptive coping hinders the harmonious development of personality and leads to impaired health at the bio-psycho-social level, which is reflected in high indicators on the scale of intrapersonal and health-related problems (IH). The respondents included in this group need qualified assistance for additional diagnosis and further psychotherapy.

Testing showed that 87% of respondents have an average and high level of Internet–addicted behavior, which is expressed in daily visits to the Internet, exceeding the amount of time planned for the network and neglecting intrapersonal problems and health. In order to prevent Internet-addicted behavior of students who took part in the testing, a conversation was held that increases their level of competence in Internet addiction issues. The majority of respondents are critical of their condition and have shown interest in this topic. Recognizing feedback as the most operational and important way for both the teacher and the student to improve the quality of communication allows conducting surveys and questionnaires. [4, p.63]

Based on the feedback from students and on the test results, the following recommendations can be identified for teachers working with these groups of students: 1. Raise students' awareness of Internet addiction issues. 2. Reduce the level of classroom and homework assignments that require an Internet connection. 3. Include exercises in the lesson system aimed at reducing emotional stress and showing imagination.

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THE WAYS OF INCREASING MOTIVATION IN THE PROCESS OF LEARNING ENGLISH LANGUAGE

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СПОСОБЫ ПОВЫШЕНИЯ МОТИВАЦИИ ПРИ ИЗУЧЕНИИ АНГЛИЙСКОГО ЯЗЫКА

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https://doi.org/10.5281/zenodo.10975207

Abstract
This article is devoted to the current problem of increasing motivation on English lessons. Various methods, ways and means of increasing motivation for the subject are considered: creating a language environment in the classroom, using video materials, songs, poems in English, using Internet resources in the classroom, organizing independent work for students. The main success of students' learning and attitude to the subject largely depend on the teacher's lesson delivery.

Аннотация
Данная статья посвящена актуальной проблеме повышения мотивации на уроках английского языка. Рассматриваются различные методы, способы и средства повышения мотивации к предмету: создание на занятиях языковой среды, использование видеоматериалов, песен, стихотворений на английском языке, применение Интернет-ресурсов на уроках, организация самостоятельной работы учащихся. Основным успехом обучения и отношение студентов к предмету во многом зависят от проведения учителем урока.

Keywords: motivation, teaching methods, project work, group work.
Ключевые слова: мотивация, методы обучения, проектная работа, групповая работа.

На протяжении многих лет в области педагогики и психологии уделяется большое внимание вопросам, связанных с мотивацией. На сегодняшний день является общепризнанным тот факт, что мотивация играет огромную роль при изучении иностранных языков. Научные работники сообщают о снижении мотивации в процессе изучения английского языка. Незадолго до начала изучения иностранного языка и в самом начале у студентов высокая мотивация. Но в процессе овладения иностранным языком отношение студентов меняется, так как им необходимо преодолевать разнообразные трудности. В результате уменьшается мотивация, снижается успеваемость, которая, в свою очередь, влияет негативно на мотивацию. Изучение проблемы повышения мотивации в ходе изучения английского языка является сейчас актуальным. Определение путей повышения мотивации при изучении английского языка и является целью данной работы. Важным фактором в обучении речевому общению на английском языке является мотивация усвоения иностранного языка.[5; 208] В педагогической литературе описаны достаточно подробно два вида мотивов: внутренние и внешние. Внутренние – это мотивы, которые развиваются под воздействием собственных мыслей обучаемого, его переживаний, стремлений, в результате чего появляется осознание внутренней необходимости. Почти у всех есть желание владеть иностранным языком, уметь общаться. Но как только начинается процесс овладения иностранным языком, и отношение учащихся меняется, многие разочаровываются. Ведь этот процесс предполагает период накопления «строительного материала», стадию неизбежно примитивного содержания, преодоления разнообразных трудностей, что отодвигает достижение целей, о которых мечталось. В результате уменьшается мотивация, пропадает встречная активность, ослабевает воля, направленная на овладение иностранным языком, снижается в целом успеваемость, которая, в свою очередь, негативно влияет на мотивацию. [5; 209]

Мотивация – это, прежде всего результат внутренних потребностей человека, его интересов и эмоций, целей и задач, наличие мотивов, направленных на активизацию его деятельности.[5; 209]

Виды мотивации при изучении английского языка.

Заслуженный деятель науки Е. П. Ильин в конце 90-х гг., анализируя современные подходы к выделению мотивов и их классификации вообще, считал, что последняя строится по тому, как те или иные авторы понимают сущность мотива: [6; 114]

1. По ведущему (наиболее ярко выраженному) мотиватору. Такие мотивы он называет, пользуясь термином научного сотрудника Л. С. Выготского, «однозначными», в отличие от «многозначных», в которых имеется сразу несколько мотиваторов, имеющих для человека противоположное значение — притягивающие и отталкивающие, приятные и неприятные.

2. По видам активности, проявляемой человеком: мотивы общения, игры, учения, профессиональной, спортивной и общественной деятельности и т. д. Здесь название мотива определяется видом проявляемой активности.

3. По временной характеристике, т. е. это ситуативные и постоянно (периодически) проявляющиеся мотивы, а также мотивы кратковременные и устойчивые. [6;115]

Одна из наиболее распространенных классификаций мотивов предполагает их разделение на внешние и внутренние (К. Замфир, М. В. Овчинников). Внутренними называют мотивы, которые непосредственно связаны с самой деятельностью. К внешним относят остальные мотивы, побуждающие индивида к данной деятельности. Совокупность внутренних и внешних мотивов определенным образом организуется и составляет мотивационную сферу личности, которая определяется психологом А. Маслоу как «иерархическая система мотивов личности». [6;115] Структура мотивационной сферы очень сложная. При этом мотивация выстраивается в определенную иерархию не только внутри каждого вида деятельности, но и происходит ранжирование мотивации различных видов деятельности. В нашем исследовании интерес представляют такие виды деятельности, как «учебная» и «учебно-профессиональная», где, по мнению ученой Н. В. Горловой, действуют одновременно и внешние, и внутренние мотивы. Их соотношение определяет психологические особенности структуры мотивации учения студентов. В сфере учебной деятельности научные исследователи Л. И. Божович и А. К. Маркова дают сходные классификации мотивов, различая при этом две большие группы познавательных и социальных мотивов. [6;115] Познавательные определяются как «потребность в деятельности, направленной на получение нового знания», и имеют следующие проявления:

1) широкие познавательные мотивы: реальное успешное выполнение учебных заданий; положительная реакция на повышение учителем трудности задания; обращение к учителю за дополнительными сведениями, готовность к их принятию; отношение к необязательным заданиям; обращение к учебным заданиям в свободной необязательной обстановке, например на перемене;

2) учебно-познавательные мотивы: самостоятельное обращение к поиску способов работы, решения, к их сопоставлению; возврат к анализу способа решения задачи после получения правильного результата; характер вопросов к учителю, а также вопросы, относящиеся к поиску способов и теоретическому содержанию курса; интерес при переходе к новому действию, к введению нового понятия; интерес к анализу собственных ошибок; самоконтроль в ходе работы как условие внимания и сосредоточенности;

3) мотивы самообразования: обращение к учителю с вопросами о способах рациональной организации учебного труда и приемах самообразования, участие в обсуждении этих способов; все реальные действия обучающихся по осуществлению самообразования. Социальные мотивы, связанные с различными социальными взаимодействиями обучающегося с другими людьми, проявляются иным образом:

1) социальные широкие мотивы: − поступки, свидетельствующие о понимании студентом общей значимости учения, о готовности поступиться личными интересами ради общественных; − включение в разные виды общественно-политической и общественно полезной деятельности;

2) социальные позиционные мотивы: − стремление к взаимодействию и контактам со сверстниками, обращение к товарищу в ходе обучения; − инициатива и бескорыстие при помощи товарищу; − принятие и внесение предложений об участии в коллективной работе; − готовность принять участие во взаимоконтроле, взаиморецензировании;

3) мотивы социального сотрудничества: − стремление осознать способы коллективной работы и усовершенствовать их; − интерес к обсуждению разных способов фронтальной и групповой работы и стремление к поиску наиболее оптимальных их вариантов; − интерес к переключению с индивидуальной работы на коллективную и обратно.[6;116]

Своеобразие мотивации заключается в том, что студент получает навыки и развивается как личность благодаря выполнению заданий по ее реализации.

Проведенные исследования показали, что одним из основных условий успешного обучения является мотивация к обучению.

Для того чтобы грамотно организовать процесс мотивации и управлять им, необходимо провести диагностику мотивации студентов, которая включает в себя:

– анкетирование студентов, в результате которого определятся уровни мотивации по диапазонам: высокий, средний, низкий;

– анкетирование учащихся, в результате которого определятся значимые для студента мотивы учения.

Наиболее значимыми в этой работе можно считать следующие установки и действия преподавателя:

– совместный со студентами выбор средств по достижению цели;

– использование коллективных и групповых форм работы;

– использование проблемных ситуаций, споров, дискуссий;

– использование игровых технологий;

– нестандартная форма проведения занятий;

– создание атмосферы взаимопонимания и сотрудничества;

– создание ситуации успеха;

– формирование адекватной самооценки у студентов;

– эмоциональная речь преподавателя.

Как известно, интерес как мотив играет важную роль в обучении студентов иностранному языку. Если студенты замотивированы, они легко преодолевают трудности, хорошо овладевают материалом, у них формируются прочные речевые умения и навыки. Особую роль в формировании мотивации играет новизна получаемой информации. Наличие элементов поисковой деятельности, познавательных мотивов и эмоциональное состояние студентов обеспечивают им выход из учебной деятельности в самообразовательную и творческую.[5; 210]

Поэтому эффективность обучения английскому языку определяется не только объемом усвоенных знаний, умений и навыков, но и теми методами обучения, которые помогут студентам эффективно овладеть информацией.[4; 149] Наилучшим вариантом решения данной задачи является применение нетрадиционных форм занятий, при котором используется коммуникативный и личностно-ориентированный метод обучения. [7; 448] К таким занятиям относится проектное занятие. В течение проектного занятие достигаются разные цели методического и психологического характера, которые можно обобщить следующим образом [4; 149]:

– центр процесса учебно-познавательной деятельности переносится с преподавателя на студентов, что по образовательному стандарту есть одна из главных задач;

– осуществляется контроль всех знаний и навыков по данной теме;

– обеспечивается более серьёзное отношение к занятию, происходит осознание себя как члена коллектива;

– приобретается новая информация;

– повышается эмоциональный настрой всех студентов.

Работа над проектом дает возможность вовлекать учащихся, независимо от их уровня языковой подготовки, в коллективную деятельность, направленную на достижение общей цели, работать в команде.

При проведении проектной работы проводятся следующие этапы[3;4]:

I. Comprehensive language input. Намечаем проблему и определяем источники получения знаний для ее решения: энциклопедии, журналы, познавательные программы телевидения, Интернет и т.п.

II. Processing. Обрабатывается вся масса информации и определяются критерии оценки данной информации с тем, чтобы проанализировать ее и выделить из нее наиболее существенные элементы, способствующие решению задачи.

III. Comprehensive language output. Предполагает собой наличие выходной информации по данному проекту, причем результат данной деятельности может быть различным в зависимости от индивидуальных возможностей или способностей участников проекта. Это может быть индивидуально написанное сочинение или проект, составленный группой учащихся совместно. Одним из условий для развития креативных способностей является создание атмосферы успеха, так как отсутствие её ведёт к крушению желания учиться. Создание ситуации успеха оказывает влияние не только на настроение учащихся, но и на качество их знаний. Театральное искусство – одна из активных форм познания и неотъемлемая часть школьного языкового образования. Театральный проект на основе сценарного подхода - это технология, которая включает для исследования выявленной проблемы театрально-игровую деятельность в качестве основного средства активизации познавательных возможностей личности в условиях творческого взаимодействия с другими.

Таким образом, проектная деятельность один из основных приемов повышения мотивации к изучению английского языка. При организации проектной деятельности студентов преподавателем, улучшаются результаты обучения ввиду интерактивности. В процессе данной деятельности преподаватель со студентами находит трудные моменты в обучении, ставит проблему, актуальную для студентов, задумывается над связями с другими объектами и явлениями, а также развивает видение практического применения получаемых знаний, в результате чего повышается мотивация к изучению иностранного языка. Каждое задание, этап занятия должен содержать проблему, которую студенты самостоятельно замечают, определяют, вырабатывают возможные пути решения проблемы, дают им оценку. Работа с проектом подразумевает умение работать с информацией, активно проявлять себя в команде, стараться стать лидером. Возрастает уверенность студентов в собственных силах, меняется отношение к изучению иностранного языка в лучшую сторону. Качество занятий повышается тогда, когда студенты, работая над проектом, берут на себя ответственность за собственные знания. Эффективные формы работы над проектами:

- организация самостоятельной работы учеников над темой проекта;
- обеспечение наглядного материала и всех необходимых предметов для разработки дальнейших действий;
- использование, при необходимости, Интернет-ресурсов. [4; 150]

Будучи наставником, преподаватель дает определения терминам, чтобы детям было понятно, чем они занимаются. Дифференциация проекта как работы, направленной на решение конкретной проблемы, на достижение оптимальным способом за-

ранее запланированного результата включает элементы докладов, исследований и любых других видов самостоятельной творческой работы студентов, но только как способов достижения результата проекта. Именно поэтому проектная деятельность актуальна на данный момент.[4; 150] Проектная деятельность на занятиях дает возможность развить творческие способности студентов. В этой деятельности у студентов появляется возможность проявить себя, свою самостоятельность в принятии решений, контролировать собственный образовательный процесс.

Необходимо сформулировать основные понятия у студентов и интерес к данному виду деятельности. Этому способствует специфика рассматриваемого предмета - английского языка. Преподаватель может предложить выбрать тему самостоятельно, предоставив возможность учащимся творчески организовать свою деятельность, используя сферу собственных интересов.[4;150] Таким образом, в сознании учащегося соединяются два момента: учебное задание и сфера своих интересов. Это важно, так как, когда студент будет прорабатывать тему, в которой он лично заинтересован или хочет разобраться (в случае возникновения трудностей), он проявит аккуратность и постарается применить все свои знания и умения для того, чтобы предоставить тему. Высокий уровень мотивации на уроках придаст уверенности студенту повысит его знания. Преподаватель, повышая уровень мотивации студентов с помощью проектной деятельности, организовывает благоприятную атмосферу на занятиях.[4; 150]

Проекты классифицируются по следующим категориям:

-научно-исследовательская работа;

-опытно-конструкторская;

-социальный проект;

-волонтерский проект;

-творческий проект. [8; 5]

Примером творческого проекта является проект «Английская сказка», суть которого заключается в создании, переводе сказки на английский язык и театральной постановке как результата обучения. Такая форма развивает коммуникативные компетенции студентов, креативность и активность, которая, впоследствии, проявляется и в жизнедеятельности. Включение различных видов деятельности на занятия содействует повышению эффективности. Проектная деятельность мотивирует и активирует самостоятельность, углубляет интерес к учению в целом.[4; 151]

Инновационная деятельность — одна из наиболее доступных и эффективных форм развития навыков коммуникативной компетенции у обучающихся, создающая условия для развития самостоятельности, креативности и активности студентов. Конечно, важным компонентом является создание комфортных психологических условий, в которых студент чувствует свою успешность, интеллектуальную состоятельность. Необходимо привлекать к данному процессу самих студентов, т. е. делать эти условия предметом обсуждения и совместного творчества. Только при таком условии студентам будет комфортно с их собственной точки зрения, а не с точки зрения преподавателя. [2] Инновационное развитие профессионального образования в группе (индивидуальную, групповую, коллективную), которые стимулируют самостоятельность и творчество студента и делает работу разнообразнее.[9; 58]

Групповая работа — организационная форма коллективной работы, при которой три и более студентов одновременно осуществляют совместную деятельность, направленную на решение поставленной задачи. Важно обратить внимание всех участников группы на то, что успех зависит не только от слаженной работы всей группы в целом, но и от личного вклада каждого студента. Преподаватель должен четко ставить задачу, ограничивать временные рамки выполнения этого задания.

В качестве примера можно привести организацию групповой работы. При повторении темы «Артикль» можно разделить на две группы по четыре человека. Формулируется задание примерно так Today we'll go round the world trip and remember when we use the definite article with the names of countries, cities, oceans, rivers and lakes. Использую физическую карту мира на интерактивной доске, раздается группам карточки с географическими названиями без артиклей (по 6 карточек каждой группе). Участники групп должны вписать артикли туда, где они нужны, и прикрепить карточки к карте используя магнит. Каждому обучающемуся в группе раздаются роли: капитан дальнего плавания (seacaptain) готовит рассказ о том, к какой стране относится то или иное географическое название; лоцман (pilot) ищет на карте расположение городов, стран, морей, океанов, рек, озер, прикрепляет карточки с географическими названиями на английском языке, озвучивает то, что изображено на карточке; боцман (boatswain) контролирует, помогает участникам своей группы заполнить пропуски артиклями; матрос (sailor) ищет значение слов (географических названий) в лингвострановедческом словаре. Ребята, работая в группе, совместно выполняют поставленную задачу. При этом более подготовленные обучающиеся помогают слабым. Таким образом, они отрабатывают грамматическое правило, произносят географическое название, Инновационное развитие профессионального образования составляют предложения, описывающие месторасположение объекта с используемым названием. [3;59]

Парная и групповая формы организации учебной деятельности дают возможность включать в активную работу практически всех студентов, воспитывать у ребят чувство ответственности друг за друга. Учитывая вышесказанное, можно сделать вывод, что использованная мной форма групповой работы является эффективным средством развития коммуникативных навыков. Она помогает более глубокому усвоению программного материала, формирует жизненную компетенцию обучающихся.[10; 4-15]. Применяя технологию критического мышления на занятиях английского языка

можно использовать следующие приемы: «Верные и неверные утверждения», «Перепутанные логические цепочки», «Ключевые термины». Например, предлагается соотнести друг с другом элементы (начало и конец предложения) и объединить их в пары. [3;60] Инновационные формы обучения способствуют организации и активизации учебной деятельности студентов, повышают результативность обучения, создают благоприятный микроклимат на уроках английского языка [11]

Английский язык - это не просто новый взгляд на мир, это способ и путь для того, чтобы пополнить свои знания в различных областях науки и искусства. Он является важным инструментом для осуществления деятельности в разных сферах общественной жизни.

Необходимо признать главную роль мотивации в обучении английскому языку и четко обозначить пути ее формирования в условиях университета и института. При рассмотрении вопроса о мотивации и поиске путей ее формирования не допустимо упрощать ее понимание. Это связано с тем, что формирование мотивации не означает, что учителя переносят в головы учеников готовые, заданные извне мотивы и цели обучения. Формирование мотивации- это, прежде всего, выражение внутренней мотивации к обучению, ее реализация самими учащимися и создание условий для дальнейшего саморазвития мотивационно-ценностной сферы. В тоже время при овладении иноязычной культурой не имеет значения, какая мотивация у обучающегося к деятельности. Для соответствующей мотивации используются различные методы и средства-лингвистические, наглядные, практические и т.д., но сегодня ведущую роль играют именно поисковые иисследовательскиеметоды. Формированию стойкой мотивации к обучению способствует активное использование игр на занятиях.

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DIGITAL TECHNOLOGIES IN CHEMISTRY LESSONS

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ХИМИЯ САБАҚТАРЫНДАҒЫ ЦИФРЛЫҚ ТЕХНОЛОГИЯЛАР

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Abstract
The current standard of education requires students not only to have theoretical knowledge, but also to develop competence in the use of ready basic physico-chemical, mathematical and other natural sciences concepts and methods in solving professional problems. In this regard, circular technologies are becoming more relevant in the practice of teaching chemistry. In addition, the development of modern information technologies has led to a wide variety of digital applications and sites, so choosing and sorting the most effective ones is a big problem.

Аңдатпа
Қазіргі білім беру стандарты студенттер теориялық білімді ғана емес, сонымен бірге дайын негізгі физика-химиялық, математикалық және өзге де жаратылыстану ғылымдарын кәсіби мәселелерді шешудегі ұғымдар мен әдістерді пайдалану құзыреттілікті қалыптастыруды талап етеді. Осыған байланысты цирлы технологиялар химияны оқыту тәжірибесінде өзекті бола түсуде. Сонымен қатар, қазіргі кездегі ақпараттық технологиялардың дамуы цифрлық қолданбалардың, сайттардың көптүрлілігіне әкелді, соған байланысты тиімдісін таңдап, сұрыптау - үлкен мәселе.

Keywords: digital technology, chemistry, Molecules, Chemistry, Quiziz, effective applications, chemical technology, environmental chemistry
Кілттік сөздер: цифрлық технология, химия, Molecules, Chemistry, Quiziz, тиімді қолданбалар, химиялық технология, экологиялық химия

Кіріспе.

Қазіргі адамзат ақпараттандыру деп аталатын жалпы тарихи процеске қосылды. Бұл үдеріс кез келген азаматтың ақпарат көздеріне қолжетімділігін, ақпараттық технологиялардың ғылыми, өндірістік, қоғамдық салаларға енуін, ақпараттық қызмет көрсетудің жоғары деңгейін қамтиды.

Қоғамды ақпараттандыруға байланысты болып жатқан процестер ғылыми-техникалық прогресті жеделдетуге, адам қызметінің барлық түрлерін интеллектуализациялауға ғана емес, сонымен бірге адамзаттың шығармашылық әлеуетін дамытуды қамтамасыз ететін қоғамның сапалы жаңа ақпараттық ортасын құруға ықпал етеді.

Бүгінгі цифрлық оқыту технологиялары:

- ақпараттық деректерді оқушыларға оңтайлы жеткізуге арналған аспаптық жинақ;
- әртүрлі оқу материалдарын жасауға мүмкіндік беретін құралдар жинағы;
- оқыту қызметінің әдістерін оңтайландыратын құралдар;
- оқушылардың білімін бақылауға арналған сандық құралдар.

Білім беру процесінде цифрлық технологияларды қолдануды басымдық деп санаған жөн, өйткені олар біздің еліміздегі білім беруді дамытудың эволюциялық логикасына, осы

процестің әлемдік тенденцияларына сәйкес келеді. Компьютер және оның негізінде жасалған технологиялар мен ресурстар оқытудың бірегей құралдары болып табылады, соның арқасында олар мұғалімдер мен балалардың назарын мықтап алады.

Біз әртүрлі ақпаратты жаңа тәсілдермен пайдалануға және сол арқылы сабақтың әдістемелік мүмкіндіктерін байытуға мүмкіндігіміз бар. Оқытудың ақпараттық технологиялары-бұл оқушыларға ақпаратты дайындау мен берудің бір түрі, мұнда құрал компьютерлік техника және басқа да бағдарламалық-техникалық құралдар болып табылады, олар әртүрлі мақсаттарда болуы мүмкін.

Бүгінгі таңда мектеп кабинеттерінің көпшілігі компьютерлік техникамен жабдықталған және біз ақпараттық технологиялардың нағыз үстемдігін көріп отырмыз.

Эксперимент табиғатты танудың ажырамас бөлігі, оның заңдылықтарын зерттеу болып табылады. Физика, химия, биология сияқты ғылымдарды тек теориялық тұрғыдан зерттеу мүмкін емес, оларға міндетті түрде практикалық негіз қажет. Эксперимент студенттерге табиғаттың қолданыстағы заңдарының дұрыстығына, сондай-ақ алға қойылған ғылыми гипотезаның дұрыстығына немесе керісінше оның қателігіне көз жеткізуге мүмкіндік береді.

Эксперименттің тиімділігін арттыру үшін заманауи құрылғыларды қолдану қажет, өйткені олар есептеудің негізі болып табылатын деректерді тіркейді. Мұндай заманауи құрылғыларға әртүрлі физикалық шамаларды, соның ішінде дыбысты, жарықты, күшті, қысымды және басқаларды электрлік сигналдарға аударуға арналған сенсорлардың барлық түрлері жатады. Алынған электрлік сигналдар Тіркеуші деп аталатын арнайы құрылғы арқылы компьютерге беріледі, онда олар бағдарламалық түрде өңделеді және бізге стильдендірілген аналогтық немесе сандық аспаптар түрінде де, графиктер түрінде де әр түрлі түрде ұсынылуы мүмкін. Соңғылары болып жатқан процестерді зерттеуде әлдеқайда айқын көрінеді және зерттеушілерді көрсеткіштерді алу және кестелерді толтыру бойынша күнделікті жұмыстардан босатады. Сонымен қатар, өлшеу кезінде кестеге мәліметтер автоматты түрде енгізіледі және экспериментаторлар тек нәтижелерді өңдеуі керек.

Негізгі бөлім.

Мектептерге түсетін жаратылыстану-ғылыми цифрлық зертханалардың (ЦЗ) жаңа буыны химиялық экспериментті түбегейлі жаңа деңгейде ұйымдастыруға, бақыланатын құбылыстарды тек қана сапалы бағалаудан сандық сипаттамаларды жүйелі талдауға дейінгі ғылыми зерттеу элементтеріне көшуге, Физика, Экология, Биология, Математика және информатикамен пәнаралық байланыстардың мүмкіндіктерін толық іске асыруға мүмкіндік береді [1]. Олар жаратылыстану ғылымдары бойынша интеграцияланған оқу жобаларын орындауға, ғылыми Статистика, қолданбалы математика, Ақпараттық технологиялар әдістерін қолдануға және игеруге мүмкіндік береді.

ЦТ оқу процесінде химия сабақтарында практикалық сабақтар мен зертханалық тәжірибелер, ғылыми-зерттеу семинарларын ұйымдастыру, сыныпта да, лагерь жағдайында да ғылыми-зерттеу жобалары үшін қолданылады.

Қазіргі уақытта мұғалімдер ЦТ-ді белсенді қолданады, әдетте, тек мектеп оқушыларының сабақтан тыс жұмыстары үшін, атап айтқанда, жұмыстың жобалық түрін ұйымдастыру үшін. Сабақтарда цифрлық технологияларды қолдануға шектеу болатын себептер 1 – суретте көрсетілген.

Сабақтарда ЦТ қолдануды шектеу, келесі себептерге байланысты:	Сабақтарда ЦТ қолдануды шектеу, біздің ойымызша, келесі себептерге байланысты:
	сабақтың қатаң уақыты;
	негізгі оқу бағдарламаларында сандық химиялық эксперименттің мүлдем болмауы;
	иллюстрациялық химиялық эксперименттің басым болуы, проблемалық, іздеу және зерттеу сабақтарына жеткіліксіз назар аудару;
	химия кабинеттерінің жеткіліксіз жабдықталуы;
	мазмұны мемлекеттік білім беру стандартынан (базалық деңгейден) едәуір асып түсетін ұғымдарды қолдану.

1-сурет. Цифрлық технологияларды сабақтарда қолданбауының себептері.

Шкетеуге қарамай мектептерді цифрлық технологиямен жақдықтау 2 – суретте көрсетілген жетістіктерге әкеледі.

Химия бойынша мектеп практикумын сапалы жаңа деңгейге ауыстыруға мүмкіндік береді:	оқушыларды химия және биология бойынша өзіндік шығармашылық жұмысқа дайындау;
	оқу процесіне іс-әрекеттік көзқарастың басымдығын жүзеге асыру;
	оқушыларда жалпы оқу және пәндік дағдылардың кең кешенін дамыту;
	танымдық, ақпараттық, коммуникативтік құзыреттілікті қалыптастыратын қызмет тәсілдерін меңгеру.

2-сурет. Цифрлық технологияларды химия сабақтарында қолданудың артықшылықтары.

Білім беруді ақпараттандырудың қазіргі кезеңінің тағы бір бағыты әртүрлі пәндерді оқыту үшін мобильді технологияларды қолданумен байланысты.

Мобильді оқыту – бұл негізінен немесе тек портативті құрылғыларды-телефондарды, смартфондарды, планшеттерді, кейде ноутбуктерді және сол сияқтыларды пайдаланатын кез келген оқу әрекеті, бірақ қарапайым жұмыс үстелі компьютерлері емес.

Мобильді қосымша-бұл әртүрлі әрекеттерді орындауға мүмкіндік беретін белгілі бір функционалдығы бар белгілі бір платформада орнатылған бағдарлама.

Ұялы телефондар, смартфондар, планшеттік компьютерлер адамның цифрлық өмірінің негізгі бөлігіне айналуда.

Егер білім беруде болжам жасасақ, 5 жылдан кейін біз мобильді оқытуға толықтай көшетінімізді көреміз. Сондықтан тақырып өзекті. [2]

Сабақта Мобильді қосымшаларды пайдаланудың артықшылықтары мен кемшіліктері.

Кез-келген инновацияны енгізу кезінде сіз жағымсыз жағына да дайын болуыңыз керек, сондықтан мобильді оқытудың сөзсіз артықшылықтарын да, жағымсыз жақтарын да қарастырамыз. Оқу орындарында мобильді құрылғылар мен технологияларды қолданудың артықшылығы мен кемшілігі 1 – кестеде көрсетілген.

1-кесте.

Мобильді құрылғыларды сабақ барысында қолданудың артықшылықтары мен кемшіліктері.

№	Артықшылығы:	Кемшілігі:
1	кез келген уақытта және кез келген жерде оқу және анықтамалық ресурстар мен бағдарламаларға жылдам қол жеткізу;	оқытушыларды да, оқу орындарының әкімшілігін де оқытудың бұл түрі оқу процесін оңтайландыруға ықпал ететініне сендіру қиын;
2	сынақтар мен бақылау жұмыстарын жүргізуді жеңілдету;	мұғалімдер (оқушылардан айырмашылығы) АКТ құзыреттілігінің тиісті деңгейіне ие емес;
3	мұғаліммен және оқу қауымдастығымен үнемі кері байланыс;	қазақ тіліндегі қолданбалардың аздығы;
4	оқушының жеке ерекшеліктерін есепке алу-проблемаларды диагностикалау, оқытудың жеке қарқыны;	
5	таныс техникалық құралдар мен виртуалды ортаны пайдалану арқылы білім алушылардың ынтасын арттыру;	
6	автономды оқытуды ұйымдастыру;	
7	оқушының жеке кәсіби бағдарланған оқу кеңістігін құру;	

Қазіргі мұғалім бүгінде мобильді құрылғылар мен технологияларды оқыту қаупінен көмек пен қолдауға айналдыра алады. [5]

Міне, химия сабақтарында қолдануға болатын кейбір қолданбалар.

1.Molecules

Бұл тегін қосымшада сіз әртүрлі заттардың үш өлшемді модельдерін таба аласыз. Молекулаларда пайдаланушыларға модельдерді айналдыруға, молекуланың масштабын өзгертуге, өлшемін ұлғайтуға/кішірейтуге және т.б. мүмкіндік беретін бірнеше бейнелеу режимдері бар. қолданбаның өзі молекулалық модельдердің өте лайықты базасына ие, бірақ сонымен бірге пайдаланушының биологиялық молекулалардың халықаралық қоймаларының мамандандырылған сайттарынан және олардың үш өлшемді модельдерінен мысалдар жүктеу мүмкіндігі бар. Ол үшін іздеу жолағына заттың атын енгізу керек (Су, Алтын, инсулин және т.б.).

3.Chemist

Бұл мобильді құрылғыдағы виртуалды химия зертханасының бір түрі. Мұнда әртүрлі заттармен тәжірибе жасап, ең күтпеген реакцияларды байқауға болады. Сіз ойлағандай, виртуалды кеңістікте тіпті жарылғыш және радиоактивті заттармен тәжірибе жасауға болады. Тәжірибелердің нәтижелері нақты уақыт режимінде модельденеді, ал бағдарлама көптеген параметрлерді ескереді: ауа құрамы, қоршаған

ортаның температурасы, аралас заттардың массасы мен көлемі және т. б. Жаңадан бастаған химикке тапсырманы жеңілдету үшін қосымшада периодтық жүйедегі әрбір зат үшін негізгі реакциялар базасы бар. Дегенмен, сіз "химиялық" бола аласыз және өз реакцияларыңызды аша аласыз.

4.Chem Lab

Бұл сіздің негізгі химиялық формулалар туралы біліміңізді тексеретін қызықты сынақ. Пайдаланушыға кезекпен 5 тапсырманы орындау ұсынылады (пробиркаға газ алу үшін қажетті элементтерді тарту немесе қолайлы заттарды қосу және т.б.). Эксперименттердің соңында әр тапсырма бойынша қажетті нәтижелер көрсетіледі және сіздің жетістіктеріңізбен салыстырылады. Сақ болыңыз-егер реакция сәтсіз болса, бірдеңе жарылуы немесе өртенуі мүмкін. Әрине, қосымшада жұмыс істеу қауіпсіз, бірақ жарылыс, кем дегенде, мұндай тәжірибені қайталамау керек екенін көрсетеді.

5. Chemical Valence

Мичиган химия профессоры жасаған бұл қолданба пайдаланушыларға молекулалардың қосылу принципін түсінуге көмектеседі. Геймплей бес деңгейден тұрады, олардың әрқайсысында ойыншы Льюистің 2D нүктелік құрылымдарын құруы керек. Тапсырманы орындаған адам 2D құрылымын 3D моделіне айналдыру арқылы марапатталады. Сонымен қатар, әр деңгейдің соңында бағдарлама сізге ғаламның және оның заттарының құрылымы туралы философиялық риторикалық сұрақ береді, сондықтан валенттілікті түсіну мүмкін болмаса да, химия философиясы сізге жақындай түседі.

6. Chemik

Элементтердің белсенділігімен танысуға, тотығу-тотықсыздану реакцияларын зерттеуге, химия мәселелерін шешуге, реакцияның соңғы өнімдерін алуға және коэффициенттерді теңестіруге мүмкіндік беретін химияны зерттеудің тағы бір құралы. Қосымшада бір жарым мыңнан астам химиялық қосылыстардың реакцияларының сипаттамасы бар. Қолданбаның интерфейсі өте қарапайым, бірақ ондағы жұмыс сияқты: реакция үшін кестеден қажетті элементтерді таңдап, оларды қосу жеткілікті.

7. Chem By Design

Молекулалық құрылымдар мен реакциялар тізбегінің кескіндер жинағы бар химиялық элементтердің тағы бір дерекқоры. Бағдарламада 600-ден астам реттілік бар, олардың әрқайсысы үшін қосымша тапсырмалар мен тесттер бар.

8. Chemistry Allie

Түрлі-түсті графикасы бар химиялық ағылшын тіліндегі викторина. Химия әуесқойлары өз білімдерін әр түрлі салаларда шыңдай алады: атомдық Нөмірді, элементтердің атауларын, қосылыстардың негізгі кластарының формулаларын анықтау, теңдеу коэффициентін табу және т.б. әр сұраққа жауап беру уақыты он секундпен шектеледі. Жауаптың 5 нұсқасы ұсынылады, бесінші қатеден кейін қолданба "бұзылады". Органикалық және бейорганикалық сұрақтар күрделіліктің жоғарылауымен 9 деңгейге бөлінеді. Chemistry Allie ағылшын тілінде болса да, тілді жақсы білу қажет емес.

9. Chemistry calculations

Химиялық университеттердің студенттеріне бағытталған американдық білім беру қосымшасы. Қолдану үшін тілді меңгерудің базалық деңгейі жеткілікті. Сонымен қатар, Chemistry calculations қолданудың үлкен ауқымына ие, бұл орташа студент үшін өте қажет. Мұндай қосымшаны пайдалану РН, молекулалық салмақты тез және дұрыс есептеуге, идеалды газ теңдеуі бойынша кез-келген параметрлерді есептеуге, Нернст теңдеуі бойынша есептеулер жүргізуге және т.б. түрлендіргіш, периодтық кесте, физикалық тұрақтылар кестесін қамтиды. Барлық қызығушылық танытқан студенттерге жүктеуге ұсынылатын керемет бағдарлама.

10. MEL Chemistry

Молекулаларды бейнелеуге арналған ең жақсы қосымшалардың бірі. Экранда немесе Виртуалды шындық көзілдірігінің көмегімен көруге болатын ұсынылған молекулалардың алуан түрлілігімен аналогтарынан жақсы ерекшеленеді. Молекулалар әртүрлі формада ұсынылған: олар оқулықтарда және масштабты модель түрінде салынған. Сондай-ақ, пайдаланушыларда молекуланы әртүрлі бағытта айналдыру мүмкіндігі бар, бұл өте көрнекі және ыңғайлы. [3]

Зерттеу нәтижелері.

Сонымен қатар әмбебаб химия сабағында да, басқа пәндерде қолдануға болатын платформаларға толығырақ сипаттама 2 – кестеде берілген.

2-кесте.

Сабақ барында қолданылған платформалар.

Атауы	Сипаттамасы	Артықшылығы	Кемшілігі
LearningApps	Білімді тексеру үшін интерактивті жаттығулар жасауға мүмкіндік беретін толығымен тегін онлайн қызмет. Шығарылған ел Германия болса да, қызмет орыстандырылған және сирек жағдайларды қоспағанда, шет тілін білу қажет емес. LearningApps-бұл 20 интерактивті жаттығу ойын форматында. Демек, бұл қызмет, Ең алдымен, балалармен жұмыс істейтін оқытушылар үшін жасалған сияқты.	Тесттердің, ойындардың алуантүрлілігі; Кез-келген тілде тапсырма құрастыру мүмкіндігі; Тапсырма шаблондардың болуы; Пайдаланушылардың бір-бірімен өз тапсырмаларымен бөлісе алу мүмкіндігі; Интерфестің түсінікті орыс тілінде болуы; Ссылка арқылы кез-келген адамға жіберу мүмкіндігі; Барлық тапсырма түрлері тегін.	Оқушылардың жетісіктерін сақтай алмау мүмкіндігі; Тапсырмалардың тек ссылка түрінде жібере алу мүмкіндігі; Тек онлайн орындалатын тапсырмалар.
Quiziz	Әрбір оқушыны оңай реттелетін мазмұнмен және инклюзивті бағалау, оқыту және тәжірибе құралдарымен меңгеруге ынталандыруға мүмкіндік беретін жартылай тегін сайт.	Тегін түрінде тестті ашық және жабық түрінде құрастыру мүмкіндігі; Кез-келген тілде тапсырма құрастыру мүмкіндігі; Тапсырма шаблондардың болуы; Пайдаланушылардың бір-бірімен өз тапсырмаларымен бөлісе алу мүмкіндігі; Интерфестің түсінікті орыс тілінде болуы; Ссылка арқылы кез-келген адамға жіберу мүмкіндігі; Ссылка мен қатар Qr-код арқылы ойынға кіру мүмкіндігі; Нақты уақыттағы мониторинг; Оқушылардың жетістігін сақтау мүмкіндігі.	Тек онлайн орындалатын тест түрлері; Тегін нұсқасында тесттің тек екі түрінің болуы;
Online Test Pad	Тегін онлайн тест, логикалық ойын және кроссворд құрастырушысы. Конструктордың интерфейсі қарапайым және қарапайым, тесттерді құру барысында кеңестер бар.	Тесттердің, ойындардың алуантүрлілігі; Кез-келген тілде тапсырма құрастыру мүмкіндігі; Тапсырма шаблондардың болуы; Пайдаланушылардың бір-бірімен өз тапсырмаларымен бөлісе алу мүмкіндігі; Интерфестің түсінікті орыс тілінде болуы; Ссылка арқылы кез-келген адамға жіберу мүмкіндігі; Барлық тапсырма түрлері тегін.	Тек онлайн орындалатын тест түрлері; Тапсырмалардың тек ссылка түрінде жібере алу мүмкіндігі;

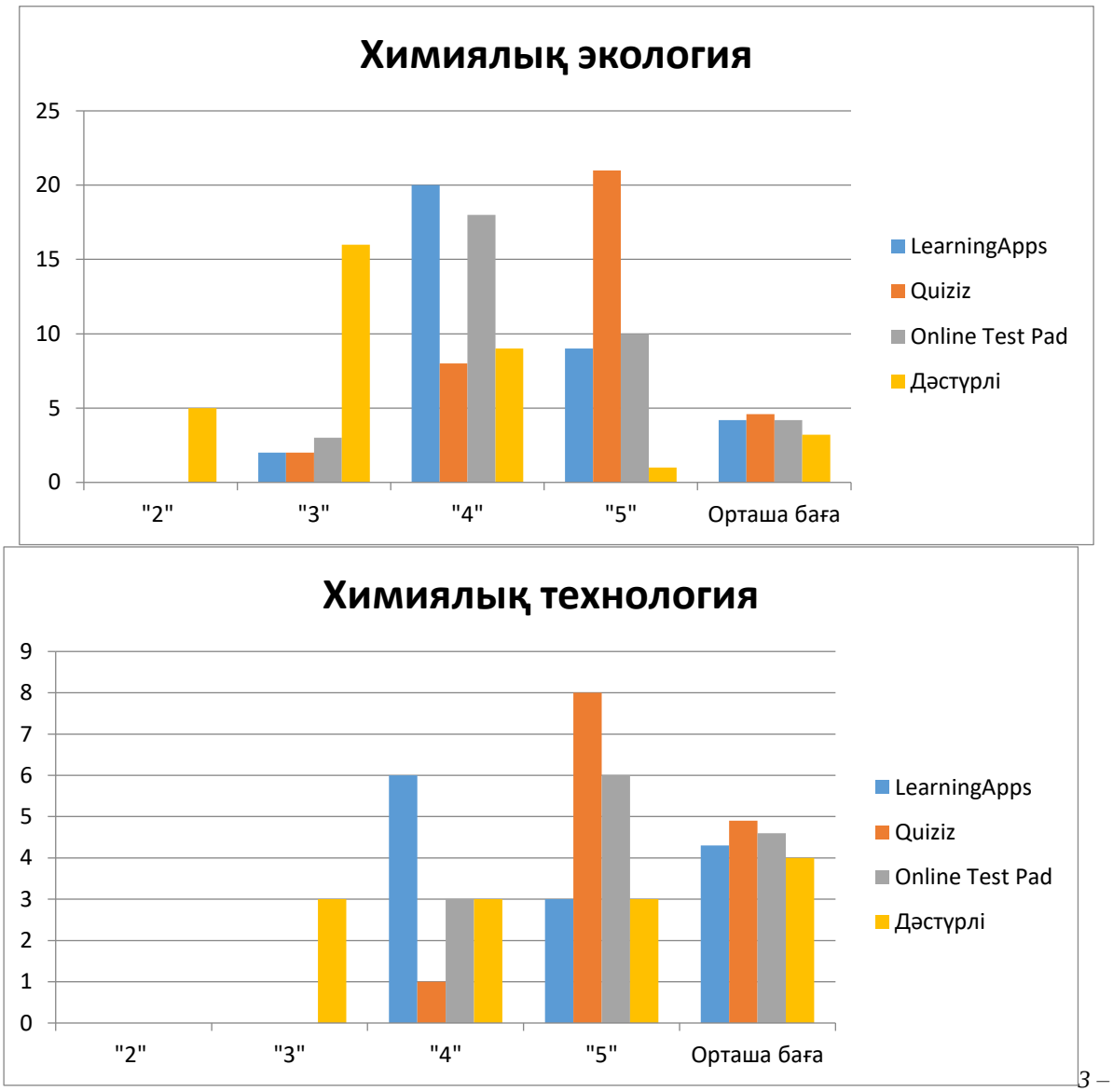
Осы үш платформалармен қатар дәстүрлі әдісті пайдалану арқылы білім алушылардың алдыңғы білімдерін тексерудегі педагогикалық эксперимент нәтижесі 3 – кестеде берілген.

3-кесте.

Педагогикалық эксперимент нәтижесі.

Пән атауы	Білім алушылар саны	LearningApps платформасын қолдану нәтижесі						Quizizz платформасын қолдану нәтижесі						Online Test Pad платформасын қолдану нәтижесі						Дәстүрлі әдісті қолдану нәтижесі					
		«5»	«4»	«3»	«2»	сапасы	орташа бағa	«5»	«4»	«3»	«2»	сапасы	орташа бағa	«5»	«4»	«3»	«2»	сапасы	орташа бағa	«5»	«4»	«3»	«2»	сапасы	орташа бағa
Химиялық экология	31	9	20	2	0	94	4,2	21	8	2	0	94	4,6	10	18	3	0	90	4,2	1	9	16	5	84	3,2
Химиялық технология	9	3	6	0	0	100	4,3	8	1	0	0	100	4,9	6	3	0	0	100	4,6	3	3	3	0	67	4

Әр пәнді жеке қарастыратын болсақ, нәтижелері 3-суретте көрсетілген.



3 – сурет. Эксперимент нәтижелері.

3-суреттен көріп отырғандай білім алушыларға дәстүрлі әдістен қарағанда әртүрлі платформаларда тапсырмаларды орындау жеңілірек болып табылады, қарап отырсақ цифрлық платформаларды қолдану арқылы орташа бағаны кем дегенде 0,7 –ге жоғарылатуға мүмкіндік береді.

Қорытынды.

Зерттеу нәтижесінде оқу барысында цифрлы платформаларды қолданудың артықшылығын атасақ,

– тексерудің ілезделігі;
– экологиялық таза әдіс;
– білім алушылардың қызығушылығын арттырады;
– білім алушының өзін-өзі бағалау;
– білім алушыға өздігінен қатемен жұмыс жасау мүмкіндігі.

Ақпараттық жүйелер өмірдің барлық салаларына енді. Цифрлық технологиялардың дамуы көптеген мүмкіндіктерді ашады. Цифрлық мектеп-бұл білім беру процесінде цифрлық жабдықты, бағдарламалық жасақтаманы саналы және тиімді пайдаланатын және осылайша әр оқушының бәсекеге қабілеттілігін арттыратын білім беру мекемесінің ерекше түрі.

Цифрлық мектеп электрондық білім беру мазмұнына еркін қол жеткізуді және әрбір оқушының қабілеттерін ескере отырып, оқу процесін дараландырудың кең мүмкіндіктерін білдіреді.

Цифрлық технологиялар жаңа оқу материалын белсенді қабылдауды қамтамасыз етеді, оны ұсынудың айқындылығын арттырады және оқушылардың заманауи химияның теориялық негіздерін неғұрлым берік меңгеруіне ықпал етеді, сондай-ақ мұғалімге оқу іс-әрекетінің жаңа, дәстүрлі емес нысандарын ұйымдастыруға, оқушылардың шығармашылық жұмысын ұйымдастыруда белсенді, белсенді оқыту әдістерін кеңінен қолдануға мүмкіндік береді.

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FEATURES OF TEACHING AN INTEGRATED COURSE «I EXPLORE THE WORLD» IN PRIMARY SCHOOL

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ОСОБЛИВОСТІ ВИКЛАДАННЯ ІНТЕГРОВАНОГО КУРСУ «Я ДОСЛІДЖУЮ СВІТ» У ПОЧАТКОВІЙ ШКОЛІ

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https://doi.org/10.5281/zenodo.10975259

Abstract

The article is devoted to the peculiarities of teaching the integrated course «I Explore the World» in the New Ukrainian School. It is noted that the course «I Explore the World» combines the educational content of several educational areas. According to the typical NUS 1 curriculum, there are three such areas: natural science, civic and historical, social and health education. According to the typical educational programme of NUS 2, there are seven such branches: linguistic and literary, mathematical, natural, technological, social and health, civic and historical, and informatics.

It is noted that the main educational field in the integrated course «I Explore the World» is the natural education field. The natural education field is harmoniously integrated with almost all educational fields defined in the State Standard of Primary Education, because nature is one of the most valuable factors in the mental, patriotic, labour, aesthetic development of a child's personality.

The peculiarities of teaching the integrated course «I Explore the World» lie in the didactic and methodological organisation of learning, namely in its connection with life, with the practice of applying the acquired ideas, knowledge, and behavioural skills in life situations. The very name of the course orientates the teacher to the organisation of students' research activities.

Анотація

Стаття присвячена особливостям викладання інтегрованого курсу «Я досліджую світ» у Новій українській школі. Зазначено, що курс «Я досліджую світ» поєднує навчальний зміст кількох освітніх галузей. За типовою програмою НУШ 1 таких галузей три: природнича, громадянська та іс- торична, соціальна та здоров'язбережувальна. За типовою освітньою програмою НУШ 2 таких галузей сім: мовно-літературна, математична, природнича, технологічна, соціальна та здоров'язбережувальна, громадянська та історична, інформатична.

Зауважено, що основною освітньою галуззю в інтегрованому курсі «Я досліджую світ» визначено природничу освітню галузь. Природнича освітня галузь гармонійно інтегрується майже з усіма освітніми галузями, визначеними у Державному стандарті початкової освіти, бо природа є одним із найцінніших чинників розумового, патріотичного, трудового, естетичного розвитку особистості дитини.

Особливості викладання інтегрованого курсу «Я досліджую світ» полягають у дидактико-методичній організації навчання, а саме в його зв'язку з життям, з практикою застосування здобутих уявлень, знань, навичок поведінки в життєвих ситуаціях. Сама назва курсу зорієнтовує вчителя на організацію дослідницької діяльності учнів.

Keywords: integration, integrated learning, primary school, New Ukrainian School, integrated course «I Explore the World».

Ключові слова: інтеграція, інтегроване навчання, початкова школа, Нова українська школа, інтегрований курс «Я досліджую світ».

Постановка проблеми. Інтеграція в початковій школі визначається як один із засобів наближення освітнього процесу до внутрішнього світу дітей молодшого шкільного віку, врахування особливостей сприйняття ними нової інформації, створення в їхній свідомості цілісного, взаємопов'язаного образу світу та надання можливості усунути фрагментарність їхніх знань. Із запровадженням Нової української школи (НУШ) інтеграція в початковій школі також визнається одним із ключових напрямів і набуває нових характеристик.

До них належать створення інтегрованих курсів, які поєднують зміст кількох навчальних дисциплін, та впровадження інтегрованого навчання на основі тематичного та діяльнісного підходів [4, с.176].

Однією з особливостей Нової української школи є впровадження у навчальний процес початкової школи інтегрованого курсу «Я досліджую світ». Безперечною є думка С. Тараненко про те, що предметом вивчення на інтегрованому уроці виступають багатопланові об'єкти, інформація про сутність яких міститься в різних навчальних дисциплінах, широке використання міжпредметних зв'язків при різнобічному розгляді однопланових об'єктів; своєрідна структура, методи й прийоми, які сприяють його організації та реалізації поставлених цілей.

Аналіз останніх досліджень та публікацій. Дослідженню проблеми інтегрованого підходу до освітнього процесу приділяють увагу багато науковців. Філософські й методологічні проблеми інтеграції висвітлюють у своїх працях С. Клепко, К. Гуз, М. Гриньова, Ю. Мальований, Л. Масол та ін. Аналіз наукової літератури щодо реформування освіти в Україні свідчить,що осмисленням проблеми є розвиток української школи в умовах реформування освіти (О. Вознюк, В. Кремень, Л. Онищук, О. Савченко, В. Сидоренко, Л. Хоружа та ін.); особливості реалізації змісту інтегрованого курсу «Я досліджую світ» в умовах НУШ (Н. Бібік, І. Андрусенко, О. Савченко та ін.).

Мета дослідження - розкрити особливості викладання інтегрованого курсу «Я досліджую світ» у Новій українській школі.

Виклад основного матеріалу. Для реалізації принципів НУШ у початковій школі запроваджено інтегрований курс «Я досліджую світ». Ключовою ідеєю цього курсу є інтеграція кількох освітніх галузей (природнича, громадянська та історична, соціальна і здоров'язбережувальна, технологічна, інформатична, частково мовно-літературна та математична).

Інноваційною складовою інтегрованого курсу стала громадянська та історична освітня галузь, мета якої - формування у здобувачів початкової освіти власної ідентичності та готовності до змін через вироблення поваги до інших, толерантного ставлення до культурного різноманіття і розбіжності суджень, набуття досвіду взаємодії та співпраці через обмірковування прийнятих у класі, школі і місцевій громаді соціальних норм, активну участь у житті цих спільнот та усвідомлення відповідальності за свої вчинки. Серед очікуваних результатів, до прикладу, для школярів 1-2 класів задекларовано уміння захищати права людини (розпізнавати вчинки і слова, які можуть підтримати або образити, а також поважати різноманітність думок, справедливо ставитися до інших). Для учнів 3-4 класів мати компетенції спілкування, враховуючи особливості інших людей, пояснювати, чому потрібно діяти справедливо, не порушувати прав інших дітей, виявляти та засуджувати такі вчинки тощо.

У Державному стандарті початкової освіти зазначено, що на підставі базового навчального плану може здійснюватися повна або часткова інтеграція різних освітніх галузей, що відображається в типових освітніх програмах, освітній програмі закладу загальної середньої освіти. У процесі інтеграції кількість навчальних годин, передбачених для кожної освітньої галузі, перерозподіляється таким чином, щоб загальний обсяг навчання не зменшувався. Зміст природничої, соціальної, здоров'язбережувальної, громадянської та історичної, технологічної та інформатичної освітніх галузей інтегрується в різних комбінаціях їхніх складових, утворюючи інтегровані предмети та курси.

На основі нового Державного стандарту затверджено дві типові освітні програми: НУШ 1 (під керівництвом О.Савченко) та НУШ 2 (під керівництвом Р.Шияна). Курс «Я досліджую світ» поєднує навчальний зміст кількох освітніх галузей. За типовою програмою НУШ 1 таких галузей три: природнича, громадянська та іс- торична, соціальна та здоров'язбережувальна. За типовою освітньою програмою НУШ 2 таких галузей сім: мовно-літературна, математична, природнича, технологічна, соціальна та здоров'язбережувальна, громадянська та історична, інформатична.

Зауважимо, що основною освітньою галуззю в інтегрованому курсі «Я досліджую світ» визначено природничу освітню галузь. Природнича освітня галузь гармонійно інтегрується майже з усіма освітніми галузями, визначеними у Державному стандарті початкової освіти, бо природа є одним із найцінніших чинників розумового, патріотичного, трудового, естетичного розвитку особистості дитини.

Особливості викладання інтегрованого курсу «Я досліджую світ» полягають у дидактико-методичній організації навчання, а саме в його зв'язку з життям, з практикою застосування здобутих уявлень, знань, навичок поведінки в життєвих ситуаціях. Сама назва курсу зорієнтовує вчителя на організацію дослідницької діяльності учнів.

Реалізація курсу «Я досліджую світ» передбачає опрацювання низки дослідницьких питань, зокрема:

- дослідження-розпізнавання (Що це таке? На що це схоже? Досліджуємо за допомогою п'яти органів чуття, описуємо, порівнюємо з іншими об'єктами та явищами);

- дослідження-спостереження (Як це працює? З якою метою використовується?);

- дослідження-пошук (ставити запитання, робити прогнози, встановлювати часову та логічну послідовність явищ і подій, встановлювати причинно-наслідкові зв'язки (чому? Як? Залежить від чого? З чим пов'язано?) (припущення, умовивід, висновок - узагальнення) [2, с.126].

Предмет «Я досліджую світ» виконує інтегративну функцію, даючи змогу учням набути цілісного наукового уявлення про природний і соціокультурний світ, про взаємозв'язок людини з природою, суспільством, іншими людьми та державою, про її сприйняття свого місця в суспільстві, формуючи світогляд, самовизначення в житті і як українця дати можливість закласти підвалини для формування власної ідентичності.

Інтегровані уроки дозволяють вчителю скоротити час на вивчення окремих тем, усунути дублювання матеріалу з різних дисциплін і приділити більше уваги (у різний спосіб) цілям, на яких наголошується на даному етапі навчання (наприклад, розвиток зв'язного мовлення та мислення).

Інтегровані уроки зменшують втому та навантаження на учнів завдяки переключенню з одного виду діяльності на інший.

Як шкільний предмет, «Я досліджую світ» надає особливі можливості для виховання соціально активних, грамотних та поінформованих особистостей. Він має розглядати питання, що стосуються взаємозв'язку та взаємозалежності природи, суспільства та економіки, впливу людської діяльності на навколишнє середовище та багато іншого.

Відмінною рисою сучасного уроку «Я досліджую світ» є його цілісність, підпорядкованість одній ідеї, що забезпечується двома найважливішими компонентами: мотивацією та узагальненням. Якщо узагальнення – це змістовно-смисловий стрижень уроку, тобто те, «задля чого» проводиться урок, то мотивація, що забезпечує виникнення запитання, – це динамічний стрижень, тобто те, «через що» проводиться урок [2, с.125].

Викладаючи предмет, учитель повинен розкривати його освітнє та виховне значення. При цьому він повинен націлювати свою роботу на те, щоб навчання не обмежувалось лише ознайомленням молодших школярів з окремими фактами з життя природи (з будовою, живленням, розмноженням рослин, тварин, життєдіяльністю людини) та суспільства (із знанням про українське суспільство; довкілля, в якому живе дитина); під час вивчення цих предметів в учнів потрібно сформувати цілісне уявлення про природу, забезпечити розуміння ними найпростіших причинно-наслідкових зв’язків, що існують у навколишньому світі; розкрити культуру взаємоспілкування людей; передбачити накопичення досвіду особистісного ставлення до системи цінностей, до суспільства; сприяти розвитку розумових здібностей школярів, їхньої емоційної сфери, пізнавальної активності та самостійності, здатності до самовираження тощо.

Методика навчання природничої, соціальної і здоров’язбережувальної освітніх галузей має свої дидактичні особливості, якими відрізняється від викладання інших дисциплін. Оскільки курс «Я досліджую світ» є інтегрованим курсом і вивчає неживу та живу природу, природне й соціальне оточення як середовище життєдіяльності людини, тому основна дидактична особливість його форм і методів викладання визначається конкретністю.

Постійно маючи справу з реальними фактами, конкретними об’єктами навколишньої природи (мінералами, корисними копалинами, рослинами і тваринами, деякі з яких можна принести в клас і навіть дати в руки учням), учитель має можливість застосувати особливі методи навчання – він може, наприклад, проводити різноманітні спостереження над роздатковим матеріалом (колекції корисних копалин, колекції мінералів і т.д.), відтворювати в класі ті чи інші природні явища, тобто проводити як короткочасні, так і довготривалі досліди, здійснювати екскурсії в природу тощо.

У галузі мислення ця методика характеризується тим, що вчить робити логічні висновки із конкретних фактів, які учні безпосередньо спостерігають, або відтворюють під час короткочасного досліду на уроці, в куточку живої природи, на пришкільній навчально-дослідній ділянці.

Вивчення конкретних фактів розвитку живих організмів, взаємозв’язку явищ у природі створює природознавчий фундамент для формування наукового світогляду.

Матеріал інтегрованого курсу «Я досліджую світ» дає можливість зрозуміти молодшим школярам значення навколишньої природи, необхідність її охорони, наукові основи сільського господарства, роль людини як складно організованої, моральної і самоцінної істоти. Ознайомлення з природою, її красою й багатством, особливо на екскурсіях, виховує патріотичні й естетичні почуття. Відповідно завданням методики навчання даної дисципліни є розробка методів, методичних прийомів та організаційних форм навчання відповідно до завдань і змісту інтегрованого курсу «Я досліджую світ» [3, с. 94].

Отже, методика навчання природничої, соціальної і здоров’язбережувальної освітніх галузей має встановити, яких знань і вмінь повинні набути учні та за допомогою яких форм і методів – досягти найефективніших результатів з курсу «Я досліджую світ».

Знайомство молодших школярів із природою починається зі спостережень, з яких вони усвідомлюють матеріальність навколишнього світу, згодом вони перетворюються із пасивних спостерігачів в активних: формуються поняття про існуючий у природі перехід кількісних змін (ріст рослин, тварин) у якісні (розвиток рослин, тварин), набувається практичний досвід поводження в оточуючому середовищі.

Спостереження – це цілеспрямоване сприйняття того чи іншого педагогічного явища без втручання у його хід. Дослідник розробляє програму, визначає об'єкти і передбачає способи фіксації спостережень (протоколи, фото- і кінозйомка, записи на магнітну стрічку, відеомагнітофон тощо).

У процесі навчання учитель повинен намагатися розв'язати суперечності: «відоме – невідоме», «зрозуміле – незрозуміле», «головне – другорядне», «засвоєне – незасвоєне», «необхідне – випадкове» та ін. Подолання цих суперечностей гарантує розумовий розвиток учнів, формує інтерес до набуття знань, до навчання. При вивченні явищ і предметів природи важливо не тільки з'ясовувати подібність і відмінність об'єктів, що вивчаються, але й, головне, встановлювати їх взаємозв'язки, взаємозалежності, що сприятиме виробленню у свідомості учнів матеріалістичного розуміння процесів життя.

У наш час учителю доступний широкий арсенал освітніх електронних та інтернет-ресурсів. До прикладу, використання на уроці «Я досліджую світ» ІКТ дозволяє підвищити мотивацію, ак-

тивізувати пізнавальний інтерес у школярів до навчання; забезпечити індивідуалізацію навчання, сприяти особистістю орієнтованому підходу, на якісно новий рівень підняти візуалізацію матеріалу, що вивчається; включити арсенал нових методів навчання – моделювання, імітації процесів тощо.

Ефективним на уроках «Я досліджую світ» є використання малих фольклорних форм – загадок, лічилок, мирилок, приказок і прислів'їв, народних прикмет, уривків з казок, дитячих пісень, колискових, щедрівок, колядок, веснянок, закличок тощо. Реалізуючи їх виховний потенціал, педагогам варто пояснювати дітям, що багатство і розмаїття народної творчості свідчить про мудрість і талановитість українського народу, а знання і трепетне ставлення до них стане запорукою збереження цього багатства для майбутніх поколінь.

З огляду на зазначене, невід'ємними складниками уроків мають бути виховні бесіди, пізнавальна інформація про Україну, її людей і події, пов'язані з ними, складання усних і письмових текстів на патріотичні теми, підготовка і презентація посильних проєктів патріотичного змісту (до прикладу, написання творів про земляків, які прославили рідний край, листів підтримки своїм ровесникам, що перебувають в зоні АТО, вітальних листівок захисникам Батьківщини).

На уроках «Я досліджую світ» учні проходять такі етапи дослідження:

1 етап – зацікавлення. Учитель пропонує учням пригадати те, що вони знають у зв'язку із записаною ситуацією і що може допомогти її зрозуміти.

2 етап – запитання. Учні повинні ставити запитання стосовно проблеми і виявити ті, які найкраще підходять для її дослідження і вирішення.

3 етап – знаходження можливих відповідей. Працюючи у групах, учні шукають відповіді на свої запитання, організовують перше дослідження, роблять відкриття, обговорюють результати та обґрунтовують ідеї.

4 етап – постановка нових запитань.

5 етап – знаходження нової інформації. Після відповіді учні можуть подумати про те, чи завжди це відбувається саме таким чином, а якщо ні, які ще запитання, як важливу частину навчання, вибудовують зв'язки з попередніми ідеями. І. Большакова звертає увагу на те, що навчання, яке базується на запитах учнів, не можливе без комфортного навчального середовища; керівництва та підтримки вчителя; розуміння вчителем рівня можуть бути варіанти.

6 етап – створення. На основі ідеї дослідження учні створюють продукт, презентують його та оцінюють.

7 етап – дискутування, презентація. Учні ставлять запитання, які спонукають до дій, що створюють додаткові запитання або ідеї. Вони цілеспрямовано та критично осмислюють інформацію, цінують та застосовують підготовки дітей; відкритості та спонтанності вчителя.

Інтегровані уроки вимагають від учителя додаткової підготовки, ерудиції та досвіду. Розробляючи такі уроки, вчителі повинні враховувати:

1. Цілі уроку, тобто необхідність скорочення часу вивчення теми, необхідність заповнення прогалин у знаннях учнів, необхідність перерозподілу пріоритетів тощо.

2. Вибір об'єкта, тобто джерел інформації, які відповідають цілям уроку.

3. Визначення системоутворюючих факторів, тобто знаходження основи для об'єднання різнорідної інформації (ідей, явищ, понять, предметів).

4. Зміна функціонального призначення знань [2, с.127].

Вивчення кожної конкретної теми інтегрованого курсу відбувається за основним текстом, що супроводжується ілюстраціями, які наочно втілюють природу об'єктів вивчення, зв'язки, ситуації між об'єктами вивчення та взаємодію між людьми, природою і суспільством. Ілюстрації доповнюються запитаннями, які спонукають дітей пояснювати, обґрунтовувати та міркувати.

Важливе місце в уроках займають творчі завдання, що передбачають застосування знань у незнайомих ситуаціях (з елементами творчості, пошукової та дослідницької діяльності).

В основу курсу «Я досліджую світ» покладено діяльнісний підхід, який має на меті змістити акцент у викладанні на активне навчання. Діяльнісний підхід - це цілеспрямована система, яка націлена на результати, що можуть бути досягнуті лише за умови зворотного зв'язку.

Висновки. Отже, розвиток початкової освіти на сучасному етапі висуває принципово нові вимоги до професійної підготовки майбутніх учителів, оскільки постають завдання, пов'язані з усвідомленням ними важливості моделювання уроків, зокрема і уроків інтегрованого курсу «Я досліджую світ».

Предмет «Я досліджую світ» виконує інтегративну функцію, даючи змогу учням набути цілісного наукового уявлення про природний і соціокультурний світ, про взаємозв'язок людини з природою, суспільством, іншими людьми та державою, про її сприйняття свого місця в суспільстві, формуючи світогляд, самовизначення в житті і як українця дати можливість закласти підвалини для формування власної ідентичності.

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PHILOLOGICAL SCIENCES

TROUBLEMAKING WORDS IN COURT INTERPRETATION

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The research was carried out with the financial support of Shirak State University within the framework of the scientific project N:SUSH N03-SCI-2023
https://doi.org/10.5281/zenodo.10975281

Abstract
The study aims to contribute to the analysis of legalese in court interptreting.
In the frame of this research close attention is paid to legal discourse as an integral communication of language and law, specifically to the function of idioms in the speech of lawyers and their translation tricks. An increase focus is put on characterising and translating idioms, due to the peculiarities of their structure and cohesion of meaning. Our database encompasses a wide range of terms drawn from the realm of law and a spectrum of idioms and slang. The coded meaning of these words is unveiled in legal discourse, moulding a rich tapestry of interpretive words with their counterparts in target languages.

Keywords: legal language, court interpretation, text interpretation, idiomatic expressions, slang; etc.

Legal court or *judical interpreting* appears in courts of justice, administration tribunals, i.e., everywhere a legal proceeding is held. In professional practice interpreting denotes the act of facilitating communication from one language into its equivalent, or appropriate equivalent in another language. The right to competent interpreter for anyone who does not understand the language of court for the accused in a criminal trial is usually considered a fundamental rule of justice. Therefore, this right is often guaranteed in national constitutions, declarations of rights etc. Legal interpreting can be the consecutive interpretation of witnesses testimony for example, or the simultaneous interpretation of entire proceedings by electronic means, for one person or all of the people attending.

The vast majority of legal texts have plain meanings in many cases. Even a text whose meaning is undisputable requires interpretation. The question is what meaning to attach to legal text. We understand the text because a language in which it was created is language we know.

In principle there is no difference between determining the semantic meaning of a legal text and the semantic meaning of any non-legal text. Interpreters need to know the rules of grammar, they consult canons based on logic, which help them understand the language. Every text requires interpretation is a precondition for inquiring the validity of the norms. Legal text has its own principles of interpretation. Legal interpreters shall solve many problems that require both linguistic and legal knowledge (Svetlana Maksimova, N2/7/p.63). Interpreting is a paramount activity in court settings where the situation depends on what people said and whether he or she tells the truth (M. Phelan, 2001). Professional legal translation requires extensive knowledge in law, current legislation, the specific use of legal terminology, etc., because each country has its own system of law, legal terminology and practice applications (/Svetlana Maksimova, N2/7/p.65).

Legal language, like any other language of profession has specific features. Among the main legalese features is distinguished its *vocabulary*. An interpreter of legal discourse should be able to use international legal resources work with international legislative databases. Hence, he should have a high level for language competence of the main bulk of legalese in SL and TS. When interpreting, there are often words that do not have an equivalent in the target language, especially in legal area.

Realizing the intent of the author is the goal of any kind of system of interpretation (subjective interpretation). Interpretation, however, can also give the legal text a meaning that actualizes objective standards (objective interpretation). Ronald Dworkin defines law itself as an interpretation. Legal tradition distinguishes between ordinary interpretation and supplementary interpretation. To interpret a text is to choose its legal meaning from among a number of semantic possibilities- to decide which of the text's semantic meaning constitutes its proper legal meaning. Usually a text has a single unique semantic meaning in the context of a given event and that meaning also serves as the text's legal meaning. In this case there's complete identity between the text's legal meaning and semantic meaning. Interpreters translate the language into law by pinpointing or extricating a single unique legal meaning. Thus, every interpreter of law is also a linguist, but not every linguist is an interpreter of law. (L. M. Solan, 1993). Certified interpreters are mostly hired for court interpreting activities. A court interpreter must remember that he or she do not have any rights to judge or question the clients. Besides, accuracy is very essential in court interpreting. There is a common rule for any court interpreters around the world that they cannot add or omit words which may change the meaning of the original source. Professional court interpreters must comprehend both the source and target languages, as well as understand court terminologies.

Various modes can be applied for court interpreting: consecutive can be used for question and answer session, note-taking can be applied when the speech is too long. Simultaneous or whispered interpreting may be used in court setting. Sight interpreting can also be applied when the court asks the interpreter to translate legal documents orally on court. In court interpretation it is not acceptable to omit anything from the source text, no matter how fast the source speaks, since not only is accuracy a principal cannon for interpreters but mandatory. The alteration even a single word in a material can totally mislead the triers of fact. The most important factor for this level of accuracy is the use of team of two or more interpreters during a lengthy process, with one actively interpreting and the second monitoring from greater accuracy. Speakers at interpreted meetings can ensure better communication of their message into other languages by slowing their delivery slightly and by adding a pause of one or two seconds at the end of each paragraph.

When interpreting, there are often words that do not have an equivalent in the target language. It is essential that the interpreter understand what the term means in English first before being able to accurately deliver the message into another language. The lexical aspect contributes to the distinctive character of legal texts. Firstly, legal language is characterised with the abundant use of *archaic words*. To Hu and Lu, archaism is old English and it is rare in daily modern English but often appears in legal documents (2017 p. 279) Veretina-Chiriac advocates that archaisms are typical examples of legalisms and lawyerisms belonging to formal style and making the document concise, but unfortunately causing comprehension problems for non-lawyers. Secondly, legal English is specific in the use of collocations, *bi-*, *tri-*, or multi-nominal pairs and phrases constituted by more than two items: upon any termination of; released without charge and on bail, grant the authority to, etc…

In addition to the formal literary language there are other aspects that contribute to the overall picture of legal language. It is embroidered with legal slang, despite the formal and stilted utterances in legal discourse. These words are characteristically associated with very informal registers and speech predominantly and again they present an alternative. Lexis of an extremely colloquial, non-standard kind (Katie Wales, A Dictionary of Stylistics, 2011). As has often been noted, the English word slang comes from sling ("to throw") - to sling one's jaw, which means "to say something violent and offensive". Slang is a special layer of vocabulary used in oral speech by certain social groups and has an expressed emotional color (S. Maksimova and co-authors, p. 67).

It's well-acknowledged that slang words in legal discourse can be tricky for court interpretation because of the lack of relevant form in the target language. Hence, the interpreter must understand what the term means in English first before being able to accurately deliver the message into another language.

Just below is introduced a rich tapestry of slang words drawn from the realm of legalese or laws-peak.

Marijuana Laws by State- State laws are constantly changing, and that is especially true with laws pertaining to the cultivation, sale, and use of marijuana (a slang term for cannabis).

LAWYERING-A slang term for practicing as an attorney or as a lawyer

STICK up- A slang phrase that describes a robbery or a hold up.

MOUTHPIECE-The term that is given to an attorney that is a slang expression.

STONEWALL- A slang expression meaning to hold a certain position or to tell a certain story even if you know it is not true.

PALM off - A slang term that means to sell or get rid off something under false pretences.

HORNS WOGGLE- A slang term meaning to cheat or to swindle.

COP- A slang term used to describe a policeman or police officer.

TO DO TIME- A slang term for serving time in jail.

LOAN SHARK- The slang name that is given to a usurer or a person who lends money and charges more interest than the law allows.

SPIFF- Slang term. The sum of money that is paid by the vendor's salesman to the retailer's salesman for motivation to push the goods of the vendor.

TAKE a BATH, TAKE a BEATING- Slang phrase that means the defeat of someone.

OASDI- An old slang term to refer to disabled individuals or the elderly who depend on the insurance and other funds that are sanctioned by the government. Social Security is the current term

GUNSLINGER- Slang term for a broker that is searching for the next big thing.

CUTTING THE MELON- Slang term used when a company issues more dividends payment with a previous payment.

GRASS WIDOW- A slang term for a woman separated from her husband by abandonmentor prolonged absence; a woman living apart from her husband.

https://thelawdictionary.org/page/2/?s=Slang

Parole- The release of a prison inmate – granted by the U.S. Parole Commission – after the inmate has completed part of his or her sentence in a federal prison. When the parolee is released to the community, he or she is placed under the supervision of a U.S. probation officer.

The Sentencing Reform Act of 1984 abolished parole in favor of a determinate sentencing system in which the sentence is set by sentencing guidelines. Now, without the option of parole, the term of imprisonment the court imposes is the actual time the person spends in prison.

https://www.uscourts.gov/glossary#skip-main-content

Cops; narks; fuzz; gumshoes- A big noise; nob; mob; don; honcho; boss

Beat out of money- To burn rubber; to lam; to belt; to flake out; to hare (away): to nip away; hightail; run/scuttle to to into woodwork; to wing (it); to bugger,

to take it on the lam-Смываться, делать ноги, рвать когти

To bust; to copper, to knock; to nip-Повязать, попалить, арестовать, взять

To be on the lam; to hole up-Быть в бегах

Lam-escape

Dogfight: yammer, ruckus; aggro: bower, prang; beat up-Махаловка, драка

Cathouse; callhouse case-Публичный дом

Bitchiness-Паскудство

Bombed; high: jonked; charged up-Упыханный, под газом

To make one's bones; to bust; to bounce; to cool; to give smb a deep-six to ice; to shellac- to kill smb.

Grass: hash; hemp; scag; boo-Трава (наркотик)

To bounce; to clock: to conk; to give smb a good going over, to hummer home; to swipe-Вмочить, вдолбить, въехать кому-то, дать по морде

Creep; robber

Геловани Г. Г. , Цветков А. М. , Русско-Английский разговорник бытовой лексики и слэнга, Москва, 1991

Apart from legal slang words lawyer's everyday speech is characterized by the presence of idioms. Generally idioms are described as non-compositional phrases. Despite the fact that idioms, compared with slang are different in nature, being used in lawyer's speech, in the process of legalese they have the same mission- to charge the speech with an emotional shade of color. Here are some examples of laws-peak idiomatic expressions.

A Law Unto Themselves

If somebody is a law unto themselves, it means that they follow their own rules instead of doing what other people say.

Above Board

If something is **above board** it means that it is all completely legal and honest.

To Cook the Books - to falsify numbers or reports.

Mend Your Ways - correct your behavior and stop breaking the law/rules.

Caught Red Handed - to be caught whist in the act of doing a crime.

Grease Someone's Palm - to pay somebody money or a bribe in exchange for a favour.

To Beat the Rap - to be found innocent of a crime.

A Slap on the Wrist - when somebody is given a light punishment for a crime.

Fall From Grace

When a once highly regarded person loses a lot of respect from their peers.

https://teachifyapp.com/en/legal-idioms/

Face the music

If someone has to face the music, they have to accept the consequences of doing something wrong.

Feather your own nest

If you feather your own nest, you use your position or your job illegally for personal gain.

Grease someone's palm

If you grease someone's palm, you pay them a bribe.

Lay down the law

If you lay down the law, you tell people what they should do in a forceful and stern way.

We can say the jury is still out when a decision still hasn't been made about

https://www.englishclub.com/ref/Idioms/Law/

With No Strings Attached

Something comes with no strings attached if we can get it without having to do anything in return. In short, we are not under any obligation to do any actions for anyone at any point in time after getting that thing. That thing comes for free.

Turn a Blind Eye To

A person is turning a blind eye to something or someone if they see something wrong or suspicious but pretend not to see anything. Turning a blind eye is an act of omission, which means not performing the actions that are expected of most people.

Take the Law Into One's Own Hands

People who try to take the law into their own hands are trying to seek justice on their own. They do not ask for help from authorities or people who can legally administer the law. Taking the law into one's own hands is generally regarded as illegal.

Null and Void

Something is null and void if it has already been canceled and is now invalid. Being canceled, that thing is redundant and worthless.

Last Will and Testament

A last will and testament is a legal document that a person creates before dying. It specifies what they want to do with their assets after death. It may also contain their notes dedicated to friends, family, and associates.

Burden of Proof

When somebody has the burden of proof, then he or she is required to present evidence to prove his or her claims.

Beyond a Reasonable Doubt

If something is beyond a reasonable doubt, then there is enough evidence to prove that thing to be true. For example, if an accused person is guilty beyond a

reasonable doubt, then it means that there is sufficient evidence to prove that they have done something wrong.

https://owlcation.com/humanities/15-Legal-or-Law-Idioms-Explained-to-English-as-a-Second-Language-Learners

Thus, legal slang words and idiomatic expressions being used appropriately in a specific situation, make speech more eccentric, expressive and adding emotional colour. Slang words in legal language are most mainly used in oral spoken language within a certain social group lawyers. Given the complex semantic and syntactic nature of idioms and slang in legal discourse, these units pose considerable translation problems in the process of interpreting. Apart from it, they are culturally charged items reverberating the world vision of the given nation. Hence, they can be tricky for court interpreters.

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PHILOSOPHICAL SCIENCES

ARTIFICIAL CONSCIOUSNESS THE NEXT STAGE IN THE DEVELOPMENT OF ARTIFICIAL INTELLIGENCE

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ИСКУССТВЕННОЕ СОЗНАНИЕ СЛЕДУЮЩИЙ ЭТАП РАЗВИТИЯ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА

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https://doi.org/10.5281/zenodo.10975293

Abstract

The article substantiates the inevitability of the emergence of artificial consciousness as a result of the development of artificial intelligence. The achievements of neurophysiology and cognitive psychology are used to argue this thesis. The basic stages through which any artificial or natural self-governing system must pass in order to reach the stage of consciousness and self-awareness are developed.

Аннотация

В статье обосновывается неизбежность возникновения искусственного сознания в результате развития искусственного интеллекта. Для аргументации этого тезиса используются достижения нейрофизиологии и когнитивной психологии. Разработаны основные этапы, через которые должна пройти любая искусственная или естественная система самоуправления, чтобы достичь стадии сознания и самосознания.

Keywords: Consciousness, sign, signal, artificial intelligence
Ключевые слова: Сознание, знак, сигнал, искусственный интеллект.

Сформулированное таким образом название настоящей статьи требует добавить, что предполагаемая неизбежность возникновения искусственного сознания весьма вероятна, если усилия по развитию искусственного интеллекта продолжатся. Чтобы обосновать это утверждение, необходимо сначала определить, что мы подразумеваем под «искусственным интеллектом».

Идея мыслящих искусственных существ исходит из античности и имеет длительную историю [8, с. 17-34], но более четкую формулировку получила в XX веке, особенно после введения термина «искусственный интеллект» в 56 г. Джоном Маккарти.

В целом проблема интеллекта наиболее полно рассматривается в когнитивной психологии. Но в нем выделяются десятки (по некоторым данным даже более 70) различных определений. Однако можно несколько условно заявить, что «интеллект — это способность учиться на основе опыта, используя метакогнитивные процессы для облегчения обучения, а также способность адаптироваться к окружающей среде. Это может потребовать различной адаптации в разных социальных и культурных контекстах» как утверждает Р. Стернберг [9, с. 555]. Похожее определение предлагает Говард Гарднер [1, с. 35], особенность которого состоит в том, что в обоих случаях подчеркивается специфика интеллекта как адаптации в определенной культурной среде.

Очевидно, что для кибернетической системы, в которой возможность принятия решений ограничена ее программой, и даже когда эта система достигает высоких результатов в пределах определенны для нее границ, она остается ограниченной по интеллекту по сравнению со многими биологическими организмами. Причина в том, что последние представляют собой самоорганизующиеся системы, эволюционно ограниченные лишь необходимостью сохранения гомеостаза (выживания организма) или создания потомства, т.е. выживание вида. Это дает им несравненно больший простор для эволюционного развития и, в конечном итоге, развития интеллекта. У человека эти два эволюционных ограничения в принципе преодолимы, главным образом, благодаря наличию сознания, которое делает его максимально свободной самоорганизующейся системой.

Но есть еще одно важное ограничение современных кибернетических систем, которое не позволяет им быть самоорганизующимися системами. Это отсутствие возможности онтогенетических изменений системы, которая у живых организмов

подкрепляется наследственностью признаков и соответствующим филогенетическим развитием. Образно говоря, огромным недостатком современных кибернетических систем является то, что они не могут самостоятельно изменять как свое программное, так и аппаратное обеспечение в ответ на вызовы внешней среды.

Тезис, который я отстаиваю, заключается в том, что если будут преодолены технологические препятствия на пути превращения кибернетических систем в максимально раскрепощенные самоорганизующиеся системы, способные «эволюционировать» программное и аппаратное обеспечение, постепенная эволюция этих искусственных самоорганизующихся систем от форм низшего интеллекта к формам высшего интеллекта неизбежно приведет к структуре тех процессов, которые лежат в основе сознания. Возникновение в этих условиях животной (сигнальной) или человеческой (знаковой) формы сознания и самосознания практически неизбежно. Чтобы обосновать этот тезис, я должен вкратце рассмотреть вопрос о том, что представляет собой сознание, а также о некоторых основных нейрофизиологических механизмах, на которых строится психика? Но прежде, чем сделать это, необходимо обозначить некоторые важные изменения в мировоззрении последних десятилетий, которые не могут не отразиться на философско-методологическом подходе к данному вопросу.

Во-первых, с развитием высоких технологий постепенно уходит в небытие один из глубоко укоренившихся в массовом сознание древнейших философских тезисов: о сознании (духе, душе) как совершенно противоположном материи или, в лучшем случае, как о чем-то «квази» материальном. Позиции, защищаемые в том числе философами, декларирующими материалистические, даже марксистские позиции. Последнее, как ни парадоксально звучит, коренится в одном из догматических положений марксизма об «идеальности» сознания. Классическим примером в этом смысле является Э. Ильенков, определяющий идеальное как схему «реальной предметной деятельности человека, согласующуюся с формой вне головы, вне мозга... его можно представить и рассматривать как особое, абсолютно самостоятельное от устройства мозга» [4, с. 136].

Болгарский философ Сава Петров практически вступает на путь частичной субстанциализации сознания утверждая - «идеальное, универсальное, каким оно представляется «внутреннему видению» субъекта, должно быть включено в материальное... Очевидно, необходимо соответствующим образом обобщить понятие материального, чтобы его абсолютная гносеологическая противоположность идеальному была релятивизирована, не отменяя его» [6, с. 74]. В конце концов, Сава Петров признает «квазиобъективного монстра», который как отмечает Л. Гурова «противоречит основному принципу материалистического монизма» [2, с. 99].

Философские споры бесконечны, а решения приходят из практики, которая отправляет в небытие ту или иную глобальную теоретическую проблему. Поэтому процесс «секуляризации» вопроса о сознании от этой идеалистической традиции получил импульс, со стороны современных информационных дисциплин, которые вполне целенаправленно пытаются конструировать психические процессы. Причина не является ни философской, ни идеологической, а вытекает из сущности любой истинной науки, которая по самой своей природе отказывается иметь дело с вещами, которые невозможно сконструировать. Такова «душа» в идеалистической философской традиции.

Во-вторых, современная нейрофизиология уже предоставила немало данных, которые хоть и не объясняют полностью сложные психические процессы, но позволяют существенно приблизиться к сущности сознания. Исходя из них, очевидно, что структура процессов сознания строится на более элементарных функционалах - безусловном и условном рефлексе. Последние неизбежны как основной этап развития психики и являются прежде всего проявлением сигнального этапа ее развития, который мы наблюдаем преимущественно в элементарной сенсорной психике.

Следующими уровнями развития психики являются перцептивный (отражение целостных объектов), а затем «интеллектуальный этап» — чувственное восприятие объективных отношений между объектами как объективных «ситуаций». На последнем этапе зарождается «знаковая» организация высших психических функций, которые становятся ведущими у человека.

Опираясь на знание этих основных физиологических процессов, мы можем приступить к раскрытию сущности сознания. Литература по данному вопросу, особенно по дисциплине «Философия сознания» (Philosophy of Mind), огромна, а если включить в нее труды ряда авторов от древнейших времен до современности, в которых вопросы о душе, духе, мышлении (все термины обозначают эту неуловимую психическую реальность), вполне можно впасть в отчаяние. Но как бы претенциозно это ни звучало, последние десятилетия дали нам возможность гораздо более оптимистично взглянуть на эту извечную проблему.

Не вдаваясь в подробности, как я это сделал в других публикациях [5], сформулирую дефиницию сознания как постоянного циклического процесса сравнения и синтеза сигналов. В этом варианте сознание можно обнаружить и у высших видов животных в виде так называемого «животное сознание» - или как циклический процесс, протекающий без участия знакоорганизованных нервных структур (цикл, не затрагивающий долевые отделы мозга). Однако у человека, помимо «животного сознания», появляется специфическое человеческое сознание. Это тоже процесс циклического синтеза информации, но уже на уровне высших психических функций, т. е. включает в себя филогенетически самые молодые отделы мозга (кору головного мозга), структура которых организована изоморфно знаку. Появление нового качества – «человеческого сознания» обусловлено окончательным

наложением знакового принципа организации структур коры головного мозга и циклического процесса синтеза информации, но уже с ведущей ролью ассоциативных полей.

Такой подход к сознанию основан на исследованиях ряда авторов. Согласно Эдельману [10] чувство «Я» и восприятие пространственно-временной непрерывности окружающего мира возникает в результате постоянного ввода в проекционные поля мозга информации, хранящейся в памяти. При этом сигналы памяти вводятся заново так, как если бы они были внешними. Этот процесс чрезвычайно быстрый с циклической повторяемостью примерно каждые 100 мс. То есть каждый момент мы словно вспоминаем, каким был мир 100 мс назад, и сравниваем его с настоящим. Это обеспечивает непрерывность сознания. Похожую гипотезу разработали В. Сергин [7, с. 627-639] и Иваницкий [3]. Гипотезу о возврате возбуждения в первичную кору как о механизме возникновения зрительных ощущений (как акта осознания) высказывают также П. Стериг и С. Брандт. [13, с. 117]. По их мнению, в основе «осознавания» тактильных ощущений лежит возврат в первичную кору сигналов из вторичных полей.

Как мы видим, поступающие стимулы (сигналы) сопоставляются со следами памяти, которые не организованы в какой-либо самостоятельный образ. Также они хранятся в разных структурах мозга и получают свою интеграцию только в процессе осознания. Другими словами, сознание «оживает», а вместе с ним и интроспективно регистрируемое ощущение «образа» только в ходе циклического процесса сравнения данных извне и данных, хранящихся в памяти.

Если перевести все это на философский язык, то можно сказать, что сознание и психика — это процесс отношения субъекта к объекту, но в первом случае это циклический процесс. Тогда как второй (психический акт) представляет собой единовременный материальный процесс, в ходе которого формируется отношение (т.е. это процесс отношения) субъекта к объекту. Предмет — это заранее фило- или онтогенетически закрепленные в памяти, сигнальные (у низших животных) или знаковые (у некоторых высших антропоидов и человека) организованные ответы (реакции) на раздражения. Объект – это раздражения, поступающие в проекционные зоны коры головного мозга.

В чистом виде сигнал, как и знаковая психическая реакция, представляют собой разовые действия по принципу открытой дуги – поступающий сигнал проходит через разные структуры мозга, не возвращаясь, однако, к месту из что оно пришло. Но в реальной жизни организма это происходит неоднократно и с большой частотой. С эволюционным развитием и усложнением условнорефлекторной деятельности возникает необходимость постоянного сравнения заученных комплексов восприятий с полученными в данный момент внешними восприятиями. Вполне логично, что те из отдельных процессов, построенных по принципу рефлекторной дуги, превращаются в циклические, т.е. постоянно повторяющимися. И это является основой процесса осознания. Важная деталь здесь заключается в том, что когда этот циклический процесс построен на сигнальной нейронной активности, мы имеем так называемую «животное сознание», а когда это происходит на базе нервных структур, организованных изоморфно структуре знака, перед нами предстает человеческое сознание. Последняя, высшая ступень сознания — это самосознание, при котором «моделируемая» внешняя реальность включает в себя основные качества личности, в мозгу которой происходят процессы сознания. Таким образом, в общей картине мира среди множества предметов появляется еще один «предмет», в качества которого входят не только данные о собственном теле, поступающие от органов чувств, но также запоминаемые и связанные с ними психические состояния. Но это возможно лишь при наличии психики организованно на базе знаков, начальные проявления которой мы находим у ограниченного числа высокоразвитых видов животных.

После описанных таким образом этапов психического развития, интеллекта и сознания, как и их взаимосвязей, становится ясно, что развитие интеллектуальных кибернетических систем (искусственного интеллекта) невозможно без прохождения этих этапов. Высшая фаза этого развития – возникновение сознания и самосознания!

В заключение я коснусь принципиального вопроса, который неизбежно будет поставлен на повестку дня в связи с искусственным сознанием. А вопрос в том: можем ли мы признать, что искусственные (кибернетические) устройства, обладающие сознанием, этически равны людям? Принять их как существ, имеющих не меньшее, чем люди, право на жизнь, свободу и неприкосновенность? Противники этой позиции могли бы возразить как минимум по трем направлениям: у них нет души, они не являются биологическими существами (находятся на другой субстратной основе) и не возникли естественным путем – их создал человек.

Во-первых, несколько слов насчет аргумента о существовании «души» (в смысле философского идеализма) как основы превосходства человека над всеми другими природными или искусственными системами, обладающими сознанием. Как я уже указывал, существование нематериальных (духовных) сущностей недоказуемо, тем более они не могут быть сконструированы и поэтому остаются вне научного анализа. Однако социальная практика требует операционалистских решений, имеющих применение в жизни. Если мы попытаемся и дальше внедрять понятие «душа» как основной объяснительный и моральный принцип в социальную практику, то нам придется отказаться от любых воздействий на мозговые структуры человека, не говоря уже о протезировании его частей. Это сведет общество на уровень мышления средневековой религиозной секты. Естественно, можно было бы попытаться выйти из ситуации, встав на позицию эпифеноменализма и заявив, что нет никакой проблемы в проведении процедур на структурах мозга, поскольку душа – это нечто, что парит над

ними. Но тогда возникает принципиальный вопрос – почему душа не может парить и над искусственными структурами?!

По поводу утверждения, что сознание можно построить только на основе белковых структур. Из приведенных фактов ясно, что все характеристики таких психических функций, как интеллект и сознание, могут быть сконструированы (если не сейчас, то в ближайшем будущем) искусственно. Вопрос в том, должен ли он быть основан на углероде или же он может быть основан на другом химическом элементе или каких-то технических элементах? Я не буду здесь вдаваться в вопрос о том, как теоретически можно построить достаточно сложные молекулы на основе любого химического элемента, кроме углерода. Важно то, что серьезной теоретической основы для так называемой «углеродный шовинизм» попросту говоря нет!

Что касается неравенства искусственных систем, в том числе искусственного интелекта, по отношению к их создателю, то мы можем определить эту «стадию» как «шовинизм по происхождению». Другими словами, это попытка найти принципиальное различие между естественными и искусственно созданными системами, даже если они имеют идентичные функциональные характеристики. Ведь экстракорпоральное оплодотворение – это тоже искусственное создание живой системы с вышеперечисленными характеристиками, называемой зиготой, но мы не объявляем созданное таким образом человека неполноценным. Нет принципиальной разницы, будет ли искусственное строительство происходить на клеточном уровне, на уровне сложных молекул или даже на атомном уровне!

Выводы, которые мы можем сделать, заключаются в том, что, если человечество продолжит усилия по созданию искусственного интеллекта, в результате оно, по всей вероятности, получит искусственное сознание. Тогда оно встанет перед дилеммой: признать ли его этически равным человеку со всеми вытекающими, в том числе юридическими, последствиями или попытаться подчинить его себе со всеми возможными негативными последствиями.

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THE SUBCULTURAL APPROACH TO THE PROCESSES OF TRANSITION TO DEMOCRACY

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Abstract

The purpose of this article is to present the application of the subcultural approach as an alternative and an opportunity to build a new theoretical base on the basis of which to explain the process of social change. The presentation is based on specific studies of the processes of transition from totalitarianism to democracy in Bulgaria.

Keywords: transition, subculture, cultureme, ideologeme

Various influential social theories proved to be powerless to explain adequately the turbulent social processes - so-called 'processes of transition' in Central and Eastern Europe which began at the end of the 20th century and which have passed under the sign of democratization. At the same time, a fairly extensive literature on the Transition has been accumulated and a significant part of it is based on in-depth historical research. However, even the most detailed and objective historiographical description of the facts cannot fully recreate the living process and is not enough to achieve the essence (understanding) of the observed processes. Understanding is still impossible without the presence of some system (a theory of social development) that explains the interrelationships between events, brings to the fore the more significant of them, and provides a methodology for the predictability of processes. Regardless of the avoidance of the existence of such "systematicity" by individual researchers (probably in order not to be accused of ideological bias), the fact remains that the systemic approach is implicitly present and often evident even from the terminology used. The use of the term 'revolution' in the characterization of the historical events in 1990-1991 by D. Ludzhev [16] and respectively 'turnabout' by I. Baeva and Ev. Kalinova [14]. But the avoidance of the meta-theory of social development in historical research, especially when it covers periods of profound social transformation of large masses of people, does not contribute to the quality of the research.

The main reason for this is the failure of the theoretical base, which not only does not offer a 'practically applicable' methodology, but also pushes a whole class of phenomena of decisive importance for the development of social processes to the periphery of historical research. Specifically, here, we are referring to the development of structures in which the public mentality is formed and based on which the structures become active subjects of the historical process. These are the subcultures. Another reason for the 'pushing to the periphery' is that the literature on the issue of subcultures accumulated since the end of the last century (Tepavicharov [21] Pastarmadzjieva[18], Barova [2]) does not offer an approach that would enable a clear qualitative and, above all, quantitative characterization of the studied social phenomena in a way that they can be treated as 'hard' historical facts. Therefore, the purpose of this article is to put the subcultures in the focus of the study of the Transition in Bulgaria, bringing to the fore the 'weight' of the presence of their cultureme in the public consciousness with the relevant quantitative and qualitative methods.

The fundamental obstacle to studying subcultures and the sociocultural mechanisms manifested through them is the insufficient adequacy of the leading macrotheories in explaining social change. For Marxism, social change is simply consequence and reflection of processes in the 'base'; they are determined by the respective economic relations and this makes them an absolutely non-autonomous transmission mechanism, as the main engine of the historical process is the development of the productive forces, which is very problematic when trying to explain the real historical process, especially in the last century.

The idea of the continuity of historical development from lower to higher forms is a millennial tradition that dates back to Antiquity (Titus Lucretius Carus, *On the Nature of Things*), passes through the Middle Ages with its history 'periodization' (the four earthly kingdoms aimed at the fifth – of God), and achieves its flourishing in European philosophy of the 18th-19th c., a tradition that views human history as a progressive development from lower to higher forms. This teleologism, which in the Middle Ages existed on the only possible basis at the time – theology, and later was placed by Marxism on materialism, is in fact both the main cornerstone and major stumbling block of the formational approach. Indeed, humanity is undergoing an ever-accelerating technological development which impacts society. Nevertheless, or at least so far, the basic structure of society has been virtually unchanged since the emergence of the first civilizations. The change dynamics in political regimes are obvious, but they are not directly related to changes in the main production factors, nor are they directly influenced by technological development or economic prosperity in general.

On the basis of teleology, there is built the so-called 'transitology', which while exploiting the ideas of the inevitable and upward development and successive 'waves of democratization' Huntington [13], tries not only to justify the transition to democracy, but also to operationalize this process with specific prescriptions for action. However, the historical events of the second half of the 20th century refuted the 'inevitability' of the movement towards democracy. At the same time, another weakness of transitology becomes evident – the focus on elites as an engine of social processes. This has led to one-sided patterns of transition and a discrepancy with reality.

An indication of the difficulties with transitology is its abandonment in 1996 by Huntington and his consequent attempt to analyse and predict historical processes through a new reading of the civilizational approach – Huntington [12]. The latter, which has its classical authors in Toynbee [23] and Sorokin [19], is the other major trend in attempts to build a metatheory of the development of human society. However, even if we assume that civilizations develop in cycles passing through the stages of 'ideational', 'sensate' and 'idealistic' cultural mentality, the category 'grid' of this development is so large that such 'trifles' as transitions from one political regime to another just can't be detected. Huntington tries to address this shortcoming by predicting the clash of civilizations and placing it at the heart of the dynamics of historical processes, at least in the coming decades.

Another of the more significant theories purporting to explain processes on a global scale is the World-Systems approach. Immanuel Wallerstein [24] is perhaps the most popular of the founders of this approach. It examines the global, and to a large extend national, historical process, as a result of the relationship between three hierarchical planes, grouping the individual countries mostly by their economic level – core, semi-periphery, and periphery. The World-Systems approach has been repeatedly criticized for its economic one-sidedness and neglect of social, spiritual, political and other factors in explaining the processes.

Until recently, it was quite popular to use the 'network approach', which is rooted in the works of Simmel and Durkheim, but underwent strong development after the mid-20th c., including through the application of graph theory. In Bulgaria, it received its application (Bundzhulov [7]) based on Bourdieu's Forms of Capital [5] and Choses Dites [6] notion of the different forms of capital – political, cultural, and symbolic. The strength of this approach is that it makes it possible to largely avoid favouring some factors (most often economic) at the expense of others (political, social, cultural, etc.) in explaining the transformation processes. It illustrates well the dynamics of social groups, down to the individual level. However, what remains outside the analysis and is practically not discussed even in the most serious study of the transition in Bulgaria carried out within this approach (Chalakov [8]), is where the impetus for the rapid transformation of capital, actors and the networks themselves started in the late 1980s.

In addition to the above variety of theories, the Bulgarian theoretical thought largely takes the view of the practically complete dominance of the exogenous model of the country's development. It follows Blagoev's theoretical proclamation that what happens in Bulgaria 'depends three quarters on the external and one quarter on the internal' factors []. This framework, which resonates with the Bulgarian folk psychology, is developed in an updated version under the methodological guise of a concept of a world system in which Bulgaria plays the most peripheral role in the European capitalis. Even if we accepted this premise as truth, it would not automatically direct the political and economic processes in the country.

All these fundamental theoretical considerations, despite being at first glance perceived as detached from the current social processes, have their reflection and 'notation' in real political action. An example of such notation is the idea of the transition being right-wing by default and therefore inevitably socially unjust. This idea finds its 'theoretical' justification in the inadequacy of the existing theory, which allows the substitution of notions and concepts for the sake of convenience of political goals. Practically, the result is an 'ideologically justified' abandonment of social policy during the transition, including by the self-proclaimed 'left' political structures. This mystification of the social processes cannot be overcome if the foundation of the theoretical basis is not completely and structurally revised to reveal the real mechanisms of social change whose sociocultural genesis takes place within the subcultures which are in complex interactions with each other and with the mainstream culture.

The conclusion drawn from the review of the main theories offering an interpretation of the social, economic and political processes of transformation that began in the late 1990s in Eastern Europe is that a comprehensive and complete elucidation of these processes is impossible without a new comprehensive macro theory of historical development. It must overcome the stated methodological shortcomings of the previous ones (teleology, the one-sided one-factor approach, scope insufficiency, etc.), by not merely reworking the old approaches, but by proposing a completely new construct in their place. In this sense our main research hypothesis is that social change follows the accumulations of changes in the mass consciousness, which in due course bring about changes in social relations. In (relatively) stable social environments, the changes occur gradually or diffusely, permeating society's fabric almost imperceptibly and without major conflicts. By contrast, when changes occur in a short time and especially when accompanied by rising social tension, then the changing social attitudes are formed and grouped around different, often antagonistic, cores. The latter form the nuclei around which social groups may form and subcultures may emerge.

Conceptual and content analysis of subcultures has been done by a number of authors such as Yinger [25] and Almond and Verba [1]. In Bulgaria, a number of authors take a stand on the issue: Blaga Blagoeva [4], Plamen Georgiev [11], Todor Tanev [20], Antoniy Todorov [22] and others, and many of them offer heuristic analyses and definitions. However, the attempt to give a summary of subcultural studies is marked by the

high degree of fragmentation of the theoretical field, demonstrated by the vagueness of the conceptual apparatus and the practical lack of a single conceptual focus to unite the individual, often heuristic, views of the authors. One of the reasons for this is rooted in the isolated consideration of subcultures and their confinement to one sphere of society or as closed social groups. Another reason is the dominant conscious or unconscious consideration of subcultures mainly as an object, consequence and reflection of certain processes and influences, a view which pushes to the background their main role in forming and influencing action, ie. being an agent of change. This limiting approach, albeit producing certain results in periods of social stability, becomes very restrictive and lacking while studying turbulent social transformations

In this context, it could be said that at the end of the so-called 'Real Socialism' period in Bulgaria (around mid-1980s) and at the beginning of the transition in the political, economic and cultural life in 1989, several important subcultures were formed which, in varying degrees, influenced the overall development of the country. The main mechanism of this influence, which turns subcultures into agents of, or active participants in, the historical process are the culturemes – cultural narratives employed by the mass consciousness to express attitudes towards the reality and to form, justify and initiate social action. These narratives are also the main mechanism by which the subcultures manifest themselves as participants/agents in the historical processes.

The research aimed at studying in depth and validating the culturemes as key identifiers of each subculture. Upon the successful completion, the research would have provided the necessary tools for the study of sociocultural transformations as well as for the overall development of scholarly theory. The research took an interdisciplinary approach, combining the perspectives and methodological tools of different scientific disciplines (culturology, cultural heritage sciences, cultural anthropology, political science and philosophy of history).

For the purposes of the study, we used the following terms and definitions. *Focus* is the part of the basic cultural spectre which acts as a focal point for a given subculture – in other words, this is the combination of drivers and goals. *Nucleus* refers to those members who wholly adopt the values and practices of the subcultures and fully identify themselves with it. The exact size of the nucleus may vary between subcultures. *Culturemes* are the narratives used in the mass consciousness for expressing attitudes towards reality and to form, initiate and justify social action. They are the main mechanism by which subcultures participate in the social processes. *Ideologemes* are political culturemes. The term 'transition' is widely used in political and social science to denote the changes in Central and Eastern European countries after the fall of the communist regimes in 1989. In the case of Bulgaria, we use the term *totalitarian state*, rather than *communist*, as it better denotes the nature of the regime and specifically the degree of state control over three main areas of society.

In Bulgaria, the transition from totalitarian society to a society with a market economy, a multiparty political system and a number of other institutions guaranteeing the basic requirements of present-day democracies, is still considered a complex, layered and controversial process. Therefore, one of the goals of the research was to uncover the internal sociocultural mechanisms of the transition. These mechanisms are of critical importance because regardless of whether one adheres to the exogenous approach or one defends the overall importance of the internal factors in explaining the cause and course of the Bulgarian transition, the historical process could not take place without mechanisms through which public attitudes are formed and directed; attitudes which in turn are the basis for the behaviour of the multitudes of individuals.

The arguments in favour of the subcultural approach, in addition to its purely theoretical justification, also requires evidence of its applicability in the practice of socio-historical research. This requires at least three successive research efforts: identification, verification, and pragmatization (demonstrating applicability) of subcultures. One such round of activities was carried out, as in the first step (identification), from the initially identified about a dozen potential subcultures, after conducting qualitative studies (Nazarska [17], Debruyne [9], Debruyne [10]) and their analysis, they were reduced to six manifesting themselves in the three main societal spheres – politics, economy and culture. We named them Real Socialism and Anti-Communism; Wrestlers/Mutri and Honest Entrepreneurs; and Environmentalists and Chalga.

The verification (the second stage) was carried out by means of a quantitative study (Karakachanov [15]), while a nationally representative survey is also pending. However, all these efforts would be just an intellectual exercise if the connection between the presence of the targeted subcultures and the actual historical process were not demonstrated. This connection is most clearly visible in the political subcultures, which are the bearers of the "political mentality" underlying the characteristic bipolar political model during the greater part of the Bulgarian Transition. It was precisely this mentality and the model built on it that determined the course and character of the Transition and set the framework for the political decisions made, beyond which it was impossible for political leaders, even at the cost of their careers. However, the influence "mentality - model - historical process" is a matter of a separate study.

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POLITICAL SCIENCES

PRIVATE MILITARY COMPANIES: INSTITUTIONALIZATION, ACTIVITIES, TRENDS

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Abstract

The article analyzes the history of creation and some directions of activity of private military companies (PMC) in performing tasks of a specific nature and protection to corporate and state interests of individual countries of the world. It is noted that as a new but effective tool, both representatives of big business, "big" and "small" countries come to the services of the PMC when they consider it necessary not to reveal their interests and remain in the "shadows". The following research tasks were solved:

– to investigate the existing theoretical approaches in assessing the functioning of military companies;
– to analyze the world experience of creating and applying PMC;
– to examine the specifics of tasks and operations of the PMC;
– to determine the development prospects of the PMC institute in the system of promoting national interests.

Keywords: private military companies, mercenary, war, legal support, Swiss initiative, military operations.

Introduction.

Formulation of the problem. The problem of PMC activity are not new but they are not open either. This contradiction of half-openness and half-closed activity of the PMC stimulates the specific interest of security specialists, especially when this issue is looked at comprehensively, that is, in a systemic way. However, in the system of international relations there are "eternal themes" that are painted in the color of struggle.

These are development security, sustainability, lifestyle, values, deterring rivals, etc. In the classical approach they have always been in the sphere of activity of the state and its institutions. The toolkit was also appropriate. However, the era of modernity (Wallernstein's expression) has made its corrections to this order of things. The world has become multi-subject due to the birth of various structures which were assigned a certain role in the system of interstate relations. The phenomenon of the PMC can be seen in the fact that in the background of various non-governmental organizations (NGOs), with the support of the state they gradually have begun to perform specific tasks of a military and security nature both within its borders and beyond its borders. The 70s of the 20th century are considered to be the peak time of the increase in the number of PMCs in the system of international relations, and the USA, and Great Britain became the leading countries in terms of their creation

The events of the last decade convincingly show that the nature of the "specific tasks" that were relied on (and are still being relied on today) by the main players of world politics in key areas is connected with the weakening of each other's positions in states (regions). This struggle takes place in the logic of the "tangle of dependencies, opportunities and benefits" of the parties where the military-power factor is mixed with economic, political-diplomatic, educational-cultural and other factors.

Analysis of recent research and publications. A considerable number of scientific works have been written on the topic of the use of private military companies by states as a tool of geopolitical influence. In the large list of authors, would like to emphasize the following works.

– McFate, S. "The New Rules of War: Victory in the Age of Durable Disorder". The author examines the use of private military companies of the Russian Federation in Ukraine and Syria, as well as their impact on international security.

– Khlebnikov, A. "Wagner Group: Russia's Private Military Company in Syria" The author investigates the activities of a Russian private military company.

– Sukhankin, S. "Russian Private Military Companies: Redefining "Hybridity" in the 21st Century". The author examines the role of private military companies in modern geopolitical conflicts, in particular in Ukraine and Syria, and their impact on international security.

– Volevodz, A. About international initiatives in the field of legal regulation of the activities of private military and security companies. 2019. 17 p.

The purpose of the study is to reveal the practice of using private military companies by the world's

leading countries as a tool of geopolitics in key areas of the world.

Presenting main material. Private military companies are commercial organizations that provide services of a military nature, usually in the form of recruiting private forces to protect people, objects and interests of clients. Such companies can perform a wide range of functions, from providing security services to participating in hostilities and supporting military operations.

It is worth noting that there is no universally accepted definition of private military companies. For example, the definition of Professor O. Volevodz, who defines private military companies as "non-governmental organizations that provide military and security services to individuals and legal entities and states on a contractual basis" is the most extensive in international legal doctrine. At the same time, military services include combat operations, collection of intelligence information, strategic planning, operational or logistical support, training of military personnel, as well as logistics" [1, p. 15].

Much more often, researchers emphasize the state nature of the PMC and believe that these new actors of international relations almost always act in the interests of the state, follow the same plans and pursue the same goals as regular armies while using more means to achieve the same goals. The following definition is more suitable for these characteristics: a private military company is a registered and highly profitable commercial structure with highly qualified technical personnel, controlled by the state, which works in the interests of the state, and this is its fundamental difference from classic mercenary and terrorist groups" [2, p. 131].

According to the definition of the law officer of the US Air Force dr. D. Tipling private military companies are "officer corporations that, on the basis of a contract with the state, provide military, escort and support services both inside the country and abroad" [3, p. 11].

Some specialists associate the term "PMC" with transnational corporations (TNCs), as they are known to be complex networks with a large number of subsidiaries operating simultaneously or sequentially in different regions of the world [4, p. 226].

The place and role of PMC in the modern world cause many discussions and views. There is an opinion that PMCs are a necessary alternative to state armies in the fight against terrorism and other security threats, especially in conflict zones where state troops cannot be present for various reasons. Others argue that PMCs can operate outside the law and are able to act in favor of their clients rather than the state.

The role of PMCs in geopolitical influence is that they can be used as a tool of foreign policy and influence on other states. At the same time, their role can be either positive, for example, in protecting citizens and ensuring social peace or negative, such as in carrying out aggressive actions against other states.

In the transformations of world development some states are increasingly reluctant to publicize armed conflicts, and most of them generally refuse to conduct high-profile military operations preferring high-tech military weapons. However, recently some of them began to use the services of private military companies that are not formally connected with the national armed forces [5, p. 207].

In general, in the modern world PMC is an integral part of the security system of many states that use them to protect their interests and citizens in different countries.

The history of private military companies remembers the time when kings in the absence of force (army) recruited private armed formations to wage war and exercise control over territories. The first mercenaries are considered to be the soldiers of Greek polis cities, in particular Sparta and Corinth, who were paid in silver for their service. Later, mercenary warriors enter the historical arena, such as: Scythian cavalry, Celtic warriors, Normans (Vikings), Italian mercenaries (in particular, the Melanes), Swiss Guards, French Chevashes, German Lanchnets, Scottish Galloglasses, registered Cossacks and many others.

In medieval Europe private military companies were usually hired to protect merchants and their goods in territories where the state could not provide sufficient protection. One of the most famous private military companies in the Middle Ages was the Swiss Guard which was founded in 1506 and still exists as the official bodyguard of the Pope.

However, from the beginning of the Napoleonic wars mercenary turned into a secondary force and later disappeared. Napoleon Bonaparte was the first to form an "army for money which underwent military training and obeyed the only rules: the statutory regulation of service and relations. For the period of the mid/end of the 19th century. military mercenaries reminded of themselves as local cells. In particular, the last example of mercenary before the beginning of the First World War was considered to be the use of Filipino pirates who for monetary payment appeared on the side of Japan in the Russo-Japanese War of 1904-1905.

The period after the two world wars is considered quite favorable for the development of mercenaries and private military companies. First, there was a situation of the clash between two powerful states and a political reshaping of the world (formations and divisions of spheres of influence). In these conditions mercenaries and privateers were a flexible and convenient tool actively used by the United States government during military operations and operations. Secondly, quite a large number of "former soldiers" for certain reasons could not find themselves in a peaceful life. This fact gave rise to the offer of private military companies in the service market. And the demand for these services grew quite quickly from many European countries. However, the greatest demand for the services of "new structures" was felt in the USA and Great Britain.

In recent history it was believed that the first private military company was Watchguard International (WI) founded in 1967 in Great Britain by colonel David Sterling who had previously created the Special Airborne Service – an intelligence unit of the British armed forces and registered commercial organization under

the control of the state which was fundamentally different from the classic mercenary unit. The main task of the WI was to work for the benefit of countries friendly to the United Kingdom and for various intergovernmental organizations. Officers of these structures have participated in operations in Oman instructing and training the troops of sultan Qaboos in the war against the rebels. Another of Sterling's companies – Kilo Alpha Service (KAS), fought poaching in South Africa in the 1980s on behalf of the International Wildlife Federation [6, p. 8].

In the 1970s the number of private companies increased dramatically. They were engaged in an increasing number of various tasks. So, in 1974 Vinnell Corp. PMC, which was part of the American military-industrial consortium Northrop Grumman, signed contracts with the US government which was worth more than 500 millions dollars. This deal can be considered one of the largest in this new, nascent industry. As part of the contracts the company's employees conducted training for the Saudi National Guard, as well as guarding oil production facilities. In 1977 the well-known company Keenie Meenie Services (KMS) was founded [7, c.56]. In 1984, personnel of this PMC acted on the instructions of the CIA in Nicaragua where the blew up the port of Managua and government buildings, planned and carried out acts of sabotage and terrorism, and at the same time illegally sold American weapons to Iran where at that time the Islamic revolution already took place. Moreover, during the Soviet-Afghan war the KMS took an active part in the training of some Afghan subversive units on behalf of the British and American governments [8, p. 235].

In the future the number of PMCs and their personnel steadily increased. According to the US State Department in early 1978 more than 11,000 American citizens were working abroad in these military programs. The first private military companies were rare and were generally used as a political tool that was not entirely clean. However, much changed in the 1990s.

It is known that even during the Persian Gulf War in 1991 the ratio of contractors to American troops was 1:50, and most of it was provided by private organizations. Commercial airlines such as Evergreen and Southern Air Transport transported 65 percent of all military forces and cargo. In addition private American contractors also provided support to Saudi troops in the rear. On the front line with the Iraqi troops the instructors of the "Vinnell" PMC provided courier assistance to the units of the National Guard of Saudi Arabia. Ensuring the security of strategically important facilities in Iraq often relies on the US military which made private military companies part of the military sector with all the relevant rights and responsibilities [9, c.33].

In a more modern sense the emergence of modern private military companies is associated with the fall of the Berlin Wall and a change in the global political landscape. After the end of the Cold War states began to reduce their forces and refocus their attention on other priorities which led to the fact that some tasks previously performed by state forces were transferred to private companies.

In April 2001 the first organization designed to coordinate the activities of private military and security companies at the international level was founded: the International Peace Operations Association (IPOA) which today, according to available data, includes more than 60 private companies. somehow involved in international military activities. IPOA is almost one of the platforms where world PMCs coordinate their actions among themselves.

Shortly after the start of the Iraq War the Private Security Companies Association of Iraq (PSCAI) was established. At that time it was supposed to coordinate the activities of the mentioned entities on the territory of Iraq which at that time included about 40 military and security companies. In addition, in 2004, the head of the Interim Administration in Iraq, Paul Bremer, signed Coalition Interim Administration Order No. 17 which granted immunity to American contractors (including employees of military and security companies) which meant that they could not be prosecuted for actions taken on the territory Iraq [10, c. 67].

As far as it is concerned, the EU's activities have historically been aimed at developing its own distinct military capacity to potentially protect European security interests beyond its borders without direct support from the US, even if resources are provided by NATO [11]. In fact EU-sponsored peacekeeping and enforcement operations have already begun, albeit on a modest scale. In 2003 the Union assumed responsibility for peacekeeping in Macedonia and policing in Bosnia, as well as the deployment of Operation Artemis – a French-led humanitarian intervention in the Congo [12, c.312]. In general from 50,000 to 60,000 military personnel from EU countries were deployed outside the NATO and EU zone, in more than twenty countries [13, c.64].

The analysis of foreign legislation shows that the lack of legal support for the activities of private military and security companies is insufficient, since in some countries the activities of private military and security companies have been regulated very superficially and have done not affect the main content of their activities, and in others, such as, for example, in the Russian Federation, has not regulated at all [14, c.48].

There are several international legal approaches to the regulation of private military companies including the Code of Conduct for PMCs, the International Convention on the Use, Management and Transfer of Services of Private Military Companies, the European Union PMC Directive and the UN PMC Resolution. Let's consider their features and compare them with each other.

1. Code of conduct for PMCs: adopted in 2010. It contains recommendations on ethical and legal standards of conduct for their activities, such as respect for human rights, compliance with international humanitarian law and protection of civilians. However, this code is not a legally binding document, and its implementation depends on the goodwill of the PMC.

2. The International Convention on the Use, Management and Transfer of Services of Private Military Companies: proposed in 2013. It contains regulations on the registration of private military companies, the establishment of rules for the employment of persons in these companies, the control of activities and the establishment of liability for violations of regulations. How-

ever, it has not yet been adopted at the level of international law, so the implementation of its provisions is not legally binding.

3. Directive of the European Union on PMC. In 2014 the European Union adopted a directive that contains regulations on the licensing and regulation of PMCs including setting requirements for the experience and qualifications of employees.

Despite the primary motivation of many private contractors engaged by private military and security companies may be personal gain, it is extremely difficult to prove this in court. However, for many private soldiers the motivation is a mixture of monetary gain, the "excitement and adrenaline" of adventure and the opportunity to put all their training into practice. PMCs typically employ personnel who are highly trained in high-risk and counterinsurgency operations, such as members of the US SEAL or SWCC, the British SAS or the French Legion.

In addition, only 32 states have ratified the International Convention on Combating the Recruiting, Use, Financing and Training of Mercenaries, and most governments that employ private military security are not parties to the Convention. [15, c. 11].

In 2006, to meet the demand for clarification of legal obligations under international humanitarian and international human rights law and private military and security companies the Swiss government and the International Committee of the Red Cross launched what was known as the Swiss Initiative – the process of international consultations with the main stakeholders: governments, the new industry of private military and security companies, and civil society [16]. The Swiss initiative was supported domestically and by the governments of the United States and the United Kingdom where most of the industry (70%) and lobbyists of the new security industry are located: the International Peacekeeping Operations Association (IPOA) and the British Association of Private Security Companies (BAPSC) [17].

On September 17, 2008 this process led to a common understanding among 17 states, known as the Montreux Document on Relevant International Legal Obligations and Good Practices for States Related to the Activities of Private Military and Security Companies in Armed Conflict [16]. It sets out what the signatories consider to be appropriate regulations applicable to private military and security companies and a set of modern practices for them. The second stage of the Swiss initiative is a proposal for the adoption of an International Code of Conduct for private military and security companies. It aims to set high standards for the industry worldwide and support the establishment of a voluntary enforcement mechanism to ensure compliance with such standards.

Despite the fact that the Code is in the process of being developed, the PMC community adheres to certain rules that are considered "mandatory" behavior. It is about the following.

Flexibility: PMCs can be very flexible in terms of missions because they do not have the same constraints as state military formations.

High level of professional training: the majority of the PMCs consists of experienced military personnel who have received training in state military formations.

Financial independence: PMCs receive money from private clients, such as governments, companies and individuals giving them financial independence from governments.

Lawlessness: In many cases PMCs can operate outside the law because they do not obey martial law or the laws governing the use of military force.

In the legal literature there are various classifications of PMC based on the place of creation, region of activity and other characteristics. [18, p. 22].

There is an opinion that private military and security companies should be divided into four groups.

1. Military provider companies. Military or servicemen of these companies that provide their clients with services that are directly related to the conduct of hostilities. Their employees take direct part in various combat operations and missions [19, p. 98-102].

2. Military consulting companies. These companies specialize in the training of various army units, training in new types of weapons and consulting state security structures on issues of reforming the armed forces. Strategic planning is also one of their tasks.

3. Military support companies. PMCs of this group are mainly engaged in the construction of military facilities but also provide logistical support to the troops. The group should also include companies specializing in the maintenance of complex military weapons systems and military computer systems.

4. Companies that provide private security services. These companies are also called private security companies. The activities of these companies are focused on risk assessment of military operations, crisis management and security consulting. In addition, PMCs of this group are involved in the direct protection of objects and the provision of support services. These companies are involved in demining territories and facilities, as well as training various military and police units.

In the context of the analysis of the proposed issues it is advisable to dwell on the policy of creating the PMCs in Russia and the tasks they perform in the war against Ukraine. The most famous entity in the list of Russian PMCs is "Wagner". According to official data it was created in 2013 by Yevgeny Prigozhin, a Russian businessman from V. Putin's personal circle. From the sources of the non-state sector its founder and immediate executor was Dmytro Utkin. At one time he commanded a special purpose unit – a unit of the Main Intelligence Directorate of the General Staff (GRU GS, *рос. Главное разведывательное управление Генерального Штаба Вооруженных Сил РФ*). "Wagner" PMC was created as part of the Special Operations Forces (SOF).

The purpose of creating the "Wagner" PMC was to secretly involve the unit in regional conflicts in the interests of the Russian Federation where official Moscow maintained neutrality. It was a kind of secret power – a reason that was deprived of state affiliation [20].

With the start of hostilities in Ukraine (February 2022) the "Wagner" unit was actively involved in the Donetsk direction but despite the professional composition of the personnel it suffered significant losses. The image of "Wagner" as an elite unit of the GRU GS was finally lost when fighters with a criminal past began to

join its ranks and in connection with the death of Ye. Prigozhin in a plane crash.

In addition, to the "Wagner" PMC there are more than ten others in Russia: "Redut", "Moran", "Orlov anti-terrorist", "Slavic Corps", "RUS-Corp" and others. According to experts, their number will grow due to various circumstances. First of all we are talking about wars and conflicts in the post-Soviet space (Ukraine, Transnistria, Nagorno-Karabakh) where Russia has important political and economic interests, and in the Middle East and North Africa – areas of its traditional interests. Practice shows that from several hundred to 3,000 fighters can operate in each conflict location.

Russian state corporations, in particular, Gazprom, Rosatom, Rosneft, and Russian Railways also employ PMCs to protect mining sites, transportation networks, construction sites or transport convoys in Africa, South America and the Middle East. In addition, in Syria and Libya, the protection of hydrocarbon production sites and transport infrastructure usually constitutes a significant part (25-30%) of contracts for the sale of energy resources and a significant source of income for PMCs.

Conclusions.

1. The phenomenon of private military companies becomes especially acute in the context of modern trends in world politics and conflicts of interest between its main players. The expansion of the location and spheres of activity of PMCs indicate the growth of their role in protecting the interests of private business in key areas of the world and the interest of the state institution to use the "hidden resource" of the power of these structures in the defense of interests.

2. The internationalization of the PMC – security trend encourages national governments to implement a policy of regulating the activities of PMC structures at the national and international levels. However, everyone understands that on the one hand, their activities should take place within the boundaries of the right field and on the other hand, excessive administration can create certain boundaries regarding the replenishment of the ranks of fighters. The way out of the situation was that existing international documents, such as the Montreux Document (2008) and the International Code of Conduct for Private Military Companies (2010), are not legally binding but only have a recommendatory nature for the activities of the PMC.

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SOCIAL SCIENCES

THE ADOPTION OF AN EFFECTIVE EUROPEAN BILL WILL BE NECESSARY TO REDUCE FOOD WASTE

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https://doi.org/10.5281/zenodo.10975352

Abstract

The purpose of this analysis is to highlight the urgency of quickly obtaining an effective European law against food waste. This analysis demonstrates the blockages (lobbing and long and slow procedures), and solutions are proposed in view of the social and environmental emergency. This analysis is therefore all the more important as it applies in a disrupted and unbalanced social and environmental situation. Indeed, with millions of poor people on the European continent on the one hand and the emergence of worrying global warming on the other, citizens are expecting effective and innovative legal tools. Legislative decision-making between the different bodies of the European Union (European Commission, European Parliament and Council of the European Union) is a legal challenge that must be taken up. It should indeed be remembered that the DrawDown project (2020) and IPCC (2022) reports have confirmed that reducing food waste is one of the three main solutions to combat global warming. Can European law therefore reconcile economic production and social redistribution for better equity between everyone ? This is the objective of this legal analysis.

Keywords: Food Waste, European Law, sustainable development, Food loss

INTRODUCTION

The Food and Agriculture Organization of the United Nations (FAO) estimates that thirty percent of the food produced worldwide is wasted[2].

This amounts to one out of every three foods worldwide.

However, according to the Food and Agriculture Organization (FAO), 783 million people globally faced hunger in 2022, and 3.1 billion people lacked access to a good food in 2021[3].

At the same time, the organization estimates that, globally, « 13% of food is lost in the distribution chain, from post-harvest to pre-retail and that an additional 17% of food is wasted at the household, food service and retail levels »[4] [5]

The demand for food items has increased globally in recent decades due to changes in eating patterns and demographic growth.

Modern agriculture faces a myriad of challenges that impede its productivity and sustainability. These challenges include inherent limitations in crop yields, the necessity for effective integration of technological advancements, the increasing frequency and severity of natural disasters exacerbated by climate change, the encroachment of urbanization on fertile agricultural lands, and the ever-growing scarcity of water resources essential for cultivation.

In light of these challenges, there arises a pressing need to bolster agricultural productivity to ensure an adequate and sustainable food supply for the world's growing population. However, simply striving for increased productivity may not be sufficient. Another critical aspect that demands attention is the reduction of losses and waste throughout the food production and distribution chain.

The distinction between 'losses' and 'waste' within the agricultural context is nuanced and often blurred due to the diverse array of circumstances encountered across different regions and nations. 'Losses' typically refer to the reduction in quantity or quality of agricultural products during production, harvesting, storage, and transportation stages. This can result from factors such as pest infestations, diseases, spoilage, mishandling, or inadequate storage facilities. On the other hand, 'waste' encompasses the inefficiencies and excesses that occur further downstream in the food supply chain, including retail, distribution, and consumption stages. This may include discarded or unsold food products, expiration of perishable items, overproduction leading to surplus disposal, and consumer behavior contributing to unnecessary waste generation.

Addressing both losses and waste in the food system requires a multifaceted approach involving collaboration among stakeholders at various levels. Strategies

[1] « Nobel Prize for sustainable development: lawyer Arash Derambarsh rewarded » : https://clever-energies.com/en/nobel-prize-for-sustainable-development-lawyer-arash-derambarsh-rewarded/
[2] The world counts. (s. d.). https://www.theworldcounts.com/challenges/people-and-poverty/hunger-and-obesity/food-waste-statistics
[3] Hunger. (s. d.). Food And Agriculture Organization Of The United Nations. https://www.fao.org/hunger/en/
[4] FAO - 2022
[5] United Nations Environment Program, 2021

may include investment in improved infrastructure and technology to minimize losses during production and distribution, implementation of effective storage and preservation techniques, adoption of sustainable agricultural practices to mitigate environmental stressors, promotion of consumer education and awareness campaigns to reduce food waste at the household level, and the development of policies and incentives to incentivize responsible consumption and production practices.

According to the FAO, 30% of food produced worldwide is wasted.

1.3 billion tons of food, or more than half of the world's grain supply, are lost or wasted annually worldwide, from agricultural production to ultimate consumption.

The issue at hand is worldwide : 670 million and 630 million tons of food are wasted annually in wealthy and developing nations, respectively.

According to FAO estimates, there will be an additional 2.3 billion people on Earth by 2050, bringing the total population to more than 9 billion. By 2100, there will be more people on the planet than 11 billion.

Food production will need to expand in order to keep up with the population's continued need for food.

Demand for food will continue to increase and it will be necessary to intensify food production to feed this population.

If this trend continues, the FAO estimates that global food production will have to increase by 40 to 70% by 2050 to meet needs.

It won't be sufficient to increase output at this rate of waste.

By examining the true demands of the consumer, we must investigate the strategies that should be used at every link in the food chain.

At every level, progress is achievable.

To create solutions that both « feed more » and « feed better » for a growing population, all stakeholders must band together.

Food waste and food insecurity are therefore two complex and interdependent phenomena. Food waste is a major problem, both environmentally and socially.

It represents a loss of valuable resources and can have a negative impact on people in food insecurity.

Therefore, the concept of food insecurity is often reduced to the question of access to sufficient food in quantity and quality.

However, a broader approach is needed to take into account the social, cultural and political issues associated with food.

By considering food insecurity through the prism of social and political factors, we are led to re-examine the legal issues that a rise from it, as evidenced by the history of the right to food. Indeed, Nicolas Bricas, Damien Conaré and Marie Walser highlight the relational and political dimension of food, which transcends many domains and profoundly influences our world. Rather than considering it as an isolated domain, an ecological approach to food suggests using it as a lever to rethink our society in crisis.

That said, the consumer-citizen, a specific actor, must be convinced of the importance of fighting against food waste and appropriate this approach, thus underlining the importance of lifelong education, training and communication. From this perspective, the causes of food insecurity are multiple and complex. They can be related to economic, social, political or individual factors.

It is precisely because there is a social emergency and a crisis at the level of the food chain that it is appropriate to legally regulate these dysfunctions and economic imbalances.

So, can the law reconcile economic productivity and social redistribution ?

Our analysis responds to this problem with a requirement to accelerate the legislative process at the European level.

MAIN PART

I- A food scandal in front of social and environmental emergency

For a long time, food contributions were the subject of a controversy as most supermarkets tossed away their unsold stock instead of donating it to the underprivileged or nonprofit organizations[6].

The fact that the Observatory of Inequalities estimates that 5.3 million individuals in France lived below the poverty level in 2023 makes this scenario much more concerning.[7]

Therefore, in order to put an end to this plague, specific answers had to be given.

The #StopFoodWaste movement led to the adoption of a legislation in France requiring retailers to give unsold food, preventing over 10 million meals from ending up in landfills and resulting in a 22% increase in food contributions to charitable organizations.[8]

Every grocery store in the European Union continues to discard more than 40 kg of food every night, despite the fact that more than 95.3 million people (or 22% of the population) live in poverty and frequently struggle to provide for their families in 2022.[9]

The #StopFoodWaste campaign's straightforward solution to this issue was to pass a national law encouraging stores to donate unsold food instead of throwing it out.

[6] The Telegraph « Iceland staff 'pour bleach onto waste food to stop homeless people eating it' » : https://www.telegraph.co.uk/foodanddrink/foodanddrinknews/7564402/Iceland-staff-pour-bleach-onto-waste-food-to-stop-homeless-people-eating-it.html

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Passed on 3rd February 2016 [10], the new law seeks to tackle food waste by obliging all French supermarkets to give away their unsold food and distribute it to those in need, ensuring that nothing is wasted. Supermarkets are free to support the aid association or charity of their choice, and every citizen can apply to create an authorised association to assist in food distribution.

Over 10 million meals are prevented from ending up in landfills each year thanks to the regulation, which has also increased food donations to social assistance organizations by more than 22%. In addition to mobilizing volunteers and streamlining the distribution of food contributions through affiliated organizations, the initiative has increased public awareness of the problem of food waste at the municipal level.

II- A European legal framework difficult to obtain

Encouragingly, the effort now aims to spread throughout the European Union.

It is necessary to expand and strengthen this attempt lawfully.

In actuality, the law mandates that stores with more than 400 square meters provide their unsold merchandise to the organization of their choice. This law has caused large supermarkets to modify their operations, but with limitations.

Since the French legislation has proven beneficial and the state of society in Europe is obviously concerning, we must secure a directive prohibiting food waste in order to bring the law to our continent.

Such a directive's effect at the European level would enable us to partially end hunger on our continent.

An act of normative action adopted by the European Union's institutions is called a directive.

Community directives are a component of EU secondary legislation, along with rules, rulings, views, and suggestions.

In contrast to a community law that is applicable in its entirety, a directive sets goals for member nations to meet within a certain timeframe. The national governments can adjust to the new laws thanks to this delay.

According to Article 288 of the Treaty on the Functioning of the European Union (TFEU)[11], the directive leaves the national authorities flexibility on the form and means of achieving the goal, but it is obligatory on the Member States that are its beneficiaries (one, multiple, or all).

Secondary EU legislation includes directives. Based on the treaties, the European institutions adopt them. The Member States then transpose them so that they become enforceable laws.

Similar to the French law, this rule is straightforward in that it would force supermarkets to contribute their unsold inventory to the group of their choosing. It would make it easier for volunteers to retrieve unwanted consumer goods from a store.

After then, the latter might give them out right away to those in need, especially the homeless.

Three effects would arise from this European legal framework :

The ability to form an association and receive permission from the appropriate authorities is available to all citizens of Europe.

Every European national will then be able to get in touch with the brand of their choosing, who will then be able to provide them with unsold merchandise to distribute that same evening.

A supermarket will also face a hefty fine if it continues to reject. A fine of 10,000 euros applies in France.

According to Article 17(2) of the EU Treaty, the European Commission has the exclusive right to propose legislation inside the Union.[12]

The legislative proposals that will be approved by the European Parliament and the Council are also created by this same Commission.

But because the European Commission is hampered in its actions by numerous lobbyists, this procedure appears altered. When discussing significant subjects, having too many obscure mediators might cause disruptions.

Thus, it is fitting that the idea originates from a head of state in full openness.

A European regulation in this food-related field must also be flexible enough to be voted on in light of the social emergency in order for European law to be implemented and administered in a timely manner.

III-Requirement to obtain an accelerated procedure in specific and emergencies situations

In fact, delays are often very long.

So, in compliance with Articles 289 and 294 of the Treaty on the Functioning of the European Union, the European Commission, on the one hand, submits a proposal to the Council and the European Parliament.[13] [14]

After that, a legislative proposal is either adopted at first reading or second reading by the Council and the Parliament.

In the event that no date is given for the first reading in the Council and Parliament, each institution's second reading deadline is three months, with a one-month extension conceivable.

A conciliation committee is constituted if, following the second reading, the two institutions are unable to come to an agreement.

The conciliation committee has to get together in six or eight weeks. After then, the committee has six weeks to approve a shared text.

Following these steps, a decision must be made by the Parliament and the Council within six weeks after the approval date of the common text.

[10] Law No. 2016-138 of 11th February 2016 relating to the fight against food waste : https://www.legifrance.gouv.fr/jorf/id/JORFARTI000032036290

[11] EUR-Lex : https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A12012E288

[12] EUR-Lex : https://eur-lex.europa.eu/legal-content/FR/TXT/HTML/?uri=CELEX%3A12012M%2FTXT

[13] EUR-Lex : https://eur-lex.europa.eu/EN/legal-content/summary/legislative-procedures.html

[14] EUR-Lex : https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A12012E294

The legislative act becomes law if, at third reading, both institutions agree to the wording chosen by the conciliation committee.

The process comes to an end and no legislation is approved if a legislative proposal is rejected at any point during the process or if Parliament and the Council are unable to come to an agreement.

These delays are significant given that around 100 million people in Europe live in poverty.

In order to swiftly enact a European rule prohibiting food waste throughout the continent, it is imperative that the legislative process be shortened and made more adaptable.

Therefore, it would not be unreasonable to request that these procedure durations be shortened in emergency situations, such when food aid is needed for charity. French legislative procedure expedited.

Article 45, paragraph 2, of the Constitution states that the expedited procedure in France is characterized by a measure being subjected to just one reading by each body of Parliament (National Assembly and Senate) before to adoption.

As a result, this limits the parliamentary shuttle to only one text communication.[15]

As a result of public pressure, and especially after over 1.6 million Europeans signed a petition, the EU has worked hard to establish a uniform framework for dealing with FLW. [16]

Additionally, the Juncker Commission unveiled a fresh plan for a circular economy in 2015.[17]

However, these measures are insufficiently successful, and on a continent where serious poverty is a problem now more than ever, passing the French law against waste must be the top priority.

CONCLUSION

As we have analyzed, the social situation is alarming. And in the face of this, European citizens are legally helpless.

The current social landscape presents a myriad of challenges, from economic disparities to food insecurity, environmental degradation, and access to basic necessities. Amidst these complexities, European citizens are confronted with a sense of legal helplessness, where existing frameworks may not adequately address their needs or provide sufficient avenues for recourse.

One of the critical areas where this legal vulnerability is pronounced is in addressing issues such as food waste and hunger. Despite growing awareness and initiatives aimed at combating these challenges, the legal tools available to European citizens often fall short. There is a gap between the scale and urgency of social issues and the legal mechanisms designed to address them, leaving individuals and communities feeling marginalized and without effective means of redress.

Furthermore, the complexity of the European legal system, with its multiple layers of governance and decision-making processes, can hinder timely and decisive action. The intricate relationship between national and EU-level regulations, coupled with bureaucratic hurdles, can impede efforts to enact meaningful change.

To empower European citizens and address these pressing social concerns, there is a need for a comprehensive review and reform of existing legal frameworks. This involves not only strengthening laws and regulations but also streamlining processes to ensure greater accessibility, transparency, and accountability.

Moreover, fostering a culture of active citizenship and engagement is essential in shaping policies that are responsive to the needs of the people. By promoting dialogue, participation, and collaboration between policymakers, civil society organizations, and affected communities, we can co-create solutions that are both effective and equitable.

Indeed, the legal tools made available to Europeans to combat food waste and contribute to reducing hunger are not suitable.

Building upon the analysis conducted earlier, it becomes evident that streamlining the voting and decision-making processes within the various legislative bodies of the European Union is imperative. Additionally, enhancing the fluidity of the relationship among key institutions such as the European Parliament, the European Commission, and the Council of Heads of State of the European Union is crucial.

The complexity and inefficiency of current decision-making processes often hinder timely and effective action on pressing issues, including those related to social welfare, environmental protection, and economic stability. Lengthy deliberations and bureaucratic hurdles can delay the adoption of much-needed policies and reforms, exacerbating the challenges faced by European citizens.

By compressing the voting and decision-making processes, we can expedite the formulation and implementation of policies aimed at addressing societal needs and promoting the common good. This may involve streamlining procedures, reducing bureaucratic red tape, and promoting greater cooperation and consensus-building among EU institutions.

Furthermore, enhancing the fluidity of relationships among key EU bodies can facilitate more cohesive and coordinated efforts in addressing shared objectives and challenges. Closer collaboration between the European Parliament, the European Commission, and the Council of Heads of State can foster greater alignment of priorities, enhance communication, and enable more effective decision-making processes.

[15] Article 45 paragraph 2 of the French Constitution of 4th October 1958 (Legifrance) : https://www.legifrance.gouv.fr/loda/article_lc/LEGIARTI000019241040

[16] « Stop Food Waste in Europe » (Change.org) : https://www.change.org/p/mettons-fin-au-gaspillagealimentaire-en-europe-stopfoodwaste?source_location=search

[17] Closing the loop: Commission adopts ambitious new Circular Economy Package to boost competitiveness, create jobs and generate sustainable growth (European Commission) : https://ec.europa.eu/commission/presscorner/detail/en/IP_15_6203

Ultimately, by reforming the structures and processes governing EU governance, we can create a more agile, responsive, and accountable system that better serves the interests and needs of European citizens. This requires a concerted effort from all stakeholders, including policymakers, legislators, civil society organizations, and the public, to drive meaningful change and build a stronger, more cohesive European Union.

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INFORMATION AND ANALYTICAL CENTRES OF UKRAINE: SPECIFICS OF ACTIVITY AND CLASSIFICATION

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ІНФОРМАЦІЙНО-АНАЛІТИЧНІ ЦЕНТРИ УКРАЇНИ: СПЕЦИФІКА ДІЯЛЬНОСТІ ТА КЛАСИФІКАЦІЯ

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Abstract

The purpose of the study is to investigate the peculiarities of the activities of domestic information and analytical centres and their typology. The methodology of the study is based on the application of the principles of scientificity, systematicity, functionality, and informativeness. General scientific methods were used: terminological, problem-chronological, analytical; special methods - analysis, synthesis, induction, deduction. The scientific novelty of the study is an attempt to summarise the results of the work of predecessors in studying the outlined problem, highlighting the peculiarities of the organisation and functioning of analytical cells of various types, as well as identifying the key parameters of their classification. Based on the study of the problem, it is found that domestic think tanks occupy an important place in the life of society, since they act as intermediaries between the public authorities and society. This is a kind of public control tool that, through the analytical products created on the basis of the priorities and values of society, helps the authorities to make effective management decisions. The specificity of think tanks is a combination of studying a wide range of economic, political and social issues. The author clarifies that domestic think tanks differ in terms of their objectives, type of founders, legal status, funding channels, etc. It is noted that the work of centres today can be considered a multifaceted phenomenon, since it involves taking into account many indicators in the process of developing a typology of centres. The authors have established that among the classifications of think tanks proposed by researchers, the determining criteria may be their specialisation and research issues.

Анотація

Мета роботи – дослідити особливості діяльності вітчизняних інформаційно-аналітичних центрів та їх типологізацію. Методологія дослідження базується на застосуванні принципів науковості, системності, функціональності, інформативності. Використано загальнонаукові методи: термінологічний, проблемно-хронологічний, аналітичний; спеціальні методи – аналізу, синтезу, індукції, дедукції. Наукова новизна дослідження полягає у спробі узагальнити результати роботи попередників із вивчення окресленої проблеми, висвітленні особливостей організації та функціонування аналітичних осередків різних типів, а також визначенні ключових параметрів їх класифікації. На підставі вивчення проблеми з'ясовано, що вітчизняні аналітичні центри посідають важливе місце в житті суспільства, оскільки вони виступають посередниками між органами державної влади та соціумом. Це своєрідний засіб громадського контролю, який завдяки створюваній аналітичній продукції на підставі урахування пріоритетів і цінностей суспільства, допомагає владним структурам приймати ефективні управлінські рішення. Специфікою діяльності аналітичних осередків є поєднання вивчення широкого спектру економічних, політичних та суспільних питань. Уточнено, що вітчизняні інформаційно-аналітичні центри відрізняються завданнями діяльності, типом засновників,

правовим статусом, каналами фінансування тощо. Роботу центрів на сьогодні можна вважати багатоаспектним феноменом, оскільки вона передбачає урахування низки показників у процесі розробки типології осередків. Авторами встановлено, що серед запропонованих дослідниками класифікацій аналітичних осередків визначальними критеріями можуть бути їх профільованість та проблематика досліджень.

Keywords: information and analytical centres, think tanks, information and analytical activities, analysis of public policy, analytical products, secondary document, classification, typology of think tanks.

Ключові слова: інформаційно-аналітичні центри, «фабрики думок», інформаційно-аналітична діяльність, аналіз державної політики, аналітична продукція, вторинний документ, класифікація, типологізація аналітичних осередків.

Постановка проблеми. Розвиток інформаційного суспільства сьогодні супроводжується підвищенням значимості інформаційно-аналітичної роботи, оскільки вона дає можливість з'ясувати поточний стан інформаційних процесів, актуальних подій, а також побачити головні тенденції їх подальших змін. В результаті реалізації набору розумових операцій з інформаційного пошуку, накопичення, зберігання, наступного оброблення та аналізу першоджерел постає принципово новий тип вторинних документів у вигляді аналітичної продукції.

Велика роль в інформаційно-аналітичній діяльності належить аналітичним центрам. Це автономного типу експертні осередки, які провадять багатогалузеві дослідження у напрямі державної політики, моніторять нагальні проблеми життєдіяльності соціуму, сприяють виробленню стратегії розв'язання різнопланових задач, допомагають розробляти рекомендації та генерують ідеї й пропозиції для публічних управлінців. Зважаючи на те, що вказані структури є своєрідними посередниками між органами державної влади та громадськістю, підсилюється значення створюваних ними аналітичних матеріалів як засобу надання публічним управлінцям цінних рекомендацій у процесі розв'язання гострих соціальних питань.

Аналіз останніх досліджень і публікацій. В ході дослідження розумінню тенденцій становлення та розвитку аналітичних центрів сприяла наукова монографія М. Сенченка, О. Сенченко, В. Гастинщикова [8], присвячена широкому колу проблем, пов'язаних з методологічними, організаційними, технологічними аспектами діяльності «фабрик думок».

Узагальнена характеристика напрямів та особливостей роботи аналітичних осередків містилася у публікаціях Є. Глущук, О. Маєвської, Н. Ржевської [1, 4, 7].

Висвітленню діяльності неурядових інформаційно-аналітичних центрів сприяли розвідки О. Клименко, О. Федорчук, Л. Чернявської [3, 10, 12].

Для розробки теми також стали у нагоді праці, що включали аналіз вітчизняної практики функціонування аналітичних структур, за авторством А. Шостак, С. Шулімова [13, 14].

Заслуговують на увагу змістовні статті з питань роботи бібліотечних та університетських інформаційно-аналітичних центрів В. Горового, О. Сербіна, Т. Ярошенко [2, 9].

Слід зазначити, що досить цінними інформаційними джерелами для вивчення наявних класифікацій аналітичних осередків були наукові публікації О. Маєвської, О. Мандзюка, І. Петренка, М. Сенченка та ін. вчених [4, 5, 6, 8].

Мета статті – дослідити особливості діяльності вітчизняних інформаційно-аналітичних центрів та їх типологізацію.

Виклад основного матеріалу. На підставі накопиченого у світовій практиці досвіду зі створення аналітичних осередків, до них відносять «фабрики думок» (think tanks), «мозкові центри» чи «brain trust» –- спеціальні служби з провадження критичного аналізу, відображення інтересів громадянського суспільства, діагностування діяльності органів державної влади та оцінки результативності вироблених ними рішень завдяки представленню членам соціуму платформ різних політичних сил. Завдяки підготовці аналітичної продукції дані осередки надають владним структурам свіжі, актуальні пропозиції та ідеї, а також є дієвим інструментом забезпечення комунікаційного процесу в ході суспільного обговорення найважливіших проблем [7, С.174].

Історично виникнення аналітичних підрозділів спричинила потреба обслуговування військово-промислової сфери наприкінці XIX – у I половині XX ст. Безпосереднє становлення мозкових центрів розпочалося по завершенні II світової війни з метою їх використання у якості безпечного, максимально захищеного місця для роботи військових експертів.

Сьогодні зарубіжні вчені, говорячи про сенс функціонування цих структур, акцентують увагу, головним чином, на їх політичній спрямованості. Проте більшість авторів схильні розглядати означені служби як неурядові організації, що виступають специфічним засобом надання інформаційних відомостей та консультаційних послуг. При цьому, характеризуючи роботу центрів, дослідники та управлінці одночасно бачать їх у ролі закладів і громадських організацій. Власне співробітники «фабрик думок» позиціонують себе як некомерційного характеру дослідницькі інституції, тим самим роблячи акцент на відповідному кваліфікаційному рівні підготовленої аналітичної продукції [3].

Існує низка характеристик, які, на відміну від решти аналогічних служб, притаманні саме аналітичним центрам:

1) виступають суб'єктами політичного процесу, що можуть активно впливати на розробку стратегічної лінії, поточного політичного курсу,

сприяти окресленню подальших сценаріїв вирішення проблемних питань;

2) можуть самостійно обирати та визначати тематику здійснюваних досліджень та, як правило, фінансуються з додаткових джерел;

3) тримають своєрідний баланс між інформаційними відомостями та владними структурами, є ділянкою для відкритого дискутування з максимальною кількістю учасників;

4) у своїй діяльності спираються на наукову методологію, методику експертного аналізу, й зорієнтовані на вирішення, у першу чергу, практичних, суспільно-значущих питань;

5) створюють та пропонують інтелектуальну продукцію (ідеї, ініціативи, робочі пропозиції, оціночні судження, прогнози ситуацій) у вигляді аналітичних доповідей, прогнозних оглядів, проектів тощо;

6) спрямовані в ході функціонування на реалізацію прописаних у статуті організації завдань задля вирішення суспільних проблем, а не на одержання суто фінансових статків;

7) здійснюють дослідження міждисциплінарного спрямування на базі використання широкого спектру засобів наук як природничого, так і гуманітарного циклу [6].

Слід зауважити, що не дивлячись на важливість виконуваних аналітичними центрами теоретичних досліджень, їх робота також передбачає вироблення рішень, і навіть їх часткове впровадження. Важливим напрямом функціонування будь-якого аналітичного осередку (відповідно до своєї галузі) можна вважати виконуваний ним аналіз політики.

У цілому аналітична діяльність містить дослідницький елемент, проте він не є визначальним, оскільки функціонування інформаційно-аналітичних центрів передбачає генерацію максимально ефективного варіанту рішення, прийнятного для усіх зацікавлених сторін, задля отримання нових, якісних змін.

Відповідно до поставленої мети аналітичні осередки виконують багатоетапну роботу, що включає:

1) безпосереднє формулювання досліджуваної проблеми;

2) попереднє оцінювання наявних ресурсів задля її розв'язання;

3) налагодження комунікування з усіма учасниками та причетними особами й організаціями (тобто, стейкхоледерами);

4) процес розробки рішення, виконання його моніторингу та оцінювання [13].

На даний момент типологія інформаційно-аналітичних центрів, не дивлячись на накопичений досвід їх діяльності, знаходиться на стадії розробки. У науковому середовищі існують різні класифікації аналітичних центрів. Узагальнено усі їх можна поділити на державні – базові науково-дослідні установи науково-аналітичного супроводу в структурі державних органів влади, аналітичні служби закладів вищої освіти (університетські) й спеціалізовані підрозділи бібліотек, а також недержавні – аналітичні осередки різних політичних партій, бізнесових структур; та неприбуткового характеру громадські організації.

Слід зазначити, що бізнесові кола більшою мірою взаємодіють з тими центрами, які переважно реалізують не стільки функції аналітичного осередку, скільки консультативні. Тому тут коректніше говорити про інформаційно-консалтингові послуги.

З причини недостатньої розвиненості системи політичних партій на вітчизняному терені, не дуже правомірно розглядати діяльність інформаційно-аналітичних центрів при них на системній основі.

Сьогодні актуалізується роль аналітичних центрів закладів вищої освіти, передусім університетів, з погляду на те, що згадані інституції виступають мультидисциплінарного спрямування своєрідним аналітичним осередком, який наділений відповідними повноваженнями для здійснення теоретичних і прикладних досліджень у різноманітних сферах, має кадровий потенціал, виконавців, масштабну партнерську мережу, належну матеріально-технічну базу тощо [9].

Досить важливою є також робота інформаційно-аналітичних підрозділів бібліотечних установ, оскільки створювана ними інформаційна продукція потребує акцентування уваги саме на аналітичній складовій в ході оброблення інформації, синтезування отриманих відомостей, та безпосереднього надання інформаційних послуг.

Деякі дослідники пропонують типологізувати аналітичні осередки:

– за видами проваджуваної діяльності: центри, що виконують аналіз, різнопланові дослідження; здійснюють навчально-організаційного плану обговорення нагальних проблем (форуми, круглі столи тощо); реалізують функції із захисту інтересів громад; інші (багатопрофільного характеру);

– за галузями роботи: державно-управлінські, політичні, економічні, оборонно-безпекові, екологічні та інші (багатогалузеві);

– за організаційно-правовим статусом: громадські організації; непартійні, неурядові, неприбуткові, некомерційні; осередки, започатковані владними та партійними органами;

– за типом засновників: громадські осередки, засновниками яких є бізнес-структури; освітні установи; департаменти у складі органів влади; комерційні організації; компанії з надання консалтингових послуг; центри виборчих технологій;

– за рівнем незалежності: центри, що обслуговують: органи влади; політичні партії; бізнесові кола; та незалежні (продуктами їхнього функціонування послуговуються владні, партійні, бізнес-структури та ін.) [8].

Вчений О. Мандзюк запропонував деталізовану класифікацію видів суб'єктів аналітичної діяльності у галузі інформаційних відносин [5, С. 165]. Зокрема, відповідно до статусу суб'єктів аналітичної роботи він виокремив: служби інформаційно-аналітичного забезпечення у складі органів влади, інформаційно-аналітичні підрозділи в структурі бібліотечних установ національного рівня, самос-

тійні (відокремлені) професійні осередки аналітичного напрямку діяльності (дослідницькі інституції й аналітичні центри), а також аналітичні центри громадських організацій.

У свою чергу О. Маєвська узагальнила зарубіжні класифікації «мозкових» центрів на основі типологій, найбільш розповсюджених в американській практиці, поклавши за основу доробок дослідника П. Діксона, а саме:

1) Неурядові (за своїм складом сформовані з експертів високого фахового рівня, що мають довгоперспективні договори з урядовими відомчими структурами).

2) Внутрішньоурядові (займаються вивченням довгострокових питань).

3) Незалежного характеру дослідницькі осередки при академічних університетах.

4) Комерційного спрямування консалтингові фірми, робота яких зорієнтована на одержання фінансового прибутку.

5) Неприбуткові інформаційно-аналітичні організації, спрямовані на громадянське суспільство [4].

На сучасному етапі в Україні більшість існуючих аналітичних центрів являють собою недержавні громадські осередки, особливості роботи яких передбачають реалізацію досліджень із суспільно значущої проблематики та пошук дієвих способів її розв'язання з урахуванням інтересів соціуму [9].

Дослідник І. Петренко назвав найбільш характерні ознаки діяльності сучасного, неурядового типу, вітчизняного експертно-аналітичного центру:

– кадровий склад не більше 10 осіб (за потреби кількість експертів може бути подвоєна);

– сконцентрованість максимально на 3–4 галузях дослідження (зазвичай це економічний, внутрішньополітичний, зовнішньополітичний та соціальний напрями);

– орієнтація в ході створення продукції переважно на потреби підготовленої аудиторії, а в процесі загальної діяльності – намагання вплинути на формування громадської думки;

– присутність членів аналітичного осередку як його представників у медіапросторі щомісячно (до десяти разів);

– розповсюдження інформаційних відомостей та підготовленої друкованої продукції за допомогою засобів світового павутиння (використання власного веб-сайту, наявність друкованого часопису, випуск монографій, збірок, брошюр тощо, призначених для спеціалістів та владних структур);

– налагодження активного комунікування з колегами (як правило, у форматі публічних форумів);

– часто-густо представник осередку є одночасно й діючим членом деякого консультативно-дорадчого органу у складі державної структури [6].

Авторка Є. Глущук виділяє такі головні напрямки роботи згаданого типу осередків: реалізація незалежних аналітичних досліджень; провадження регулярних, якісних соціологічних опитувань громадян та фахових експертних опитувань; організація різноманітних публічних форумів (конференцій, семінарів, круглих столів, брифінгів, зустрічей тощо); налагодження тісної співпраці з представниками ЗМІ; активне співробітництво з органами держаної влади [1].

Загальна мета функціонування будь-якого аналітичного центру – запропонувати всебічно проаналізоване рішення, яке на базі наявної ресурсної бази можливо практично впровадити у життя. З урахуванням того аналітичний осередок частково виконує окремі функції державного органу: надає консультативні послуги та на підставі аналізу визначає оптимальний варіант розв'язання проблеми серед усіх існуючих стосовно до його дієвості, і лише потім пропонує конкретні рекомендації.

Існуючі в Україні аналітичні центри загалом можна умовно розподілити на:

1) Авторитетні осередки з тривалою історією функціонування, усталеним фінансуванням (переважно із закордонних джерел), достатньо великим штатом працівників, постійним згадуванням у засобах масової інформації, масштабним спектром досліджуваних питань, суттєвим впливом на аудиторію.

Даний рівень може бути репрезентований Українським центром економічних і політичних досліджень ім. О. Разумкова (недержавний аналітичний центр), що є повністю самостійною структурою, яка здійснює дослідження в економічній, енергетичній, соціальній, внутрішньополітичній і зовнішньополітичній сферах, у галузі державного управління, земельних відносин, а також у напрямах міжнародної та регіональної безпеки, національної безпеки і оборони [11].

Поважне місце в аналітичному середовищі України займає й Національний інститут стратегічних досліджень. Він є головною науково-дослідною установою, що забезпечує науково-аналітичний супровід діяльності Президента України та Ради національної безпеки і оборони, виступає органом консультаційно-дорадчого характеру при Президентові України та провадить роботу теоретичного й практичного спрямування у напрямах суспільно-політичного та соціально-економічного розвитку держави.

2) Аналітичні служби, які є своєрідним симбіозом як аналітичних центрів, так і громадських організацій.

До такого роду суб'єктів можливо зарахувати Міжнародний центр перспективних досліджень, що, з одного боку є поважним аналітичним осередком (розпочав діяльність 1994 р. задля сприяння євроінтеграційним процесам України), а, з іншого, виступає громадською організацією, започаткованою Інститутом відкритого суспільства.

Серед подібних структур також необхідно назвати організацію антикорупційного спрямування «Громадянське суспільство в Україні» («Transparency International Ukraine»), що постала 1993 р. в Берліні з метою провадження досліджень у сфері боротьби з корупцією шляхом просування ідей прозорості публічної влади, бізнесових структур і громадянського суспільства.

Заслуговує на увагу й Центр UA або Центр спільних дій (громадська організація, створена 2009 р. як платформа для розвитку проєктів). Осередок позиціонує себе як незалежне утворення, що представляє інтереси суспільства, здійснює аналіз і моніторинг політики на державному та регіональному рівнях, застосовує засоби активного залучення громадян до співучасті в демократичних процесах.

3) Центри, що спеціалізуються на вивченні певної проблематики.

Так, розробкою питань міжнародної політики займаються Національний інститут стратегічних досліджень та Міжнародний центр перспективних досліджень; у сфері економіки – Інститут економічних досліджень і політичних консультацій; з тематики національної безпеки і військово-технічних аспектів працюють «Український центр економічних і політичних досліджень ім. О. Разумкова» й Центр досліджень армії, конверсії та роззброєння. На вивченні громадської думки спеціалізується Фонд «Демократичні ініціативи» ім. Ілька Кучеріва.

Прикладом інформаційно-аналітичного центру, що здійснює комплексні дослідження у напрямі державної політики з питань науково-технічного розвитку України, є Український інститут науково-технічної експертизи та інформації (УкрІНТЕІ). Вказаний прогнозно-аналітичний осередок провадить розробку нагальних наукових тем, за результатами чого готує прогнозно-аналітичного характеру інформаційну продукцію, займається конкретно орієнтованими соціологічними дослідженнями, забезпечує згаданими матеріалами процес реалізації державної політики у сфері вітчизняного науково-технічного розвитку.

Необхідно зазначити, що на початку 90-х рр. XX ст. аналітичні осередки стали створюватися у якості структурних підрозділів бібліотечних установ. Зокрема, у складі Національної бібліотецки України імені В.І. Вернадського 1992 р. постав самостійний підрозділ під назвою «Служба інформаційно-аналітичного забезпечення органів державної влади» (СІАЗ), який мав сприяти налагодженню та оптимізації форм співробітництва з органами державної влади шляхом підготовки інформаційно-аналітичних документів [2]. Надалі аналітичні служби стали започатковуватися на базі інших бібліотек країни.

В Україні діє також більш як 20 аналітичних центрів при закладах вищої освіти (наприклад, у складі Київського національного університету імені Тараса Шевченка, Харківської національної юридичної академії, Прикарпатського національного університету імені Василя Стефаника, Національного університету «Києво-Могилянська академія» та ін.).

Про результати розвитку аналітичних центрів в Україні свідчить наступна статистика: станом на 2020 р. у нашій державі функціонувало близько 90 аналітичних осередків [14].

Отже, в сучасній Україні спостерігаються позитивні тенденції щодо актуалізації ролі інтелектуальних «фабрик думок» та виконуваної ними діяльності.

Висновки. На підставі вивчення проблеми можна зробити висновок, що вітчизняні аналітичні центри посідають важливе місце в житті суспільства, оскільки вони виступають посередниками між органами державної влади та соціумом. Це своєрідний засіб громадського контролю, який завдяки створюваній аналітичній продукції на підставі урахування пріоритетів і цінностей суспільства, допомагає владним органам приймати оптимальні управлінські рішення. Специфікою діяльності аналітичних осередків є поєднання вивчення економічних, політичних та суспільних питань. Як бачимо, вітчизняні інформаційно-аналітичні центри відрізняються завданнями діяльності, типом засновників, правовим статусом, каналами фінансування тощо. Роботу центрів на сьогодні можна вважати багатоаспектним феноменом, оскільки вона передбачає урахування низки показників у процесі розробки типології осередків. Серед запропонованих дослідниками класифікацій центрів визначальними критеріями можуть бути їх профільованість та проблематика досліджень.

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TECHNICAL SCIENCES

ALGORITHM OF GEOMETRIC NORMALIZATION OF FACE IMAGE

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Abstract
Face image identification and verification has been a popular research topic in computer vision for several years. Geometrical normalization of the face image is important in this, and it has a direct impact on the recognition accuracy. This article is devoted to face image geometric normalization algorithms, it describes a face image normalization algorithm with high recognition speed and real-time performance.

Keywords: face image, normalization, algorithm, scale, brightness, recognition, warp matrix, threshold, segment.

Introduction

The practical application of facial recognition is becoming more and more interesting for many reasons. Facial recognition systems are widely used in video conferencing, robotics, intelligent security, and access control. In this case, the face image will have a geometric normal of large size, which will protect the recognition accuracy. The normal image addition problem exists in many image-related additions. Add-on acceleration uses on-the-fly image preprocessing [1-13]. Usually, this starts with adding normal image manipulation methods and it is removed based on the modified sequence given by [14]. Before normalization of the face image, it is necessary to clarify the location of the front face. Methods and algorithms for identifying face problems are detailed in [15-19].

One of the quality features in the arrangement of geometric images of the face is the central point of the eyes. today there are great algorithms for determining the location of the eye in the image. Below is the image of the normal operation algorithm of product production as the recognition speed and real-time operation efficiency are high. This algorithm is determined by the detection of the surface of the depicted face. The eyes and mouth center are found on the detected face. Then it moves to the operation of eliminating geometric boundaries on the face, that is, geometric normal operation. In this, the face image is normalized by applying eye location production warping and affine exchange. The following steps are required in the algorithm:

- determination of left and right eye center;
- determining the center of the mouth;
- orientational normalization;
- scale normalization;
- determination of the pupil.

Pupil location is determined based on image comparison and luminance histogram. In order to ensure high calculation speed, the image is converted to grayscale, and the comparison starts from the upper left corner (Fig. 1).

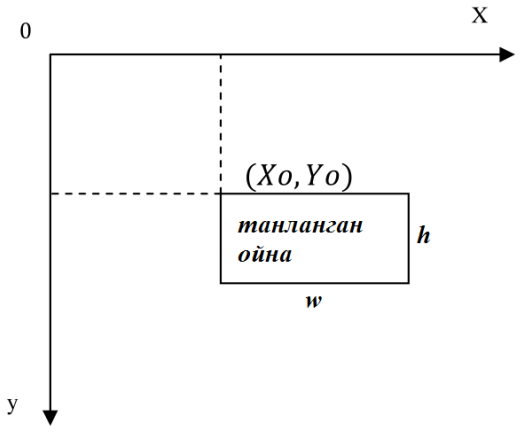

Figure 1. Scheme for finding the coordinates of the pupil

Determining the pupil area can be done by estimating the proximity of the candidate area to the sought area. A rectangular window size is required to be large enough to fully cover the eye area. Usually, the height and width of the window are specified by h and w, respectively. For example, let the selected coordinates for the upper left window be (35, 15, 50, 30), then its height will be h=20 and width w=20. In a selected mirror, pupils and eyebrows can be considered lower in brightness than other areas of the face.

The selected window is scrolled from left to right and from top to bottom. In this case, the initial state is taken as 0 and moved to 15 in 3 steps. All pixels in the window are sorted based on their gray value. The first value is taken as the threshold value and all irreversible threshold values are determined. The most recent value is taken as the maximum limit. The candidate region for the pupil is taken as 15% of the smallest gray value region.

$$T = g(x, y)(0.15 * N) \quad (1)$$

$$f(x) = \begin{cases} 0 \; x \le T \\ 255 \; x \ge T \end{cases} \quad (2)$$

where (x, y) is the pixel coordinate at the $i-$ index of the array sorted by the gray value of the pixels in the selected window, N is the number of all pixels in the window, T is the segment threshold value.

Pupils and eyebrows can be segmented in a face image. A grayscale image can be converted to a binary image by formula (2). For a binary image, horizontal and vertical histograms are constructed using the following formulas.

$$P_v(y) = \sum_{x=1}^{N} I(x, y) \quad (3)$$

$$P_v(x) = \sum_{x=1}^{N} I(x, y) \quad (4)$$

Usually, a horizontal histogram has two minimum limits. The one below corresponds to the eye, and the one above corresponds to the eyebrow. The horizontal histogram is sorted in descending order, where if the distance between the two indices of the horizontal histogram is in the range [54, 60], then the horizontal left index is assigned a value of 2, otherwise 1.

If there are at least 4 white pixels to the left or right of a pixel, then this pixel is considered to be the candidate pixel x coordinate for the left eye, otherwise, the above steps are repeated. In this way, the y coordinate of the candidate pixel for the left eye is also determined, and the median of these points gives the final point for the left eye. Detection of the right eye pupil is performed in the same way as detection of the left eye.

Determining the center of the mouth. The position of the mouth cavity is found by the centers of the left and right eyes, and their coordinates are determined as follows:

– left eye horizontal position + (right eye horizontal position)/2 + 25;

– left eye horizontal position + (right eye horizontal position)/2 + 60;

– left eye vertical position + (right eye vertical position)/2 - 15;

– left eye vertical position + (right eye vertical position)/2 + 10.

The threshold percentage is taken as 40, and the horizontal and vertical position of the mouth center is determined based on the operations used for the center of the right pupil.

Face normalization. Geometrical normalization of the facial image can be performed after the above steps have been performed. If the vertical distance between the vertical coordinates of the left and right eye is from 20 to 30, then the face image is normalized.

A line passing through the centers of the pupils of the left and right eyes is taken and their center deviation is calculated. The angle between the horizontal line and the line through the eyes is determined. If the value of the angle is less than 6, the normalization is carried out by turning the angle (Fig. 2). Otherwise, the given image is considered normalized. In this case, the turning angle is determined by the following formula:

$$\alpha = -\arctan\left(\frac{b_y}{b_x}\right), \quad (5)$$

where b is the vector connecting the pupil centers.

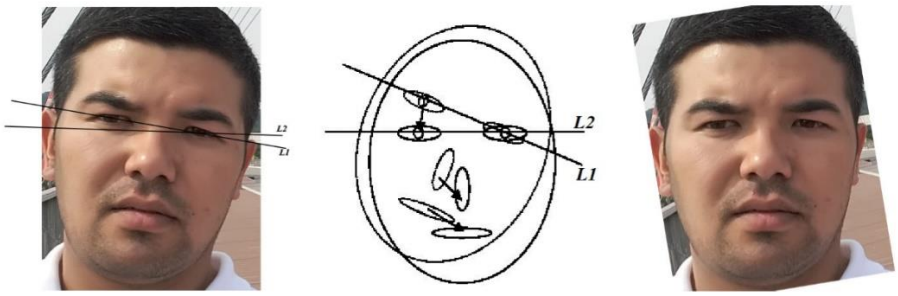

Figure 2. *Geometric normalization of face image*
The torsion matrix is expressed as:

$$T = \begin{pmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{pmatrix}, \quad (6)$$

where α is the turning angle.

The new coordinate of the point with coordinate (x, y) is calculated as follows after the rotation operation:

$$\begin{pmatrix} x' \\ y' \end{pmatrix} = T * \begin{pmatrix} x \\ y \end{pmatrix}. \quad (7)$$

Changing the warping algorithm by shifting as follows minimizes distortions in the image. In this case, the torsion matrix is expressed as a product of three displacement matrices:

$$\begin{pmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{pmatrix} = \begin{pmatrix} 1 & a \\ 0 & 1 \end{pmatrix} \begin{pmatrix} 1 & 0 \\ b & 1 \end{pmatrix} \begin{pmatrix} 1 & c \\ 0 & 1 \end{pmatrix}, \quad (8)$$

where $a = \frac{tg\alpha}{2};\ b = -\sin\alpha;\ c = \frac{tg\alpha}{2}$

Scale normalization. Before face images can be compared, bringing them to a certain standard appearance is necessary. In this case, the left and right eyes must be on the same horizontal line and the distance between the pupils must have a constant predetermined value.

Recognition methods and algorithms require normalized images based on certain requirements. Therefore, in scaling normalization, the number of pixels between the pupils is brought to a certain value according to the previously developed requirements.

The scaling factor is determined by the following formula:

$$k = \frac{eye_{dist}}{|b|}, \quad (9)$$

where eye_{dist} is the fixed distance between the pupil centers.

A scaling algorithm can be built based on the nearest neighbor principle. The brightness of the field in the new image (x', y') is determined based on the following formula:

$$f(x', y') = g\left(\left[\frac{x'}{k}\right], \left[\frac{y'}{k}\right]\right). \quad (10)$$

Here $[x]$ is the closest integer to x, $g(x, y)$ is the brightness function of the given image, k is the scaling factor, $k > 0$

Based on the algorithms presented above, a software package was developed and tested based on several facial images [19]. The proposed algorithms have shown the expected performance in experimental studies. Therefore, they can be used in facial recognition systems.

Conclusion

Face image normalization algorithms are widely used in various applications. This is due to their improvement in image quality and accuracy of facial image analysis. In this paper, a face image normalization algorithm with high recognition speed and real-time performance is proposed, and it is recommended to apply it after the detection of the face area in the image. Before face images can be compared, making them look like a certain standard is necessary. In this case, it is also necessary that the left and right eyes are on the same horizontal line, and the distance between the pupils must have a fixed pre-fixed value.

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DEVELOPMENT OF E-COMMERCE THROUGH DATA MİNİNG İN AZERBAİJAN

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https://doi.org/10.5281/zenodo.10975448

Abstract

The digital age has steered into a new period of commerce, transubstantiating traditional business models and functional strategies across the globe. Azerbaijan, a burgeoning hub for technological advancement, has not remained untouched by this digital revolution. In the realm of electronic commerce (e-commerce), the country substantiates a massive affluence of structured and unstructured data, inclusively known as big data. This data, gathered from client relations, seller conditioning, market trends, and the broader business ecosystem, presents unknown openings for e-commerce realities. This paper is devoted to the application of data mining (DM) methods in the Azerbaijani e-commerce sector, focusing on three vital algorithms:, clustering, classification and association rules . By employing these algorithms, e-commerce companies can unlock perceptivity for wares planning, sales forecasting, basket analysis, customer relationship management, and market segmentation. The primary idea of this study is to explore the application of data mining in enhancing e-commerce through the methodical analysis of both structured and unstructured data acquired from different sources, including cloud computing services. The significance of data mining in streamlining operations and fostering competitive advantage is emphasized, highlighting its role in data-driven decision-making. Additionally, the paper addresses the challenges encountered in the data mining process, such as spider identification, data transformation, and the presentation of data models in a business-friendly manner. The issues of managing slowly changing dimensions and making the data transformation and model-building processes more accessible to business users are also scrutinized. Through this exploration, the paper aims to offer a comprehensive guide for e-commerce companies in Azerbaijan, equipped with vast data reserves, to effectively leverage data mining techniques for business optimization and competitive edge. This study not only underscores the transformative potential of data mining in the e-commerce landscape of Azerbaijan but also presents a pathway for businesses to navigate the complexities of big data, ensuring sustained growth and innovation in the digital marketplace.

Keywords: Data Mining, Big Data, E-Commerce, Cloud Computing, Azerbaijan

Introduction

E-commerce, an economic sector revolutionized by the digital era, has undergone transformative growth globally, significantly impacted by advancements in data analysis techniques such as data mining. This evolution is vividly observed in Azerbaijan, where the burgeoning e-commerce landscape is increasingly leveraging data mining to enhance business strategies and consumer engagement. This exploration delves into how data mining propels the e-commerce sector in Azerbaijan, highlighting the synergy between data analytics and digital commerce to foster growth and innovation in this emerging market.

The Emergence of Data-Driven E-Commerce in Azerbaijan

The onset of the digital age heralded new frontiers for businesses worldwide, with e-commerce at the forefront of this digital revolution. Azerbaijan, recognizing the potential of digital commerce, has increasingly adopted data mining techniques to refine and enhance its e-commerce operations. Data mining, the process of discovering patterns and knowledge from large amounts of data, has become a cornerstone in understanding consumer behavior, optimizing inventory, and personalizing marketing strategies in Azerbaijan's e-commerce sector.

What is E-Commerce?

E-commerce represents a departure from traditional commercial establishments, utilizing every aspect of information technology to solve numerous commerce-related problems in an easy, convenient, fast, detailed, and economical manner. It is the operation of conducting trade transactions digitally among businesses, organizations, and individuals. If you wish to order a product from the comfort of your home, having access to all necessary information, e-commerce comes to your aid. It creates conditions for technology and internet users that include:

- Being present everywhere at the same time
- Eliminating borders to reach people and operations worldwide
- Establishing international standards
- Creating information richness
- Enhancing technological means
- Allowing for customization and updates in e-commerce technology

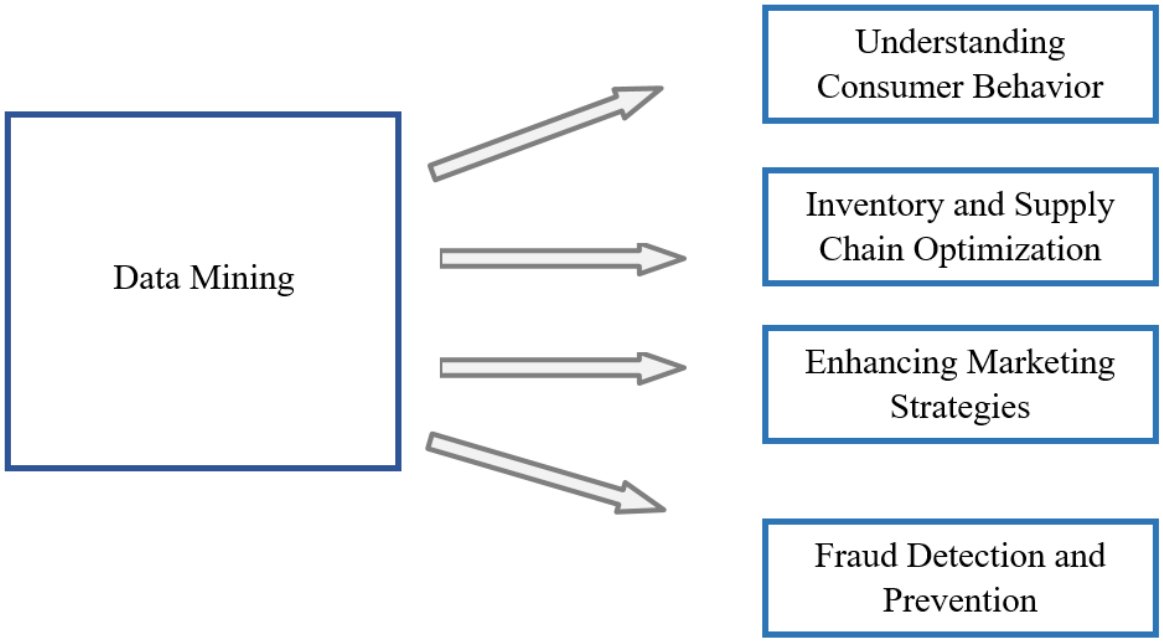
Types of E-Commerce

E-commerce can be classified into various types:

- **B2C (Business-to-Consumer):** In this e-commerce system, the company acts as the seller, and the individual acts as the buyer. The realization of goods and services is carried out by the consumers themselves through an electronic showcase, using essential interface elements

- **B2B (Business-to-Business):** This model involves transactions between two businesses, such as a manufacturer and a wholesaler, or a wholesaler and a retailer. B2B e-commerce platforms often cater to specialized industries and might include bulk purchasing, supply chain management, and business procurement functionalities.
- **C2C (Consumer-to-Consumer):** C2C e-commerce enables transactions between consumers, usually through a third-party platform that facilitates the exchange. This model includes online marketplaces and auction sites where individuals can buy and sell goods and services among themselves.
- **C2B (Consumer-to-Business):** In this business model, customers provide goods and services to companies. This can apply to consumer-generated goods, crowdsourcing projects, and freelancing services. Businesses can frequently ask the public for donations or services through platforms that support business-to-business transactions.
- **B2G (Business-to-Government):** B2G e-commerce involves transactions conducted between companies and public sector entities. It includes procurement, licensing, and other government-related operations that are facilitated through online portals.
- **G2B (Government-to-Business):** This refers to the transactions made from government bodies to businesses, typically involving regulatory requirements, reporting, and procurement services provided by businesses to the government.
- **G2C (Government-to-Consumer):** In a G2C setup, government entities provide services or disseminate information to their citizens through electronic means. This can include tax filing services, public health notices, and e-voting systems.

The Role of Data Mining in E-Commerce Development



I. Understanding Consumer Behavior

In Azerbaijan, e-commerce entities utilize data mining to analyze customer behavior, preferences, and trends. This deep dive into consumer data allows for the crafting of personalized shopping experiences, targeted marketing campaigns, and improved customer service, thereby increasing customer satisfaction and loyalty.

II. Inventory and Supply Chain Optimization

Data mining aids in predicting demand, managing stock levels and optimizing supply chain operations. By analyzing sales data, seasonal trends, and customer preferences, Azerbaijani e-commerce businesses can maintain optimal inventory levels, reducing overhead costs and minimizing the risk of stockouts or overstock.

III. Enhancing Marketing Strategies

Through the analysis of customer data, e-commerce companies in Azerbaijan can identify the most effective marketing channels, tailor promotional activities, and optimize their advertising spending. Data mining enables the segmentation of customers into distinct groups, allowing for more targeted and personalized marketing efforts.

IV. Fraud Detection and Prevention

Data mining techniques are employed to enhance security in e-commerce transactions. By analyzing transaction patterns and behaviors, anomalous and potentially fraudulent activities can be identified, helping protect both the business and its customers from fraud.

Impact of Data Mining on E-Commerce Development in Azerbaijan

Year	Total E-Commerce Volume (AZN)	%Growth in E-Commerce Volume	Number of E-Commerce Transactions	% Increase in Transactions	Data Mining Adoption Rate (%)	Impact on Customer Satisfaction	Impact on Revenue Growth (%)
2020	X	-	Y	-	Z	A	B
2021	X1	(X1-X)/X * 100	Y1	(Y1-Y)/Y * 100	Z1	A1	B1
2022	X2	(X2-X1)/X1 * 100	Y2	(Y2-Y1)/Y1 * 100	Z2	A2	B2
2023	X3	(X3-X2)/X2 * 100	Y3	(Y3-Y2)/Y2 * 100	Z3	A3	B3

- **Total E-Commerce Volume (AZN):** Total revenue generated from e-commerce transactions within a given year.
- **% Growth in E-Commerce Volume:** Year-over-year percentage growth in total e-commerce volume.
- **Number of E-Commerce Transactions:** The total number of e-commerce transactions that took place within the year.
- **% Increase in Transactions:** Year-over-year percentage increase in the total number of e-commerce transactions.
- **Data Mining Adoption Rate (%):** Percentage of e-commerce businesses adopting data mining technologies.
- **Impact on Customer Satisfaction (%):** Estimated impact of data mining on customer satisfaction levels, potentially based on customer surveys or Net Promoter Scores (NPS).
- **Impact on Revenue Growth (%):** Estimated impact of data mining on e-commerce revenue growth.

Challenges of Data Mining in E-Commerce

The integration of data mining into e-commerce has significantly enhanced the capabilities of businesses in understanding consumer patterns, improving product recommendations, and optimizing inventory management. However, this integration is not without challenges. The effective utilization of data mining in e-commerce faces several hurdles, both technical and ethical, which can impact the success of its application.

- Data Quality and Preparation:

One of the primary challenges lies in the quality and preparation of data. E-commerce platforms generate vast amounts of data, which are often unstructured and cluttered with irrelevant information. The process of cleaning, transforming, and standardizing this data to make it suitable for analysis can be time-consuming and complex. Ensuring the accuracy and completeness of data is crucial for reliable data mining outcomes.

- Privacy and Security Concerns:

With the increasing scrutiny over data privacy, e-commerce businesses face the challenge of balancing between leveraging customer data for insights and respecting user privacy. Data mining involves analyzing detailed customer behavior, which can raise concerns about personal privacy. Additionally, the storage and processing of this data pose security risks, necessitating robust data protection measures to prevent breaches.

- Complexity of Algorithms

Data mining utilizes sophisticated algorithms to uncover patterns and predictions from data. The complexity of these algorithms can pose a challenge, especially in terms of understanding, implementing, and fine-tuning them to suit specific e-commerce needs. Businesses often require skilled data scientists to navigate these complexities, which can be a significant investment.

- Changing Consumer Behavior:

Consumer preferences and behavior are constantly evolving, influenced by trends, seasons, and socio-economic factors. This dynamism makes it challenging for data mining models to stay relevant and accurate over time. E-commerce businesses must continuously update and refine their models to keep up with these changes, requiring ongoing analysis and adaptation.

- Integration with Existing Systems:

Integrating data mining solutions with existing e-commerce platforms and IT infrastructure can be challenging. Compatibility issues, data silos, and the need for seamless real-time analysis can pose significant hurdles in leveraging data mining effectively. This integration often requires significant technological upgrades and process re-engineering.

- Scalability and Performance:

As e-commerce businesses grow, the volume of data to be processed and analyzed also increases exponentially. Ensuring the scalability of data mining processes to handle this growth without compromising performance is a critical challenge. This requires scalable infrastructure and efficient data processing capabilities to manage and analyze large datasets effectively.

- Ethical and Legal Impacts:

The use of data mining in e-commerce also raises ethical and legal questions. Issues such as data discrimination, unfair profiling, and the potential for manipulation can arise from the insights gained through data mining. Navigating these ethical considerations while complying with evolving data protection regulations adds another layer of complexity to its application in e-commerce.

Conclusion

The development of e-commerce through data mining in Azerbaijan presents a compelling case of how digital transformation and advanced analytical techniques can propel the growth of the digital economy in emerging markets. As Azerbaijani businesses continue to embrace data-driven strategies, the landscape of e-commerce in the country is witnessing profound changes, offering insights into the potential for innovation and growth in similar contexts.

Data mining has emerged as a pivotal force in this transformation, enabling businesses to harness vast amounts of data to enhance customer experiences, optimize operations, and drive innovation. By analyzing patterns and trends in data, companies can make informed decisions that cater to the specific needs and preferences of their customer base. This, in turn, has led to the creation of more personalized, efficient, and engaging shopping experiences, which are essential for customer retention and acquisition in the competitive e-commerce sector.

Moreover, the integration of data mining techniques has facilitated the identification of new market opportunities, improved supply chain management, and the development of targeted marketing strategies. These advancements have not only contributed to the operational efficiency and profitability of e-commerce businesses but have also fostered a more dynamic and competitive market environment in Azerbaijan.

However, the journey towards fully leveraging the benefits of data mining in e-commerce also involves navigating challenges such as data privacy concerns, the need for skilled professionals, and the establishment of a robust technological infrastructure. Addressing these issues requires concerted efforts from businesses, policymakers, and educational institutions to create a conducive ecosystem for the growth of data-driven e-commerce.

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STUDY OF THE INFLUENCE OF OPERATIONAL FACTORS ON LOAD PARAMETERS POWER ELECTRICAL EQUIPMENT OF TROLLEY BUSES AND SAFETY OF PASSENGER TRANSPORTATION

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https://doi.org/10.5281/zenodo.10975460

Abstract
The question of ensuring the appropriate level of electrical safety by controlling the technical condition of the insulation of traction motors is considered. Mathematical models of changing the parameters of electric machines and their resource on different routes of the corresponding trolleybus have been developed, which is confirmed experimentally, ie according to the operating data. The issues of the influence of the length of the haul on the temperature conditions of the power electrical equipment of trolleybuses, in particular traction electric motors, are considered.

Keywords: trolleybus, electric motor, insulation, electrical safety, reliability, parameters, technical condition. temperature conditions, loading factors, insulation.

Formulation of the problem. Trolleybus transport, along with significant advantages, has several disadvantages. First of all, this refers to the need to address the issue of electrical safety, because in violation of the insulation of high-voltage electrical equipment may cause electric shock to passengers. Therefore, during the operation of trolleybuses, the technical condition of isolation of high-voltage circuits is constantly monitored. With high-voltage electrical equipment, traction motors are the least protected against the effects of weather conditions because they are located under the floor.

In case of high humidity or dew due to changes in the motor temperatures, it is possible to reduce the electrical insulation resistance and the potential to appear on the trolley body relative to the road surface. Since the traction motor is also engaged in the braking modes, a malfunction in its operation is directly related to the safety of movement.

Therefore, the issue of monitoring the technical condition of traction motors in terms of ensuring the appropriate level of electrical safety and braking modes is urgent [1].

Analysis of publications. Research findings [2–5] and experience in operating trolleybuses indicate that there is currently no effective automatic control of the isolation status, in particular during operation, which will significantly improve the electrical safety status of trolleybuses on routes. A considerable number of publications are devoted to the identification of faults in electric machines and their control [6–11].

An analysis of the operating conditions of electric motors in recent years shows that the reliability of the electric drives has not only reached the desired level, but on the contrary, decreased.

Thus, monitoring the technical condition of the insulation in order to improve the reliability of traction electric motors during operation for trolleybuses is an urgent task.

The purpose of the work is to increase the reliability of traction electric motors and to organize the control of the technical condition of the insulation to increase the safe transportation of passengers.

Main part. The rolling stock of urban electric transport typically uses DC electric motors. Depending on the excitation systems, they are classified into machines with parallel, sequential and mixed excitation.

In the process of traction electric motor degradation of the parameters of a number of its elements occurs, which leads to the following significant negative consequences:

– disability of the traction electric motor;

– the presence on the body of the engine (body trolleybus) is dangerous for passengers and staff voltage;

– increased against the natural rate of wear of the individual elements of the traction electric motor;

– high vibrations with a negative impact on the comfort of the trip and the trouble-free operation of other elements of the trolley that are damaged by the vibration of the engine.

The process of changing the parameters of an electric motor can be mathematically described by a power function: $y = ax^{\alpha} + в.$

Considering the change of the parameters P of the technical condition of the electric motor we have:

$$П = V_c l^{\alpha} + \Delta П, \quad (1)$$

where V_c – the rate of change of the parameter;

$l -$ mileage of the moving unit, km;

$\Delta П -$ admission to development;

$\alpha -$ the exponent of the approximation function.

In general, the transport company operates several types of trolleybuses $j_{m\acute{o}}=1,2,\ldots, J_{m\acute{o}}$ on different routes $i_{m\acute{o}}=1,2,\ldots, I_{m\acute{o}}$, which, for known reasons, have different indicators of the cost of resources and the volume of transport services provided. There fore, given (1) relative to the trolleybus (*mб*) by types and units change the parameter of electric machines $\Delta П$ and identifying their resource $\mathrm{r}_{j_{m\acute{o}}}$ can be represented as a mathematical model (2):

$$\mathrm{r}_{j_{m\acute{o}}} = \begin{cases} \dfrac{\Delta П_{1_{ем}}^{(j=1m\acute{o})}}{\sum l_i} = \dfrac{V_c l^{\alpha_1(j=1m\acute{o})}}{\sum l_i}; \\ \dfrac{\Delta П_{2_{ем}}^{(j=2m\acute{o})}}{\sum l_i} = \dfrac{V_c l^{\alpha_2(j=2m\acute{o})}}{\sum l_i} \\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots; \\ \dfrac{\Delta П_{n_{ем}}^{(j=Jm\acute{o})}}{\sum l_i} = \dfrac{V_c l^{\alpha_n(j=Jm\acute{o})}}{\sum l_i} \end{cases} \quad (2)$$

Change the parameter $\Delta П$ electric machines and their resource on different routes $\mathrm{r}_{i_{m\acute{o}}}$ the corresponding trolleybus can be represented as a mathematical model (3):

$$\mathrm{r}_{i_{m\acute{o}}} = \begin{cases} \dfrac{\Delta П_{1_{ем}}^{(j=1m\acute{o})}}{\sum l_{i_м}^{(i=1m\acute{o})}} = \dfrac{V_c l^{\alpha_1(j=1m\acute{o})}}{\sum l_{i_м}^{(i=1m\acute{o})}}; \\ \dfrac{\Delta П_{2_{ем}}^{(j=2m\acute{o})}}{\sum l_{i_м}^{(i=2m\acute{o})}} = \dfrac{V_c l^{\alpha_2(j=2m\acute{o})}}{\sum l_{i_м}^{(i=2m\acute{o})}} \\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots; \\ \dfrac{\Delta П_{n_{ем}}^{(j=Jm\acute{o})}}{\sum l_{i_м}^{(i=Im\acute{o})}} = \dfrac{V_c l^{\alpha_n(j=Jm\acute{o})}}{\sum l_{i_м}^{(i=Im\acute{o})}} \end{cases} \quad (3)$$

$\Delta П_{ем}$ – depends on a number of factors, such as the distance of the moving unit, the insulation heating temperature, the operating conditions, the operating time, or aging [4,5].

Loading modes of power electrical equipment of electric vehicles are determined by the operating conditions of the traction unit (TU). A comprehensive, systematic study of the main operational factors is an important task, the solution of which will increase the level of adequacy of the developed methodology to real conditions.

To analyze the operating conditions of rolling stock (RS), studies were carried out on the route systems of large cities in Ukraine. At the same time, methods of probability theory and mathematical statistics were widely used [1,2], which made it possible to determine with a sufficient degree of accuracy the laws of distribution of various motion parameters for trolleybuses of various modifications and the level of technical condition.

Experimental studies made it possible to identify the influence of many factors on the operating modes of the power drive. Among them, the main ones can be identified [3]:

– length of hauls;
– travel speed or travel time along the stretch;
– vehicle speed restrictions;
– contact line voltage;
– qualifications and experience of the driver;
– technical condition of the substation.

The influence of each factor individually and all of them together determines the complex processes of loading the power electrical equipment (PEE) of trolleybuses. Identification of the main statistical characteristics, laws of distribution of the operating factors under study, their correlation with the value of specific

power consumption allows us to consider in more detail the process of formation of loading modes of the power drive,

The length of the haul also affects the temperature conditions of power electrical equipment. Increasing the length of the haul increases the duration of the traction mode, and therefore the duration of operation of the traction electric motor (TEM) under current. The permissible duration of operation of power electrical equipment (PEE) at a given load is determined by heating its parts above safe temperature values regulated by relevant standards.

Figure 1 shows the motion curve of a traction unit on a stretch of length L with a single switching on of the power circuit, with the curve of the current consumed by the traction motor plotted on it.

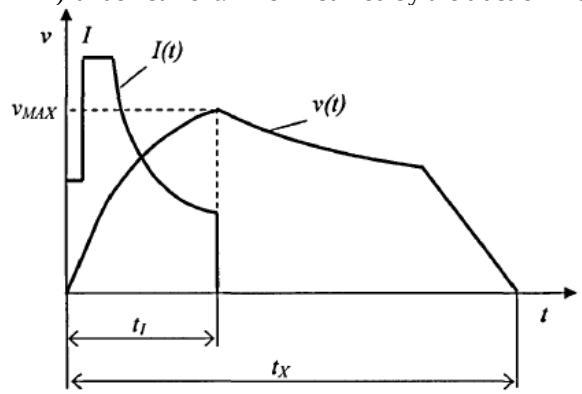

Figure 1 – Curves V(t) and I(t) for a single switching on of the electric motor at stage L

The operating conditions of urban electric transport are characterized by repeated and short-term loading modes of the traction motor. Then, under the assumption that the thermal energy released by the TEM is determined by the expression:

$$\Delta P = I^2 r, \quad (4)$$

where *r* is the resistance of the TEM windings, the heat balance equation, when averaging the values included in it [4,5]:

$$\frac{1}{t_x}\int_0^{t_x} \Delta P dt = \frac{1}{t_x}\int_0^{t_x} I^2 r dt = \frac{r}{t_x}\int_0^{t_x} I^2 dt = I_э^2 r \quad (5)$$

where Ie is the mean square current during the stroke time t_x.

Obviously, the value of the root mean square current depends on the duration of the mode or modes of movement under current. Which, in the absence of additional obstacles, is clearly determined by the length of the stretch (Fig. 2).

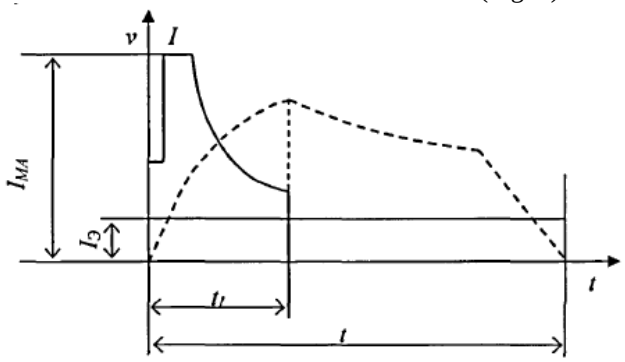

Figure 2 – Curves V(t) and I(t) for I_e movement under current on section L.

An area of increased attention is the insulation of the TEM windings. The service life of the insulation, and therefore the TEM, is inversely proportional to the temperature to the third power.

The magnitude of the temperature rise of the TEM over the ambient temperature is estimated using the heating equation for a homogeneous body [4,5]:

$$\tau = \tau_\infty \left(1 - e^{-1/T}\right) + \tau_0 e^{-1/T}, \quad (6)$$

where τ_∞ is the steady increase in the heating temperature of the windings at a given load above the ambient temperature (at);

τ_0 – initial temperature rise of the windings above the ambient temperature;

T – thermal time constant for traction motor windings;

t – heating time of the traction motor windings.

Expression (6) contains the sum of two exponentials: heating (Fig. 3, curve 1) and cooling with the initial coordinate (Fig. 3, curve 2).

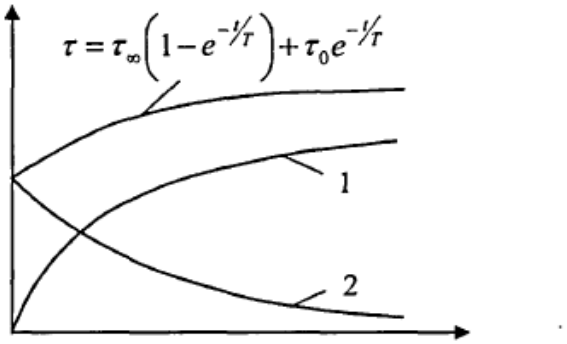

Figure 3 – Heating and cooling curves of trolleybus TEM

Expression (6) contains the heating time t of the TEM windings, which is determined by the duration of movement of the substation in traction mode or under current, which is realized during the acceleration mode or when the power circuit is additionally turned on during the haul.

In the course of experimental studies, it was established that in real operating modes, the implemented load modes of the power electrical equipment (PEE) not only do not lead to overheating of the windings, but also in some cases do not contribute to the drying out of the electric motor, which significantly increases the probability of insulation breakdown, and therefore shortens the operating time power drive of the traction unit.

Expression (6) contains the heating time t of the TEM windings, which is determined by the duration of movement of the substation in traction mode or under current, which is realized during the acceleration mode or when the power circuit is additionally turned on during the haul.

Conclusions. In the course of experimental studies, it was found that in real operating modes, the implemented loading modes of the PEE not only do not lead to overheating of the windings, but also in some cases do not contribute to the drying of the electric motor, which significantly increases the likelihood of insulation breakdown, and therefore reduces the operating time of the power drive of the traction unit.

Today, in such difficult economic conditions, scientific research in Ukraine should be directed to the development and implementation of technologies of the most efficient use of well-known equipment, its modernization, increase of reliability and prolongation of the resource of work.

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"COMPETITIVE ASSESSMENT" OF CLOUD SERVICE PROVIDER

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https://doi.org/10.5281/zenodo.10975466

Abstract

This abstract preview an original and exploration that sets out to differentiate and evaluate the offerings of three dominant cloud service providers: Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP). This study ventures beyond traditional assessments by not only scrutinizing performance, security, and cost-effectiveness but also delving into the increasingly important dimensions of environmental sustainability and developer-friendliness. Performance metrics encompass not just raw computing power but also focus on service reliability, scalability, and the potential for multi-cloud interoperability. By scrutinizing containerization solutions, serverless computing frameworks, and data storage options, the study aims to unravel the nuanced strengths and potential pitfalls of each platform. Security, an evergreen concern in the cloud landscape, is investigated from both technological and organizational standpoints. The research looks at end-to-end encryption, compliance standards, and the inherent security culture of each cloud provider to provide a holistic view of safety measures. Cost-effectiveness evaluation is not limited to pricing structures alone. The study unpacks the value-added features, budget management tools, and growth potential offered by each provider. It also aims to project the long-term cost implications, helping businesses make fiscally sound choices. Unique to this comparative analysis is an investigation into the environmental impact of cloud technologies. The synthesis of this multifaceted evaluation equips decision-makers with an uncommonly thorough understanding of cloud technologies. Businesses and IT professionals can leverage these findings to make nuanced and tailored selections that align with their strategic goals, ethical considerations, and technological visions in a cloud landscape marked by its dynamism and diversity.

Keywords: Cloud service providers, Cloudscape Navigator, Cloud technologies

Introduction

Cloud technologies have revolutionized the way businesses operate, offering a virtual playground where the possibilities seem endless. This comparative analysis embarks on a unique journey, where we aim to peel back the layers of cloud technology and discover the distinguishing features that set apart the giants of the cloud world. Our exploration extends the increasingly vital realms of sustainability and user-friendliness. As we journey through this analysis, our goal is to present you with a fresh perspective on cloud technologies, providing insights that will help you make informed decisions in this dynamic, ever-evolving digital ecosystem.

Methods

In this study we use the Cloudscape Navigator method. Choosing the right cloud technology for project can be akin to selecting the perfect tool for a complex craft. To solve this challenge, we introduce the "Cloudscape Navigator" method, a unique and comprehensive approach designed to help steer through the clouds and choose the most suitable technology for your specific project. This method combines strategic planning, analysis, and adaptability to navigate the ever-changing landscape of cloud offerings effectively. Here's how it works:

We begin by clearly defining the objectives, scope, and unique characteristics of project. This initial step is akin to mapping the stars in your project's constellation. What are your performance goals, security requirements, budget constraints, and scalability needs? By having a precise project constellation, you establish a clear direction for your cloud journey.

Next, we dive deep into the cosmos of cloud technologies. Research and catalog the various cloud providers, services, and solutions available. This phase involves staying up-to-date with the latest advancements and identifying any emerging stars in the cloud galaxy.

And after develop a set of navigational tools that encompass performance metrics, security benchmarks, cost analysis, and environmental considerations. These tools will be your compass and sextant throughout the journey.

After we create a visual map of the cloudscape, plotting the key features, advantages, and limitations of various cloud technologies. This map serves as your navigational chart, helping you identify the stars that align with your project constellation.

The Cloudscape Navigator method ensures that your cloud technology selection process is not just a choice but an exploration, an expedition through the cosmos of possibilities. It is a unique and adaptable approach designed to make cloud technology selection a journey of discovery, ensuring that your project finds its ideal path among the stars.

Results

The application of the Cloudscape Navigator method has illuminated a path towards optimal cloud technology selection for project.

The Cloudscape Navigator method has enabled a highly customized alignment of project's unique con-

stellation with the right cloud technology. This alignment ensures that every aspect of project, from performance to security, is optimally catered to.

Dynamic Adaptability:

The Cloudscape Navigator approach emphasizes the adaptability of your cloud technology selection. As the project evolves and new technologies emerge, this approach can be easily recalibrated to ensure your project remains on a trajectory for success.

Alignment with Sustainability Goals:

One of the unique aspects of this method is its consideration of environmental sustainability.

Reduced Risk of Mismatch:

By mapping project's specific requirements against the cloud technology landscape, this approach substantially reduces the risk of a mismatch between what project needs and what the chosen technology can offer. This, in turn, mitigates costly disruptions and setbacks.

Discussion

The Cloudscape Navigator method provides an inventive and individualized solution to the age-old challenge of selecting the most suitable cloud technology for a given project.

The Cloudscape Navigator method represents a paradigm shift in the process of cloud technology selection. Unlike conventional methods that rely heavily on predefined criteria, it encourages a holistic, exploratory approach. This shift from a checklist-style selection to a dynamic, data-informed navigation opens the door to more tailored and precise solutions.

Bespoke Alignment with Project Goals:

One of the key takeaways from the method is its ability to create a bespoke alignment between the cloud technology and the project's goals. It reframes the selection process from merely addressing technical requirements to crafting a seamless synergy. This close alignment ensures that every facet of the chosen technology resonates with the project's unique aspirations.

A Strategic Advantage in a Dynamic Environment:

In a cloud technology landscape that is constantly evolving, adaptability is paramount. The Cloudscape Navigator method not only acknowledges this dynamism but also leverages it. Its recalibratable nature positions projects to maintain a strategic advantage by staying in tune with emerging technologies and market shifts.

Conclusion

The method emphasizes long-term viability, acknowledging that the present is just one phase of a project's journey. By selecting technologies with scalability, adaptability, and sustained support, organizations prepare for the future. The project becomes an enduring entity, equipped to navigate challenges and seize opportunities that lie ahead.

In conclusion, the Cloudscape Navigator method is a unique and transformative approach to cloud technology selection. It reframes this process from a mere task to a journey of discovery and innovation. It aligns technology choices with project aspirations, encourages exploration, adapts to changing landscapes, and embraces environmental responsibility. It equips projects to not just succeed in the present but thrive into the future, charting a course towards exceptional success in the ever-evolving world of cloud technologies.

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УДК 338.4.62.

PROBLEMS OF DEVELOPMENT OF THE GENERAL THEORY OF TRANSPORT SYSTEMS

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Abstract

The subject of the article is the methodological provisions of the general theory of transport systems; the object of the article is the transport system; the purpose of the article is to increase the efficiency of the processes of designing and restructuring transport systems; to achieve this goal, the article solves the following tasks: the theoretical provisions of the general theory of the development and functioning of transport systems (transportology) are developed; a comparative analysis of the organizational structures of innovative activities in transport engineering; the specifics of innovative entrepreneurship in the conditions of the global crisis are described; the provisions of the criterion approach in the theory of the firm are being developed; it is shown that the formation of clusters and technological platforms as new organizational forms of innovation development is associated with the need to decentralize decision-making and more fully take into account the interests of all participants in the innovation process, including individuals and small innovative firms; the research methods in the article are historical, logical and system analysis; synthesis; firm theory; theory of hierarchical systems; the scientific novelty of the article is connected with the formation of the methodology of design and restructuring of transport systems

Keywords: transport, science, analysis, innovation, structure, theory, firm, globalization, market, criterion, crisis, analysis, methodology

Introduction. The relevance of this article in 2023 is determined by the activation of the design processes of new and restructuring of existing transport systems under the influence of the global crisis.

The scientific hypothesis of this article is the assumption that in order to increase the efficiency of the processes of designing and restructuring transport systems, it is necessary to develop the methodology of the general theory of transport systems (transportology).

The purpose of the article is to increase the efficiency of the processes of design and restructuring of transport systems.

To achieve this goal, the following tasks are being solved:

- the concept, content and significance of the organization of innovation activity for the economy and global scientific and technological progress (STP) are investigated;
- research of trends and problems of formation of organizational infrastructure of innovation activity in Russia;
- development of methodology and comparative analysis of the effectiveness of organizational structures of innovation activity in mechanical engineering;
-formation of methodological provisions of the general theory of transport systems (transportology).

The object of the article is the transport system.

The subject of the article is methodological provisions of transportology, methods of comparative analysis of the effectiveness of organizational structures of innovation activity.

We will perform an analysis of scientific publications on the topic of this article. Scientists believe that in the conditions of the formation of a new technological order, the clustering of the economy is taking place [1, pp. 38-45; 2, pp. 435-440; 3, p. 2]. Analysts note the great influence of transport on socio-economic development [4, pp. 17-23]. This leads to the need of development of the theory of transport systems [5, p. 2] . Philosophers Express a point of view about the necessity of advancing the development of science [6, p. 2]. Scientists are conducting research systems of socio-economic processes [7, p. 2]. Analysts say the strong impact of risks on the socio-economic result of innovative projects [8, pp. 37 - 46; 9, p. 2]. To accelerate scientific and technological progress of the state and private companies to form programs of innovative activities [10, p. 2]. States develop the institutional system to support innovation [11, pp. 131-141]. Experts note a high level of risks in innovation activity [12, pp. 456-465]. The European Union is creating risk management programs in the field of innovation [13]. Scientists develop methods of risk identification [14, p.2]. With purpose of increase of efficiency of innovative activity in the European Union create a technology platform [15, p. 2]. In economic theory developing the theory of the firm [16, p. 2]. Analysts believe that corporations can be subjects of management geopolitical risk investment and innovation activities [17, pp. 201-212]. Scientists believe that in a crisis it is necessary to manage the risks of firms' activities [18, p.2]. Experts believe that the effectiveness of innovation activities can be improved by creating a system of strategic management of innovative activities of firms [19, p.2]. Analysts believe that enterprises should develop their own innovation policy and strategy [20, p.2].Experts note the important role of innovation finance [21, p.2]. Scientists create a general theory of scientific activity to solve problems of improving the efficiency of innovation [22, p.2]. Analysts are developing new ways to activate innovation activities [23, pp. 29-31]. University teachers and students form methods of designing the sphere of transport services [24, pp. 99-115]. Experts develop the theoretical foundations of

transport systems [25, pp. 4-12].The analysis of scientific publications carried out in this article confirms the relevance of the topic of this article.

Method. The object of this article is transport systems of all hierarchical levels (global, regional, national, local, corporate).

We agree to take into account the increasing influence of the methodology and organizational structures of science and innovation on the pace and efficiency of the development of the national transport system in the context of the global crisis, sanctions. From the point of view of philosophy in the field of technology, the transport industry currently requires (taking into account the acceleration of scientific and technological progress) the transition to an advanced model of the relationship between science and technology. Such an advanced model of the relationship between science and technology is characterized by the fact that the initiative to introduce innovations should come not from engineers (or inventors), but from scientists. This approach ensures the transformation of scientific knowledge into technical tools [6, pp. 24-25]. The model of advanced development of science should be reflected in the methodology and organization of science. The need to develop and improve a new scientific discipline, the object of study of which is the transport system, is associated with the following factors:

- the increased importance of the transport system for the world economy, state, economy and society in the context of globalization;
- changes in the nature and topological structure of the economy as a result of the global crisis, which will lead to the redistribution of freight and passenger flows, and therefore to the need for restructuring and further development of the entire transport system;
- the expected emergence of new and hybrid modes of transport, the use of known modes of transport for new purposes;
- increased competition between different modes of transport in a crisis of customer solvency;
- the need to develop ecological (green) transport;
- the need to increase the level of complexity in providing transport services to customers;
- the growing importance of the transport system for the competitiveness of corporations in the context of the global crisis and much more.

The study of the innovation management system can be considered as one of the effective tools for improving the efficiency of innovation. The structure of the management system is called the way of its organization, a set of elements, departments and links between them [7, p. 191].

The design and study of the organizational structure of innovation activity should be based on the study of its departmentalization - a way of dividing an organization into relatively independent units. Two principles of departmentalization are considered the most important, namely, the allocation of divisions in the organization and their grouping around the work or result (product) [7, p. 191].

In a market economy, the methodology and organizational structure of scientific and innovative activities in the national transport system should cover and allow for effective coordination of all the necessary elements of an innovation project, up to the desired practical social and economic result. Such an organizational structure should allow solving scientific, technical, financial and other problems inherent in an innovative project in a systematic unity and effectively. These problems of an innovative project can be considered as a set of risk events inherent in an innovative project in mechanical engineering. The analysis and assessment of the impact of various risks on the financial result of an innovative project is carried out in the article [8, pp. 45-46]. In the future, in this article we will proceed from the fact that the study of the methodology and organization of innovation activities in the national transport system should focus primarily on whether the current methodology and organizational structure of science and innovation management correspond to the tasks they solve or not [7, p. 191].

In the process of comparative analysis of organizational structures of innovation activity, it should be taken into account that corporations are currently the most economically significant form of innovative entrepreneurship (business). Transnational and national corporations perform a set of functions and play a set of roles in modern globalization, including innovations, STP.

The innovative activity of corporations is so important for scientific and technological progress (STP) that it can be considered as one of the motives for the development of globalization. Earlier studies have shown that one of the reasons for modern globalization may be the increase in the resource intensity of innovation. Therefore, in order for resource-intensive innovations, for example, the development of the Airbus A-380 (which, according to media reports, cost $ 10 billion before entering flight tests), a global market is needed. This allowed us to put forward an innovative hypothesis of the nature of modern globalization: globalization is associated with an increase in the resource intensity of innovations and the need to increase the capacity of markets to obtain positive financial results from these innovations. 9, p. 61. The hypothesis of the innovative nature of globalization is confirmed by world statistics and practice. At the beginning of the 21st century, corporations account for more than a quarter of the global production of goods and services, and three hundred of them owned 25% of the total capital used in the global economy and provided 70% of foreign direct investment [9, p. 14].

На долю научно-технического прогресса в развитых странах приходится до 70-80% прироста ВВП [10, с. 15]. Инвестиции в США в НИОКР, финансирование технологий и науки составили в 1998 году 221 млрд. долл. США, в 1999 году они составляли уже 236 млрд. долл. США (рост на 7% в год) [10, с. 11]. При этом глобальные финансовые результаты таковы, что корпорации США получили из-за рубежа только в виде роялти и лицензионных вознаграждений в 1996 году $ 129,8 млрд.

Поэтому, инновации выступают не только как объект инвестиционной деятельности, но и как фактор конкурентоспособности продукции, источник

финансирования развития корпораций и государств, стимул к инвестиционной деятельности. Это создает экономическую основу для развития частно - государственного партнерства в сфере инновационной деятельности в национальной транспортной системе. В связи с этим были исследованы направления и критерии совершенствования институциональной системы государственной поддержки инновационной деятельности [11,с. 131-141].

The share of scientific and technological progress in developed countries accounts for up to 70-80% of GDP growth [10, p. 15]. Investments in the USA in R&D, technology and science financing amounted to 221 billion US dollars in 1998, in 1999 they were already 236 billion US dollars (an increase of 7% per year) [10, p. 11]. At the same time, the global financial results are such that US corporations received $129.8 billion from abroad only in the form of royalties and licensing fees in 1996.

Therefore, innovations act not only as an object of investment activity, but also as a factor of product competitiveness, a source of financing for the development of corporations and states, an incentive to investment activity. This creates an economic basis for the development of public-private partnership in the field of innovation in the national transport system. In this regard, the directions and criteria for improving the institutional system of state support for innovation were investigated [11, pp. 131-141].

The motivating reasons for the intensification of innovation activities in public and private corporations may be such considerations.

Firstly, it became clear that the shortcomings of the development of the investment and innovation sphere of the national transport system can be a serious restriction on the freedom of investment and price decisions by corporations.

Secondly, the urgency, the need to develop investment and innovation activities in the national transport system is explained by the possibility of introducing restrictions in the context of the global crisis.

Thirdly, the high level of depreciation of fixed assets.

Fourth, the lag of the transport industry in the field of innovation and high technology from other countries.

Fifth, the relevance of the implementation of plans to create new high-tech jobs.

Sixth, the level of technological development of transport affects the direction of investment flows in the global economy in such a way that 80% of investments are cross-investments of economic entities of developed countries. Therefore, countries need to diversify their economies and develop innovations in order to attract foreign investment.

A change in the approach to the methodology and organization of innovative activities in the transport system is required. The transition to the entrepreneurial paradigm and public-private partnership in innovation activities in the national transport system is necessary.

Innovative entrepreneurship in the transport system is the regular activity of market entities, financial and economic activities aimed at: the search for undetected or unsatisfied public needs in the field of transport; the implementation of a set of innovative projects (innovation basket) in the national transport system aimed at satisfying the transport needs of the economy. The goals of innovations in the field of transport can be: fuller satisfaction of public needs for transport services; profit; ensuring capital growth; improving the competitiveness of corporate organizations and the national economy.

The goals of innovative entrepreneurship at the level of a transport organization are: fuller satisfaction of public needs for transport services, maximizing profits (in the short term); maximizing the value of the company (in the long term).

The goals of innovative entrepreneurship in the national transport system at the state level should be recognized as the creation of more comfortable and safe conditions for the population to receive transport services.

In the process of state regulation and financing of innovative activities in the national transport system, the following specifics of innovative entrepreneurship should be taken into account: in the process of such entrepreneurship, a systematic unification of scientific potential, financial, technological and natural resources takes place; intangible assets of the organization are much more important and influential (than in ordinary entrepreneurship); as a result of the implementation of innovative entrepreneurship, an increment occurs scientific knowledge of the company and intangible assets of the organization; a high level of risks and uncertainty of the results of innovative entrepreneurship in the context of globalization.

The object of innovative entrepreneurship in the transport system is innovative projects aimed at improving existing or creating new goods and services, technologies for their production and consumption. The main problem of innovative entrepreneurship in the regional transport system is the ability of a team of innovators to design and implement new goods or services on the global and/or regional market that can more fully satisfy public needs for transport services and bring profit.

At the same time, at the beginning of the 21st century, in innovative entrepreneurship in the transport system, industrial (from need to its satisfaction) and post-industrial approaches can be distinguished (from technical capability to the creation of a new need and its subsequent satisfaction due to this new technical capability).

One of the most important methodological problems of organizing the commercialization of knowledge and innovation in the transport system can be called the underdevelopment of innovative organizational philosophy, culture and organizational structure based on market principles (freedom of competition and transactions, actions in their own interests, equal access to information, etc.).

The infrastructure of innovative entrepreneurship in the transport system consists of: inventors (know-how), scientific organizations (research institutes and design bureaus), venture investors (funds), technology

parks, business angels, business incubators, accelerators and more.

As you know, venture (risk) funds are financial institutions whose specialization is portfolio investment (a typical investment ranging from 1 to 5 million dollars per project) in innovative enterprises with the aim of rapid growth in the cost of capital (but not profitability). As a rule, 70-80% of projects do not provide capital growth, but the increase in the value of the shares from the remaining 20-30% of investments recoups all losses from unsuccessful investments in innovation.

Business angels focus their business activity on financial investments in companies at the earliest stage of development. The invested amount is from 50 to 300 thousand dollars. US dollars in the project.

It should be noted that successful innovative entrepreneurship sets the task of harmonizing relations between all infrastructural elements of this entrepreneurship and the process of commercialization of innovations. At the same time, almost all Western accelerators of innovative entrepreneurship are financed by individuals and companies. For example, Techstars reports on its website that it is funded by more than 75 venture funds and business angels. Abroad, competition among business angels for promising innovative projects and businesses is great. Foreign leading players in this market seek to gain access to potentially successful innovative organizations at an early stage, when such organizations are too small for them.

Mentoring provides an innovative entrepreneur with methodological, moral, and psychological support in key decision-making situations. In essence, we are talking about the "umbrella" mode of operation of small innovative firms at corporations (for example, in Japan) interested in the development of relevant innovations.

Mentoring in the form of increased attention (from the state, society, business associations, corporations) to innovative business, its problems reduces the risks of such entrepreneurship, increases the likelihood of timely solving the problems facing the entrepreneur, increases the psychological stability of the innovative entrepreneur in the process of solving problems.

Foreign statistics show that in the early 1990s, the share of successful innovative projects in Japan was 60%, in the UK - 54%. At the same time, the total share of commercially unsuccessful projects has remained steadily high over the past decades: from 40 to 60% [12].

Mentoring, connections in industrial and financial circles make it possible to optimize the "development trajectory" of an innovative enterprise, minimize costs and risks when creating a financial, technological, trade infrastructure of an innovative business.

A certain methodological problem of innovative entrepreneurship can be recognized as the lack of systematic scientific and methodological support for innovative business. At the same time, as part of the development of the theoretical foundations of innovation, the experts of the European Community pay great attention to risk management in the implementation of innovative projects. European experts formulate concepts that combine the theories of innovation management and risk theory [13].

At the beginning of the 21st century, scientists are actively engaged in the problems of studying the organizational risks of innovative projects and assessing the impact of these risks on the success of an innovative project. Considering the risks of innovative projects in a strategic context requires a special attitude to the organizational aspects of the processes of development and introduction of new products [14, p.6].

The additional relevance of the organization of risk research, the development of this particular area of methodological support for innovations in the national transport system in a global market is increasing due to the fact that, as is known, the global financial crisis broke out in 2008. For the organization of innovative activities in the national transport system, such a crisis is characterized by additional risk factors: an aggravation of the global struggle for resources, including financial and intellectual resources that have come to the fore; a tightening of the struggle for product sales markets; attempts by national governments to limit the offshore business of corporations (political risk); an increase in inflation and currency risks; an increase in geopolitical and political risk (sanctions, etc.).

At the same time, the theoretical understanding of the essence of the organization of innovation and the place of corporations in the field of innovation, the expression of this essence in the form of a scientific theory of the firm, is also relevant. Innovative entrepreneurship is more developed in the following types of corporations: consortia, trusts, financial and industrial groups.

The methodology of comparative analysis of organizational structures of innovation activity should be based on the study of factors and properties of a certain corporate, organizational structure that affect the very possibility and results of innovation activity.

The consortium is a temporary corporate association of legally independent organizations in the interests of developing a new innovative product, reducing the costs of such developments. For example, Airbus began as an association (consortium) of organizations from 10 European countries. Currently, the Renault-Nissan automobile consortium (France-Japan) is known. Such an association allows its participants to: reduce the total costs of new developments; unify platforms, nodes and aggregates, and more. All together, this generates the effect of reducing costs per unit of production with an increase in production volumes (the "scale effect" works).

A trust is a corporate association of organizations engaged in the development, production and sale of similar types of products. The organizational structure of the trust makes it possible to implement programs for the unification of parts and assemblies of similar goods, increase their output and use the scale effect of production to increase financial results (profit).

The Financial and Industrial Group (FPG) is a vertically integrated business structure that allows you to implement the entire cycle of development, testing, production of innovative goods and services, starting with the extraction of raw materials and ending with finished products.

Trusts and FPG can be created by exchanging shares between their member organizations, creating one legal entity, etc.

At the beginning of the 21st century, technological platforms are being formed in the European Union. A technological platform is understood as a communication tool aimed at: attracting new resources; commercialization of knowledge and technologies; improving the regulatory framework for innovative development; creating new products based on the participation of all stakeholders (government, business, civil society) [15]. At the same time, technology clusters are being actively created in the USA and other countries.

In organizing the processes of innovation development in the country, it is also important to understand that the most economically and socially significant experiences of small innovative entrepreneurship lead to the creation of global high-tech corporations.

Effective organization of innovative activity of subjects of the national transport system should be based on a more general theory (theory of the firm). It is known that R. Coase put forward the theory of a firm (corporation) as a way to reduce transaction costs of economic activity within a group of enterprises (firms). R. Coase defined the firm as follows: "A firm ... is a system of relations when the direction of resources begins to depend on the entrepreneur" [16, p.205].

Within the framework of a systematic approach in economic theory, it can be said that the entry of a separate enterprise into a corporation can allow such an association of enterprises within the transport system to achieve the following results: to ensure the complexity of transport services provided; to increase the economic efficiency of joint activities of several organizations (enterprises), reduce their total costs, risks, increase liquidity or reduce the execution time operations; reduce the financial cycle of the aggregate corporate structure [17, pp. 201-212]. Based on the study of the roles of corporations , such a definition can be given: "A corporation is a complex subject of financial and economic activity, in the conditions of globalization, performing the roles of: globalization of the economy, information space and socio-cultural life; concentration of capital; optimization of intersectoral and sectoral distribution of capital; strengthening the processes of differentiation, division and specialization of labor; increasing the market stability of the corporate structure when the market conditions change; unification of requirements and cross-country staff migration; integration of fictitious and real capital; integration of entrepreneurship and management; differentiation and decentralization of management; making profits and excess profits on the basis of monopolization of markets; innovative activities to create new goods, technologies and services; protection of enterprises included in its structure from tough acquisitions and mergers; development of small and medium-sized businesses; development of demographic processes; formation of social structures of society", etc. At the same time, the corporation is an association of a number of legal entities, taking into account the distribution of functions and roles in technological and economic activities [9, p. 203].

This article develops a "criterion" approach to the study of the essence and competitiveness of corporations (firms) in the regional transport system, adopted in [18, p. 63]. With this approach, the criterion can be considered in two ways: as a quantitative reflection of the degree to which an economic entity or object has achieved its goals; as a rule, the choice of the best course of action (including investment and innovation) from a number of possible ones in a certain criterion sense. Economic indicators used in the formation of performance evaluation criteria affect the behavior of economic entities [9, p. 70]. Based on the set of effect parameters (income, costs, liquidity, time, risks) included in the criterion for evaluating the effectiveness of any corporation in the regional transport system, we can say the following.

A corporation can be competitive if it surpasses similar data of another (competing) organization in at least one of these parameters.

The dominance of the organization of the regional transport system over its competitors is expressed in the fact that this corporation has the best indicators for all the above-mentioned parameters of the effect of other organizations (income, costs, risks, liquidity and time) [9, p. 70].

Based on the income parameter, the theory of the firm can be formulated as follows: "A corporation (firm) is a system of relations when the allocation of resources to a new enterprise (production) begins to increase overall profitability (or profit)." If, within the framework of the criterion approach to the analysis of the essence of a corporation, the understanding of competition as cost reduction is taken as a basis, then the theory of the firm (corporation) can be formulated as follows: "A corporation (firm) is a system of relations when the inclusion of a new enterprise (production, division) in it reduces the overall costs of the organization to achieve the goal" (minimizing transaction costs according to R. Coase).

Based on the liquidity parameter, we can say: "A corporation (firm) is a system of relations that allows you to increase the liquidity of an organization in the process of achieving its goals."

Within the framework of the criterion approach to the study of the essence and competitiveness of corporations of the national transport system, it is rational to include the time factor among the considered parameters of activity. It is known that any organization (regardless of its nature and purpose) has its own internal space and time. The pace of the passage of time in the corporation of the national transport system should be related to the speed of: firstly, changes in the external environment of the organization; secondly, the speed of processes within the corporation, including exchange of information processes, between the system and its subsystems. The management that ensures the finding of an object of innovation and/or investment activity in the field of controlled states with a probability higher than a given one will be called real-time risk management [9, p.70].

A comparative analysis of the time indicator (duration of the production cycle) allows us to conclude: "A corporation (firm) is a system of relations when the

inclusion of a new enterprise (production, division) in it reduces the total time spent on achieving the set goal of the entire corporation."

Within the framework of the "risk" theory of a corporation, we will argue that a corporation (firm) is a system of relations when an entrepreneur is still able to control (manage) the entire set of risks (and damages) associated with the business (businesses) being carried out, including innovative projects. An excessive number of divisions, areas of activity or markets in which the corporation operates causes an increase in risk and the transition of risk into the category of catastrophic risk. In other words, within the framework of the risk theory of the firm (corporation), it can be argued that the boundaries of the firm are determined by the ability of the organization's management to manage the total risk of activity (including innovation), providing acceptable levels of entrepreneurial risk in the management process.

The risk of an innovative project can be divided into external and internal. The external (wars, embargoes, etc.) risk of an innovative project may be fundamental, which means that the corporation does not have the ability to manage this risk.

The criterion approach creates conditions for a comprehensive analysis of the activities of the firm (corporation) of the national transport system. At the same time, each of the effect parameters can be considered as a direction for improving the corporation's activities.

To ensure the competitiveness of the company, it is necessary to manage such indicators of its efficiency as income (profit), costs, process time, asset liquidity, risks. A strategic approach in the management of innovative projects and the formation of an organization's innovation policy can improve the efficiency of innovative project management [19, p.5; 15, p. 3].

The policy of innovative entrepreneurship can be called a set of measures aimed at achieving a positive social, financial result of an innovative project. Consensual and confrontational approaches are possible in the policy of innovative entrepreneurship. The methodology for the formation of an entrepreneur's innovation policy is formed in the work [20, p.19].

Organizational and innovative activities cover not only scientific, technological, design problems, but also finance. The peculiarities of distributive monetary relations in innovation have caused the need for the formation of innovation finance. Monetary distributive and redistributive relations consisting in the formation and use of funds of funds in the process of innovation activity are called the finances of innovation activity [21, p.60].

To plan and evaluate financial results taking into account risks in innovative entrepreneurship, it is possible to use the methodology proposed in the article [8, pp. 38-46]. As already noted, since 2008, new organizational forms of innovation activity have been intensively developing abroad with the support and regulation of states: clusters and technological platforms.

"Cluster" is an institute for the development of innovation activity based on the concentration of companies, research institutes, universities, public organizations, mentoring groups, technology parks, innovation incubators and other organizations working on the same topic in a certain territory. In the cluster, the synergetic effect of a disproportionately large increase in the efficiency of innovation activities is provided by a large concentration of organizations, creative people working in the same industry. On the basis of competition and concentration of interconnected economic entities, new ideas, services, products, companies and new skills can arise. This synergistic effect can arise as a result of the effect of collective generation of ideas. Research has shown that collective idea generation provides more useful ideas than independent research [22, p.27].

It is proposed to build hierarchically and functionally interconnected scientific platforms in the regional transport system for greater product orientation (reorientation from resource orientation to product orientation). These scientific platforms in the regional transport system (machine-technological, operational, information, etc.) should be responsible for the efficiency of spending allocated resources (including budget financing) in the interests of achieving scientific and practical results of scientific research and innovative projects (product orientation).

The scientific platform can be called a systematic combination of scientific knowledge from various branches of science, technology and technology that participate in the formation and implementation of the idea of safe and economical creation during innovative projects and the implementation of the full life cycle of mechanical engineering products [22, p.67] and the production of services in the regional transport system.

Each scientific platform is a system-forming and coordinating top of the "scientific (innovation) pyramid", which includes the following levels:

- the "production (technological)" platform represents a set of organizations involved in the preparation of production and the implementation of the production of innovative means of transport;
- "circulation platform (trading platform)"- this is a set of organizations that are responsible for the development, promotion and implementation of innovative transport services;
- "operational platform (after-sales service platform)" unites organizations that provide after-sales service of means of transport and infrastructure in the transport system;
- an accompanying service platform providing information and other types of services related to the provision of transport services to consumers;
- the "recycling platform" includes organizations that carry out the disposal of vehicles that have worked out their assigned service life (resource) [22, p.54].

These organizationally flexible entities in the national transport system function in cooperation with scientific public organizations (civil society) within the framework of the concept of crowdsourcing, which makes it possible to increase the role of fundamental science in choosing priorities, selecting project participants and solving other tasks of innovative activity [23, pp. 29-31].

The objective need to expand the public (social) intellectual base of innovation activity in the regional transport system beyond the narrowly professional community is explained by the importance of transport for society and the economy, the complexity of the process of formalizing social needs and ways to meet them during innovation activities against the background of limited intellectual resources of the professional academic community.

Unlike corporations with their rigid administrative hierarchy and innovative culture, it is clusters and scientific platforms that allow for more flexible incorporation of participants who have the necessary in a particular innovative project and on this basis more successfully solve the problems of innovative projects.

A comparative analysis of the organizational features of clusters and technological, scientific platforms suggests that the emergence of clusters and technological platforms abroad as new organizational forms of innovation development is associated with the need to expand the public intellectual base of innovation, decentralize decision-making and more fully take into account the interests of all participants in the innovation process, including individuals and small innovative firms.

It is probably these organizational features of clusters and scientific and technological platforms that create a strategic competitive advantage for them in relation to all types of corporations in the future. At the same time, the very concept of organizational structure in clusters and scientific and technological platforms is transformed into the concept of "architecture of innovation activity".

The architecture of modern scientific and innovative activity in the transport system can be called conceptual (based on the understanding of the innovation system) the structure of scientific and innovative activity, which determines the sequence of solving scientific problems, conducting information processing and including methods of obtaining information and converting it into data and principles of interaction of project participants (personnel), hardware and software in the implementation of scientific and innovative projects in the transport system.

Based on the results of the research in this article, conclusions can be drawn that due to the changes taking place in scientific and technological progress, the scientific sphere, the change of strategies in the markets (the transition from a sales strategy to a marketing strategy), a change in organizational forms, the architecture of scientific and innovative activities is required [22, p.53] and in the transport system. When building the architecture of the innovation component (subsystem), the features of the transport system should also be taken into account.

We will agree to call the transport system a set of all types of transport that ensure the connectivity of the economic and social structure of a region (or state) in the process of their functioning and development through the provision of transport services. Transport services consist in the movement of people and/or goods with specified safety, reliability and quality indicators. The methodology of designing the sphere of railway transport services is reflected in the work [24, p.99-115].

It is also important that the transport system belongs to the category of large systems and has the following properties:

1) heterogeneity and a large number of elements of the transport system (types of transport: aviation, automobile, railway, sea, river, pipeline; various vehicles; infrastructure; personnel; resources; energy supply, legal regulation, etc.);

2) emergence - irreducibility of the sum of the properties of the transport system as a whole to the properties of its individual elements (for example, no single mode of transport or vehicle can replace the entire system as a whole);

3) hierarchy - the presence of several levels (global, regional, national, local, corporate, etc.) of the transport system and ways to achieve the goals of the corresponding levels, which can generate intra- and inter-level conflicts in the transport system;

4) aggregation - combining several parameters of a lower hierarchical level transport system into parameters of a higher hierarchical level transport system (lower level parameters are reflected in the aggregated parameters of the higher level);

5) multifunctionality - the ability of a large transport system to implement a certain set of functions on a given structure, which manifests itself in the properties of flexibility, adaptation, survivability;

6) flexibility - the property of a transport system to change the purpose of its functioning depending on the external operating conditions or the state of its subsystems;

7) adaptation - changing the objectives of the functioning of the transport system when the external conditions of operation change;

8) reliability is the property of a transport system to implement specified functions for a certain period of time with specified quality indicators (parameters);

9) safety - the ability of the transport system not to cause unacceptable impacts to technical facilities, personnel, and the environment during its operation;

10) durability - the property of the transport system to perform its functions when the parameters of the external environment go beyond certain limitations or tolerances (for mechanical systems, they talk about a margin of safety);

11) vulnerability - the ability of the transport system to receive (or not receive) damage when exposed to external and/or internal damaging factors of various nature;

12) survivability is the ability of a transport system to change the purpose of functioning in case of failure and (or) damage to elements.

When creating a scientific, innovative platform in the national transport system, a certain methodological basis is required. Such a methodological framework should cover all scientific problems (quite diverse: marketing and design of transport services, transport engineering, design, finance, monetary relations, etc.) of an innovative project in the national transport system. Due to the rapid complication of the content of innovative projects, the development of a new, broader

scientific, methodological basis of the modern national transport system - transportology - is becoming extremely relevant.

Let's agree to call transportology the science of the creation, innovative modernization and functioning of the national transport system, which covers a complex of scientific problems, including philosophy, ideology, politics, motives, methods, methods, tools, technologies for the creation of the national transport system, its elements, their circulation and use in the provision of transport services up to the moment of their disposal, and there are also methods for assessing the impact of the national transport system on the economy and society.

We will describe the scientific method, object, subject, functions and roles of transportology. The scientific method in transportology will be called a system of principles and techniques by which objective knowledge of the processes and socio-economic results of innovation, design, creation, circulation, use, modernization, utilization of elements of the national transport system is achieved.

The functions (from the word "I perform") of transportology are that within the framework of transportology can be done in the geopolitical, political, social, economic, technological, ecological subsystems of the state and society.

The economic and social role (significance) of transportology is determined by the effectiveness of the performance of those functions that it performs in relation to meeting the needs of society.

The main functions of transportology will be considered: methodological, cognitive, instrumental, legislative, optimization, prognostic, preventive, psychological functions, the function of socialization of knowledge, minimization of technogenic and environmental risks.

The methodological function of transportology consists in the formation of a conceptual apparatus, theoretical foundations and methodology for the study of phenomena and processes, the formulation of laws and categories of the transport system, the development of tools for managing the life cycle of the transport system and its elements in order to maximize the effectiveness of their use, minimize damage from man-made risks and ensure the effectiveness of policies (systems of measures) in the development of national transport systems.

The cognitive function of transportology integrates the processes of accumulation, description, study of the facts of reality in the transport system at various levels (global, national, sectoral, regional, etc.), analysis of specific phenomena and processes in the cancers of the life cycle of the transport system and its elements, identification of the most important problems and sources of development of the transport system, justification of individual measures and development programs transport system.

The instrumental (regulatory) function of tranportology reflects the practical nature of this science, and consists in: developing tools for managing the life cycle of the transport system and its elements; developing practical recommendations for government agencies, experimental design (R&D) organizations, machine-building industries that produce products for the transport system and its components; preliminary assessment of the effectiveness of R&D, R&D, production and operation, modernization and disposal of products (goods and services) within the transport system.

The legislative function of transportology manifests itself in the process of substantiating the need and developing certain legal norms that contribute to the development of the transport system, forms of liability for damage to third parties, personnel and society as a whole at all stages of the life cycle of the transport system and its elements, etc.

The optimization function of transportology consists in choosing the best methods and techniques for implementing both individual stages and the entire life cycle of services in the transport system and its technical and technological elements.

The prognostic function of transportology includes an assessment of the state of the transport system, economy and society in the future from the point of view of the possibility of developing certain areas (subsystems and elements) of the transport system, reducing dangerous levels of functioning in the transport system, modeling social and economic processes in the transport system and their changes under the influence of scientific and technological progress and information technologies.

The preventive function of transportology can find its expression in carrying out proactive and preventive measures based on the results of forecasting the possibility of the development of technical and economic crises, man-made disasters, technological crises and other types of negative phenomena arising from the development of global, regional and national transport systems.

The psychological function of transportology consists in the orientation of citizens to the continuous development of innovation and scientific and technological progress in the field of the transport system, the orientation of society to the sustainable nature and effective management of scientific and technological progress in the transport system.

The function of socialization of knowledge in the field of transportology is to disseminate knowledge about the transport system and the need to take effective measures to develop the transport system among the general population. The implementation of the function of socialization of transportology is important to ensure the sustainability of development and progressive legal support for the development and functioning of the transport system and its elements.

The roles of transportology are proposed to be recognized: firstly, optimization of the processes of development of scientific and innovative support of the transport system; secondly, reduction of risks in the development and functioning of the transport system, implementation of innovative projects; thirdly, increasing the financial results of functioning and innovation in the transport system.

Let us agree to call the laws of transportology stable cause-and-effect relationships, the interaction of

parts and relationships that arise in the process of functioning and development of the transport system. The following laws of transportology can be formulated:

1. The development of the transport system in the 21st century leads to an increase in the complexity and, accordingly, the resource intensity of innovative projects;

2. There is a reduction in the development and implementation of new innovative projects in the transport system;

3. The pace of scientific and technological progress in the national transport system is accelerating;

4. The main directions of improving the services of the transport system in the 21st century are: expansion of the functional completeness of transport services, fuller satisfaction of the needs of buyers, ensuring cost reduction, greater convenience and safety of transport services for users and staff.

5. Scientific and technological progress in the transport system is continuous, but may be accompanied by qualitative leaps, which most often occur in the time periods between the so-called "technological generations" and "technological modes";

6. There is a so-called "technological pyramid" in the transport system, at the top level of which there are companies synthesizing new technological principles, then there are companies implementing these principles in their new developments, producing vehicles in transport engineering, after that there are companies producing transport services for other sectors of the economy using vehicles and societies.

6. In the process of providing transport services, there is both cooperation and competition between different modes of transport.

7. Technologies for the provision of transport services belong to the category of multi-link technologies, closely integrated with information technologies.

8. The risks of competence of personnel and/or project participants significantly affect the safety, reliability of the transport system and the financial result of an innovative project in the transport system.

9. The list of laws of transportology is not closed and is updated based on the results of the development of the transport system and discussion of their scientific and technical community.

Discussion. Further development of the general theory of transport systems will allow: to increase the efficiency of innovation activities in the creation and restructuring of transport systems of various hierarchical levels (global, regional, national, local, corporate); to more accurately predict the development of transport systems; to synthesize ideas of innovative projects and more.

This article proposes to develop and clarify the interpretation of the concept of "scientific platform in the transport system". It is proposed to call the scientific platform in the transport system a systematic association of scientific knowledge from various branches of science involved in the formation and implementation of the idea of safe and economical creation during innovative projects and the implementation of the full life cycle of products in the transport system. The list of scientific directions that participate in the implementation of an innovative project in mechanical engineering reflects the data obtained on the basis of an analysis of the work performed during the innovation project 8,pp. 37-46. Within the framework of transportology, when implementing innovative projects, not only technical problems are scientifically solved, but also problems of global competition, scientific and technological progress, the forecast of monetary policy, etc. All these problems are in system connection with each other and technical problems of the project. This fundamentally complicates the work of the participants of the innovation project, who must take into account these systemic connections when making decisions.

- The architecture of the scientific platform in the national transport system and transport engineering should be aimed at providing scientific support for an innovative project to the full depth of the life cycle of an innovative project. Therefore, the scientific platform in the national transport system should include scientific platforms at the stages of development of transport services, innovative products of transport engineering, production of these products, their operation and disposal.
- The essence of the scientific platform in the national transport system can be studied from several points of view. From an organizational point of view, a scientific platform is a set of scientific organizations (or their divisions) – its structural elements and links between them.
- From an institutional point of view, a scientific platform in the national transport system is a set of relations (rules of the game) that arise between participants of innovative projects in the process of solving scientific problems related to this project.
- From the point of view of personnel management of the innovation project, the scientific platform should include methods for assessing the competence of participants in the innovation project. The development of transportology as a methodological basis for creating a scientific platform for the development of innovative activities in the national transport system will reduce the risks of competence.
- Competence risk is the risk of financial losses due to reasons related to the lack of competence of personnel engaged in the implementation of innovative projects. During the functioning of the scientific platform of innovation in mechanical engineering, it is necessary to constantly analyze and improve the competence of participants in innovation activities.
- Competence is usually understood as having a certain competence - knowledge and experience of one's own activities. The competence of a participant in innovation activity can be understood as the possession of a certain competence as a system of knowledge and practical experience necessary for the creation of a competitive innovative product or service by a team of participants. The competence structure of the participant of the innovation project is proposed to be called the systemic unity of his competencies that allow him to solve the problems of the project that are in the sphere of his responsibility.

• The qualification requirements for the project participant include the competencies that he must possess in order to successfully solve the project tasks assigned to him within the framework of this project.

Within the framework of transportology, a project team participates in an innovative project, which must solve the whole set of marketing, design, technological, organizational and financial tasks arising during an innovative project.

The innovative project will be successful, provided that the project team can solve a number of interrelated scientific, technical, technological, economic problems. In order to solve the totality of problems, the team of participants in an innovative project must work harmoniously as a whole and solve specific scientific problems of this innovative project in the context of the goals and objectives of this innovative project.

The competence analysis of an innovative project participant is the establishment of logical links between the assessment of the competence of a project participant and the observed, obtained technical, technological, and financial characteristics of the project.

Competence analysis should be carried out taking into account the hierarchical position of the project participant (specialist, head of technical direction, project manager) who are in various functional and job positions in the project.

Conclusion. This article develops the methodological provisions of the general theory of the functioning and development of the transport system (transportology) and its innovative component, conducts a comparative analysis of the organization and architecture of innovation, innovative entrepreneurship, examines the problems and specifics of the organization of innovative entrepreneurship in a global crisis, develops a criterion approach to the analysis of the essence and competitiveness of a corporation (firm) and risk theory firms, suggested and justified, that the emergence of clusters and technology platforms abroad as new organizational forms of innovation development is associated with the need to decentralize decision-making and more fully take into account the interests of all participants in the innovation process, including individuals and small innovative firms.

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№130/2024

Norwegian Journal of development of the International Science

ISSN 3453-9875

It was established in November 2016 with support from the Norwegian Academy of Science.

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