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# AGRICULTURAL SCIENCES

## INFLUENCE OF SOIL TILLAGE ON THE PRODUCTIVITY OF MEADOW CLOVER IN THE WESTERN FOREST STEPPE OF UKRAINE

**Dudar Ivan,**

*Candidate of Agricultural Sciences  
Lviv National Environmental University  
m. Dubliany, Str. Vladimir the Great, 1*

**Ohorodnyk Nataliia,**

*Doctor of Veterinary Sciences  
Lviv National Environmental University  
m. Dubliany, Str. Vladimir the Great, 1*

**Pavkovych Serhii,**

*Candidate of Agricultural Sciences  
Lviv National Environmental University  
m. Dubliany, Str. Vladimir the Great, 1*

**Dynia Volodymyr**

*Candidate of technical sciences  
Berezhny Agrotechnical Institute  
m. Berezhany, Str. Akademichna 20*

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## ВПЛИВ СПОСОБУ ОБРОБІТКУ ҐРУНТУ НА ПРОДУКТИВНІСТЬ КОНЮШИНИ ЛУЧНОЇ В ЗАХІДНОМУ ЛІСОСТЕПУ УКРАЇНИ

**Дудар Іван**

*кандидат сільськогосподарських наук  
Львівський національний університет природокористування  
м. Дубляни, вул. В. Великого 1*

**Огородник Наталія**

*доктор ветеринарних наук  
Львівський національний університет природокористування  
м. Дубляни, вул. В. Великого 1*

**Павкович Сергій**

*кандидат сільськогосподарських наук  
Львівський національний університет природокористування  
м. Дубляни, вул. В. Великого 1*

**Диня Володимир**

*кандидат технічних наук  
Бережанський агротехнічний інститут  
м. Бережани, вул. Академічна 20*

### Abstract

The article presents the results of research on the effect of tillage on the content of dry matter, yield of feed units and digestible protein from the green mass of meadow clover. It was established that plowing with a PYA-4-40 row plow to a depth of 14-16 cm contributed to the formation of a high yield of fodder units (11.7 t/ha) and digestible protein (1.68 t/ha) from green mass.

### Анотація

У статті наведені результати досліджень щодо впливу обробітку ґрунту на вміст сухої речовини, вихід кормових одиниць та перетравного протеїну із зеленої маси конюшини лучної. Встановлено, що оранка ярусним плугом ПЯ-4-40 на глибину 14-16 см сприяла формуванню високого виходу кормових одиниць (11,7 т/га) та перетравного протеїну (1,68 т/га).

**Keywords:** yield, meadow clover, feed units, digestible protein

**Ключові слова:** урожай, конюшина лучна, кормові одиниці, перетравний протеїн.

Важливу роль у забезпеченні населення продуктами харчування відіграє галузь тваринництва. Подальший її розвиток вимагає підвищення конку-

рентоспроможності сільськогосподарського виробництва та посилення продовольчої безпеки держави, що досягається створенням міцної кормової бази. Вона формується з різних видів кормів. Серед

них провідне місце займають збалансовані за протеїном і амінокислотним складом багаторічні бобові трави. На сьогодні вони є неперевершеними культурами по вирішенню проблеми білкового дефіциту у польовому і лучному кормовиробництві.

В західному регіоні України чільне місце серед бобових трав належить конюшині лучній. Її вирощують у сівозмінах і використовують для поліпшення природних кормових угідь, створення культурних сіножатей і пасовищ. *Урожайність конюшини лучної залежить від багатьох чинників*, у тому числі й обробітку ґрунту. Як відомо, на поживну цінність трав істотно впливають ґрунтові умови, видовий і сортовий склад травостоїв, режим його використання, внесення добрив та інші агротехнічні заходи.

Негативний антропогенний вплив на ґрунт призводить до стрімкої зміни його родючості та порушення стійкості екосистеми [1, 3-6].

Наші дослідження полягали у встановленні оптимального способу основного обробітку ґрунту і вивченні його впливу на вміст сухої речовини та вихід поживних речовин з зеленої маси конюшини лучної сорту Трускавчанка, що є надзвичайно актуальним за сучасних соціально-економічних умов та глобальних змін клімату.

Дослід включав три варіанти способу обробітку ґрунту: 1.Звичайний (контроль) - оранка плугом ПЛН-4-35 на глибину 20-22 см; 2. Чизельний – оранка плугом ПЧ-4,5 на глибину 20-22 см; 3. Ярусний - оранка плугом ПЯ-4-40 на глибину 14-16 см.

Агротехнічні умови вирощування конюшини лучної були загальноприйняті для зони західного Лісостепу України.

Ґрунт дослідної ділянки темно-сірий опідзолений легкосуглинковий, характеризується низьким вмістом гумусу (2,80-2,85%). Реакція ґрунтового розчину слабокисла (рН сольове - 5,7-5,8). Забезпечення ґрунту азотом, що легко гідролізується, – низьке (106-110 мг/кг ґрунту), фосфором (188-193 мг/кг ґрунту) і калієм – середнє (122-126 мг/кг ґрунту).

Досліди закладали відповідно до вимог методики виконання польових досліджень [2].

На основі результатів дослідження встановлено вміст доступних для рослин поживних речовин, що визначає поживний режим ґрунту.

За роки дослідження встановлено, що в шарі ґрунту 0-40 см були значні запаси нітратного азоту. Найбільшу його кількість (0,57 мг/100 г абсолютно сухого ґрунту) виявлено за оранки плугом ПЯ-4-40.

Аналіз отриманих результатів показав, що найбільше рухомого фосфору (6,57 мг) було у варіанті звичайної обробітки. За ярусної і чизельної оранки ці значення зменшувались відповідно до 6,54 і 6,51 мг/100 г абсолютно сухого ґрунту.

За ярусного обробітку ґрунту вміст обмінного калію був вищим (7,37 мг/100 г ґрунту) порівняно до звичайної і чизельної оранки (7,27 і 7,21 мг/100 г ґрунту).

Нагромадження поживних речовин з високим вмістом азоту, фосфору і калію в ґрунті, зумовило збільшення сухої речовини, *кормових одиниць* та перетравного протеїну з *зеленої маси* (рис. 1).

Поживна цінність корму визначається вмістом сухої речовини та забезпечення перетравним протеїном. У наших дослідженнях вміст сухої речовини у зеленій масі конюшини лучної знаходився в межах від 17,5 до 18,0%. Причому максимальні значення були за ярусного обробітку (18,0 %). Проведення оранки плугом ПЯ-4-40 забезпечило приріст сухої маси на 0,3% та 0,5 % порівняно з контролем та чизельним обробітком. Таким чином, дані досліджень свідчать, що вміст сухої речовини у зеленій масі мало залежить від обробітку ґрунту.

Найбільший вихід кормових одиниць (11,7 т/га) та перетравного протеїну (1,68 т/га) був за ярусного обробітку ґрунту, що більше контролю (оранка плугом ПЛН-4-35) на 0,91 т/га та 0,13 т/га.

У варіанті за виконання чизельної оранки вихід кормових одиниць та перетравного протеїну із зеленої маси конюшини лучної становила 10,0 т/га та 1,43 т/га (за два укоси), що на 0,79 та 0,12 т/га менше, ніж за звичайного обробітку (контроль). Результати дисперсійного аналізу переконливо підтверджують вірогідність дослідження.

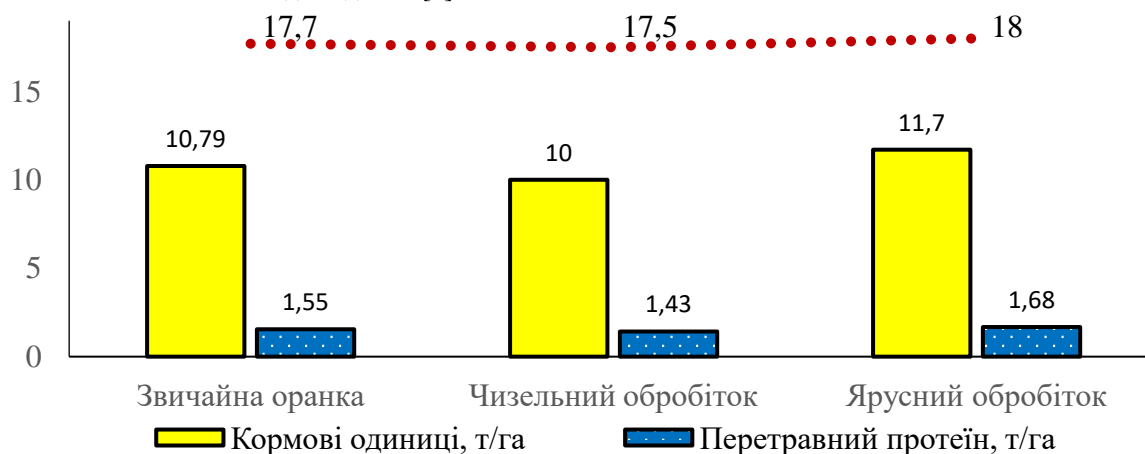


Рисунок 1. Вміст сухої речовини та вихід кормових одиниць і перетравного протеїну із зеленої маси конюшини лучної залежно від способу обробітку ґрунту (середнє за 2019-2021).

Таким чином, ярусний обробіток ґрунту створює найбільш сприятливе середовище для живлення рослин азотом, добрими фосфором і калієм впродовж усього періоду вегетації. Оранка плугом ПЯ-4-40 на глибину 14-16 см забезпечує найвищий вихід з 1 га кормових одиниць і перетравного протеїну з зеленої маси конюшини лучної.

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# ARTS

## MODERN APPROACHES TO DIAGNOSIS AND TREATMENT OF DESTRUCTIVE PNEUMONIA IN CHILDREN

Makhmudov I.Sh.

Mustafayeva S.Y.

*1st Department of Childhood Diseases of AMU*

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### Abstract

Destructive pneumonia (DP) is inflammation of the lung tissue, accompanied by the development of purulent-inflammatory processes and the appearance of gross morphological changes in the lung parenchyma. Currently, acute destructive pneumonia, accompanied by various complications, is considered one of the most severe purulent-septic diseases in children. The relevance of the problem is due to the fact that, despite modern achievements in pulmonological science, the frequency of purulent-septic processes in the lungs and pleura among children of different ages continues to remain at a high level. The presented article provides extensive information about the epidemiological and etiological aspects, pathogenesis, pathomorphology and clinical signs of destructive pneumonia, as well as an assessment of the effectiveness of diagnostic methods used to clarify the diagnosis, as well as the results of recent scientific research. about various methods of antibacterial therapy and disease prevention.

**Keywords:** children, destructive pneumonia, diagnosis, treatment, prevention.

**Introduction.** Destructive pneumonia (DP), which can be caused by different strains of different microorganisms, is characterized by destructive changes in lung tissue. Currently, acute DP, accompanied by complications, is considered a dangerous and severe purulent-septic disease of childhood. In many cases, bronchopulmonary diseases that begin in childhood, especially DP, lead to disability in terms of certain diagnostic and treatment difficulties. The mortality rate of DP is 2–4%, and cases of chronic inflammation are sometimes observed [1]. For these reasons, destructive pneumonia continues to be a pressing problem for pediatricians and pediatric surgeons today. Acute DP, considered an unusual and dangerous complication of pneumonia in children, is characterized by the formation of parenchymal cavities in the lungs and destruction of the pleura, often accompanied by empyema and bronchopleural swollen tissues.

**Epidemiology.** In many countries using the conjugate vaccine against pneumococcal infection, despite a relative decrease (<1%) in the incidence of pneumonia and, accordingly, complications, an increase in the incidence of pleural empyema among children aged 2–4 years was noted. in the USA (1996–1998 - 3.7 cases per 100,000 children in 2005–2007; 10.3 cases in 2005–2007). Even in many states, the prevalence of empyema has increased to 5–12.5 cases per 100,000 children, due to the fact that some pneumococcal serotypes are not included in the vaccine [3–11]. Such complex variability of the epidemiological status is explained, first of all, by the variability of the etiological agent, including some temporary changes occurring in the body, as well as the use of antibiotic therapy according to the usual template regimen.

**Etiology.** As mentioned above, the most common pathogens of DP are pneumococci and *Staphylococcus aureus* [7–8]. Pneumococci have a polysaccharide capsule, cell surface and cell wall proteins, as well as virulence factors such as pneumolysin, the most important

of which is a polysaccharide. -read- capsule counts. There are different variants of it, causing the presence of more than 98 serotypes that can protect the microorganism from the influence of the immune system. Individual serotypes differ in their ability to colonize and cause local or general changes, as well as in resistance to antibiotics. Most pneumococcal serotypes associated with pneumococcal DP are not included in the 7-valent pneumococcal vaccine. Among them, serotypes 3 and 19 A are more closely associated with DP of pneumococcal origin. While serotype 3, which has a very dense capsule, resists phagocytosis and causes a pronounced inflammatory response including intense neutrophil infiltration with necrosis, serotype 19A, which has a high invasive potential, can grow more vigorously than other pneumococcal serotypes under normal sterile conditions and often resistant to many antibiotics and resistant to action [7]. *S. aureus* pathogens, capable of colonizing and evading the immune response, possess numerous virulence factors, including surface proteins that disrupt local defenses. When infected with *S. aureus*, after local defense is disrupted, the pathogen's toxin, which quickly destroys granulocytes and monocytes, causes infiltration of the lung tissue. On the other hand, by disrupting epithelial barriers and the immune function of cells, it facilitates the invasion of the pathogen into tissues [8–16]. Panton-Valentine leukocidin (*PVL-Panton-Valentine leukocidin*) is considered the most important of the generally recognized causes of DP, associated with severe forms of pneumonia in healthy children and adults [5–12]. The exotoxin produced by PVL first activates immune cells such as neutrophils and then destroys them, releasing foreign proteins that damage surrounding tissue. According to studies by French researchers, mortality in DP caused by PVL-secreting strains of *S. aureus* in children and adults reaches 56%, and antibiotic therapy in the form of monotherapy may be ineffective in 20% of patients [12]. However, it should be noted that the contribution



of pathogenicity of PVL-producing strains is difficult to determine. This is partly due to the fact that PVL has cell and species specificity, which manifests itself differently in individual cell cultures and experimental models. For example, human and rabbit neutrophils are highly sensitive to PVL in vitro, whereas monkey and mouse neutrophils are highly resistant to this effect. Moreover, although there is a strong association between PVL-producing *S. aureus* strains and skin and soft tissue infections in systematic reviews, no such correlation with pneumonia has been observed. Studies in adults suggest that viruses play a minor role in the development of DP. They can rarely act as a separate cause of DP, even in patients with severe adenoviral pneumonia. However, although there are few studies on the association of the disease with respiratory viruses, some reports have suggested an association of DP with RSV (respiratory syncytial virus) and influenza viruses. Thus, in a study conducted on 57 patients with pneumonia, respiratory viruses (rhinovirus, n=5; influenza, n=4; parainfluenza, n=2; coronavirus NL63, n=) were detected in the upper respiratory tract of 12 (21%) patients using PCR testing [16]. According to the results of another study, a virus culture (influenza, n=3; adenovirus + enterovirus, n=1; parainfluenza n=1, metapneumovirus, n=1) was found in 6 patients with hemolytic-uremic syndrome among 18 patients with pneumonia [10 - 16]. The mechanism of mutual association of viruses and bacteria in the respiratory tract is a multifaceted, complex and difficult to understand process. Thus, viruses have the ability to disrupt epithelial barrier and mucosal function, modulate immune function and interfere with immune system components, and reduce bacterial clearance by reducing phagocytosis and intracellular uptake of neutrophils and causing apoptosis. However, it should be remembered that no matter how difficult it is to study such an interaction, conducting this research is considered more important for the development of preventive social health strategies, diagnosis and treatment optimization.

**Microbiological diagnostics.** To determine the etiological causes of DP, a wide range of diagnostic tests are used (peripheral blood analysis, serological tests to detect pathogens such as *M. pneumoniae*, pleural fluid analysis, PCR, rapid antigen analysis, etc.). Among these studies, the study of pleural fluid using more sensitive molecular diagnostic methods has greater diagnostic value in order to reduce microbial culture. Pleural fluid can be collected during chest drainage, puncture, or thoracoscopy. Considering the presence of a pathogen such as pneumococci in a healthy child, sputum culture for the purpose of microbiological diagnosis is considered unreliable. Likewise, detection of viruses in the respiratory tract may not significantly influence the treatment plan (eg. stopping antibiotics). Thus, the detection of secreted viruses does not provide grounds for concluding that they are etiological agents [10]. However, one should not lose sight of the fact that the majority of patients (44–100%) were taking antibacterial drugs before hospitalization. Thus, it has already been established that positive laboratory test results can decrease by up to 64% after taking antibiotics. In such cases, it is considered more appropriate

to study pleural fluid using more sensitive tests, such as PCR [2-13]. Thus, some diagnostic difficulties associated with previous antibacterial therapy can be overcome using methods such as PCR.

**Antibacterial therapy.** Considering the above, the spectrum of antibacterial drugs used as first-line drugs in the treatment of DP should cover many gram(+) microorganisms, especially pneumococci, *S. aureus* and *S. pyogenes*. For this purpose, penicillin and ampicillin are the first choice drugs for severe but uncomplicated domestic pneumonia requiring hospitalization. Sometimes adding  $\beta$ -lactam antistaphylococcal antibiotics, such as oxacillin or flucloxacillin, to the treatment plan further improves the outcome [2-11]. It should be noted that the use of vancomycin in such patients is ineffective (it penetrates poorly into the lung parenchyma). Considering that the results of such empirical treatment are positive only in 8-55% of cases, the subsequent treatment regimen can be adjusted based on the results of laboratory tests and an antibacterial drug can be prescribed depending on the specific pathogen.

Thus, the use of  $\beta$ -lactam antistaphylococcal antibiotics is more effective and advisable in the treatment regimen for DP until laboratory identification of the pathogen. Although evidence is lacking, adding drugs such as linezolid, clindamycin, or rifampicin that have the ability to inhibit protein synthesis to the treatment regimen for DP caused by certain strains of *S. aureus* and *S. pyogenes* may increase the effectiveness of treatment. When DP develops against the background of pneumonia, it is preferable to use macrolides (clarithromycin or azithromycin) [2-15]. Type B.N. In children not vaccinated against influenza (Hib), or with nosocomial infections, empirical antibiotic therapy can be started with third or fourth generation cephalosporins. The optimal duration of antibiotic therapy in the treatment of DP has not been fully determined. However, in many studies this period varies between 13-42 days (average 28 days) [15]. During treatment, a decrease in body temperature to subnormal or normal values after 24 hours, as well as the absence of signs of sepsis in the patient and a dynamic decrease in inflammatory markers serve as a reasonable basis for transferring the antibiotic to oral administration. instead of intravenous or intramuscular injection. However, from this point on, antibiotic therapy should be continued for at least 10–14 days [11].

**Prevention.** More serious attention should be paid to preventive measures among children under 5 years of age, where household pneumonia is more common. Despite recent advances in medicine, the incidence of DP caused by pneumococci, especially their serotypes not included in the pneumococcal vaccine, has been increasing in recent decades. For this reason, it is recommended to strictly monitor such issues as improving living conditions, changing indoor air, providing clean drinking water, maintaining personal hygiene and nutrition, as well as expanding the level of medical care provided to children and vaccination [8-10].

**Result.** Considering the above, we can conclude that the main causative agent of DP, which is consid-

ered a dangerous complication of pneumonia in children, is *S. pneumoniae* and *S. aureus*. The persistence of high fever and symptoms of respiratory failure against the background of appropriate antibiotic therapy in a patient with pneumonia suggests DP. In such cases, first of all, it is considered important to correctly assess the interaction between the host and the pathogen, clarify the microbiological diagnosis, and also optimize conservative and surgical treatment.

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# ECONOMIC SCIENCES

## DIGITAL TRAVELERS AND TOURISM INDUSTRY

**Meladze Maia,**

*PhD., Professor, Grigol Robakidze University, Georgia*

**Sachaleli Nino**

*PhD candidate, Assistant, Grigol Robakidze University, Georgia*

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### Abstract

The paper is an integral part of the project "Research on the use of digital products in the Georgian tourism sector" which won the internal grant projects competition of Grigol Robakidze University.

The aim of the article is to study the role of digital technologies among the digital travels. The article demonstrates the current digital market and digital applications in tourism, which travelers are using while planning traveling and during the traveling itself. In the article are demonstrated the results of quantitative research, based on it, it can be said that digital technologies have completely changed the lifestyle of travelers, it has made traveling more flexible and affordable. The future is promisable, as applications are being developed and gaps which are identified while using digital technologies are eliminated, at the same time new functionalities are being implemented and their coming closer to answer.

**Keywords:** Smart Travelers, Digital Applications, Digital Era

### Introduction

Digital technologies are the trend nowadays and it is almost impossible to be competitive on the market if companies are not using digital technologies. Thus, nowadays a lot of applications and software are created that help business owners control their businesses and satisfy their customers. With the help of Artificial Intelligence software and applications, the business managing process is more complex, flexible and allows making hotels more customer orientated. The digital travelers themselves are actively using digital applications while traveling.

Computer-mediated technologies allow individuals, companies, NGOs, governments, and other organizations to view, create, and share information, ideas, career interests in virtual communities and networks. The use of the Internet and other information and communication technologies is ushering in a new era of global economy. The advent of digital tools has had a noticeable impact on tourism. A growing number of travelers plan their trips relying on online travel agencies (OTAs), digitally user-generated content (UGC) and other digital tools. Digitalization has also transformed the traditional roles of tourism producers and consumers, with new roles, relationships, business models, and competencies emerging. The rise of digital platforms has increased the variety and volume of tourism products, services and experiences, with on-demand functionality accelerating the speed of economic transactions, market awareness and feedback. These shifts have created new opportunities, as well as challenges, for tourism industry.

There are a lot of essential modern digital trends that those in the tourism industry need to be aware of, and adapt to, if they are going to successfully optimize business performance. Tourism business has to keep up with the latest digital trends, if they want to successfully operate on the market. In line with the new trends of traveling, there is a dynamically growing demand for

special tailor-made offers beyond mass tourism, as conscious consumers expect personal solutions that answer their individual needs.

### Literature Review

The industrial revolution, which began in the 1800s, was one of the most massive and global changes the world has seen, and it continues to shape in the present times. Revolution of the technologies is part of these changes. Advances in digitalization and Internet technologies are creating the new paradigm of industry, which is distinguished for rapid changes such as individualization on demand, increased ability of buyers to decide about the conditions of the exchange, more flexibility in the creation of products and services, decentralization with fast decision-making processes, efficient management of resources and sustainable approaches. It basically allows a strong technology-push in various industries and practices as well. These new processes bring a wide range of new trends related to short developing periods of products and services, and high innovation strategies that help many enterprises become successful [Gvaramadze 2022].

Technological advancements have brought great opportunities to the tourism industry as well. Easier access to the information through new technological advances has the potential to radically change the tourism industry. Tourist applications are in the seventh place in terms of downloads. 30% of consumers use a mobile app to book/buy a hotel, and 40% use a mobile app to book/buy airline tickets. These numbers grow every year. Internet advertising has had a significant impact on the management, promotion and sales processes of tourism companies. Therefore, on the perception of visitors who are planning trips using digital technologies [Gvaramadze 2022]. Virtual reality (VR) can be a powerful tool for destination marketing in the tourism industry. VR technology allows potential tourists to experience a destination before they book a trip, which can help them make more informed decisions about

where to travel. During the COVID pandemic, virtual tourism has become more popular around the world. For instance, to commemorate the 500th anniversary of Leonardo da Vinci's death in 2019, the Louvre Museum used virtual reality tours [Archi and Brahim Benbba 2023]. Moreover, apps like WalkinVR and Rendever provide accessible travel experiences for people with disabilities or mobility limitations, enabling them to explore the world without barriers. It is noteworthy that Cruise lines like Royal Caribbean and Carnival have started incorporating VR to enhance onboard experiences for their guests. Virtual reality (VR) is a powerful tool for destination marketing in the tourism industry. VR technology allows potential tourists to experience a destination before they book a trip, which can help them make more informed decisions about where to travel. Additionally, VR can allow visitors to improve their perceptions by considering hedonistic and emotional experiences [Archi and Brahim Benbba 2023]. However, the COVID 19 pandemic has clearly challenged the industry and its operations. Many companies have been negatively affected by important economic losses in millions of dollars and have had to deal also with losses of their workforce, who have chosen other, safer industries. The current situation is also affecting different communities and their destinations, which makes the entire industry re-think about problems and solutions, come up with changes and new innovations to recover, and be able to keep travelers safe and motivate them to travel to the touristic destinations [Muñoz 2023]. All things considered, digital innovation has become an essential element for tourism.

In addition, it is important to emphasize the process of sustainable tourism development. VR protects the environment from damage and pollution. On the other hand, it protects destinations from damage that can be caused by tourists, whether at the site's heritage, environmental or social level [Schmidt 2023]. For instance, National Geographic's VR app offers virtual safaris, allowing users to observe wildlife in their natural habitats. These experiences foster a greater appreciation for the natural world without disturbing ecosystems. Tourism industry is becoming more and more competitive day by day, that is the reason why tourism companies are trying to create and develop their own "Digital Ecosystem".

Besides, border control is a very important part of the tourism sector. The development of digital technologies facilitates these processes. For example, nowadays many airports use iris-scan, 3D facial recognition and touchless fingerprint scanners. This is the proof that in a few years, digital technologies will fundamentally change border management and create a huge opportunity for industry transformation [Kaspar al 2023].

The growth of role of digital technologies has become clearly in the Georgian market as well. In 2019,

22.6% of international visitors received information about Georgia from the internet, and in 2022 this figure increased by 25.5% [gnta.ge]. It is obvious that the Internet is one of the main ways of obtaining information. Representatives of the tourism sector actively use modern booking applications. Such mobile applications as Audio Guide Georgia, TravelGis, Expago, Biliki make the trip to Georgia even more interesting, comfortable and unforgettable for tourists. For example, the Audio Guide Georgia application performs the function of an audio guide and provides the services of a physical guide to tourists during excursion. It not only informs tourists about various history and places in detail, but also helps them to discover sightseeing from a completely different angle [Entrepreneur Georgia, 2023]. Very popular applications among Georgian travelers are TripAdvisor, Airbnb, Google Maps, HostelWorld, Uber, etc.

Overall, the decisive role of digital technologies in the modern tourism industry, including in the Georgian market, is obvious. Along with the increase in free time, expended energy and incomes, the desire for tourism products get higher. A good example of a solution to this, are electronic applications and digital devices, that save time and make travel much easier. At the same time as the development of technologies, the frequency and scale of their use increases.

### Materials and methods

The research was conducted using materials provided by articles, research papers and literature reviews as well as books of Georgian and foreign scientists. Furthermore, a quantitative (structured questionnaire was developed) method was used to obtain information about consumer attitudes towards digital technologies. The target segment of travelers was selected for data collection. The sample was selected by random sampling. The sample represents a diverse range of demographic characteristics, including age, gender and education. 303 people took part in the survey (period – from 15th of July to 15th of August), from which 300 answers were valid. They were randomly selected respondents, who had a desire to take part in the research.

Data was collected by using online surveys that were distributed through various platforms such as social media, online forums and email invitations. Quantitative research participants were given clear instructions on how to complete the questionnaire. The confidentiality of the respondents is ensured.

The quantitative was analyzed, with SPSS, using descriptive statistics such as frequencies, cross tabulation and means.

### Results and discussion

To summarize the results of the research, 300 people took part in the research, from which 54. 3% were women and 45.7% were men (see, Table1/ Gender).

Table 1.

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	163	54.3	54.3	54.3
	Male	137	45.7	45.7	100.0
	Total	300	100.0	100.0	

Note. Authors' according to the research

According to the age statistics most of the travelers were from 35-44 age group - 47.0%; 45-54 - 23.7% ; 25-34 – 23.30% ; 18-24 – 4%. (see, Table 9. Age and Frequency of Traveling Cross tabulation).

Table 2.

Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-24	12	4.0	4.0	4.0
	25-34	70	23.3	23.3	27.3
	35-44	141	47.0	47.0	74.3
	45-54	71	23.7	23.7	98.0
	55+	6	2.0	2.0	100.0
	Total	300	100.0	100.0	

Note. Authors' according to the research

According to the collected data 34% of respondents were having bachelor's degree, 54% master degree, 11.7% PhD and 0.3% secondary education (see, Table 3. Education).

Table 3.

Education					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bachelor	102	34.0	34.0	34.0
	Master	162	54.0	54.0	88.0
	PhD	35	11.7	11.7	99.7
	Secondary education	1	.3	.3	100.0
	Total	300	100.0	100.0	

Note. Authors' according to the research

The statistics show that most of the interviewers 82% were working full time, 11.7% part time, 5% were self-employed and 1.30% unemployed (see, Table 4. Occupation).

Table 4.

Occupation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Full time	246	82.0	82.0	82.0
	Part time	35	11.7	11.7	93.7
	Self employed	15	5.0	5.0	98.7
	Unemployed	4	1.3	1.3	100.0
	Total	300	100.0	100.0	

Note. Authors' according to the research

What about income, 1% had income from 0-500 GEL, 0.70% - 501-1000 GEL, 11.30% 1001-1500; 34% - 1501-2000 GEL and 53% more than 2000+ (see, Table 5. Monthly Income)

Table 5.

Monthly Income					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 – 500	3	1.0	1.0	1.0
	1001 – 1500	34	11.3	11.3	12.3
	1501 – 2000	102	34.0	34.0	46.3
	2000 +	159	53.0	53.0	99.3
	501 – 1000	2	.7	.7	100.0
	Total	300	100.0	100.0	

Note. Authors' according to the research

According to the statistics of the frequency of traveling: 0.30% chose once in a month, seldom - 8.3%, once in quarter - 16.7, once in a year 35.7%, and twice in a year 39.0% and this was the highest percentage (see, Table 6. Frequency of Travelling).

Table 6.

Frequency of Travelling					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Once in a month	1	.3	.3	.3
	Once in a year	107	35.7	35.7	36.0
	Once in quarter	50	16.7	16.7	52.7
	Seldom	25	8.3	8.3	61.0
	Twice in a year	117	39.0	39.0	100.0
	Total	300	100.0	100.0	

Note. Authors' according to the research

The cross tabulation was done in order to see the relationship between monthly income and the frequency of traveling. And it has been shown that, twice in a year (70 individuals) and once in a year (50 individuals) travel the group of individuals who have income more than 2000+ GEL (see, Table 7. Monthly Income and Frequency of Travelling).

Table 7.

Monthly Income and Frequency of Travelling							
Monthly Income and Frequency of Traveling Cross tabulation							
Count							
		Frequency of Traveling					Total
		Once in a month	Once in a year	Once in quarter	Seldom	Twice in a year	
Monthly Income	0 – 500	0	0	1	2	0	3
	1001 – 1500	0	14	4	4	12	34
	1501 – 2000	0	42	16	10	34	102
	2000 +	1	50	29	9	70	159
	501 – 1000	0	1	0	0	1	2
Total		1	107	50	25	117	300

Note. Authors' according to the research

At the same time cross tabulation was done to see the gender and frequency of traveling. The results showed, that the most of the females (68) travel twice in a year and on the second place is once in a year (52 female). What about males, 49 of them, which is the highest number, travel also twice in a year. The results demonstrate, that people are planning traveling on vacation time, which mostly is twice in a year (see, Table 8).

Gender and Frequency of Traveling Cross tabulation). The cross tabulation was also done to see the age and frequency of traveling, the data showed, that mostly active were people from 35-44- 58 people who travel twice in a year and once in a year (49 people) (see, Table 9. Age and Frequency of Traveling Cross tabulation).

Table 9. Age and Frequency of Traveling Cross tabulation

Table 8.

Gender and Frequency of Traveling Cross tabulation							
Count							
		Frequency of Traveling					Total
		Once in a month	Once in a year	Once in quarter	Seldom	Twice in a year	
Gender	Female	1	52	21	21	68	163
	Male	0	55	29	4	49	137
Total		1	107	50	25	117	300

Note. Authors' according to the research

Table 9.

Age and Frequency of Traveling Cross tabulation							
Count							
		Frequency of Traveling					Total
		Once in a month	Once in a year	Once in quarter	Seldom	Twice in a year	
Age	18-24	0	4	4	4	0	12
	25-34	1	21	10	10	28	70
	35-44	0	49	28	6	58	141
	45-54	0	31	8	3	29	71
	55+	0	2	0	2	2	6
Total		1	107	50	25	117	300

Note. Authors' according to the research

The results of the research showed, that sources of getting information for 58% were friends and for 35% was social media (see, Table 10. Sources of getting information).

Table 10.

Sources of getting information					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Friends	174	58.0	58.0	58.0
	Other	5	1.7	1.7	59.7
	Social Media	105	35.0	35.0	94.7
	Web-sites	16	5.3	5.3	100.0
	Total	300	100.0	100.0	

Note. Authors' according to the research

The question about priority while traveling demonstrated that 43.3% prefer traveling abroad and 44.7% both, abroad and in Georgia as well, only in Georgia preferred just 12% (see, Table 11. Priority while traveling).

Table 11.

Priority while traveling					
Where do you prefer to travel?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Abroad	130	43.3	43.3	43.3
	Both	134	44.7	44.7	88.0
	Georgia	36	12.0	12.0	100.0
	Total	300	100.0	100.0	

Note. Authors' according to the research

The respondents were asked question about using travel agencies, the results demonstrated, that 2% were using tourism agencies, 30.3% were not and 67.7% are using it seldom (see, Table 12. Collaboration with tourism agencies).

Table 12.

Collaboration with tourism agencies					
Do you use tourism agencies, while planning the tour?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	91	30.3	30.3	30.3
	Seldom	203	67.7	67.7	98.0
	Yes	6	2.0	2.0	100.0
	Total	300	100.0	100.0	

Note. Authors' according to the research

The frequency of using mobile apps statistics showed, that 86.3% were using them, 10% used them seldom and 0.7% did not use (see, Table 13. Using mobile applications while traveling).

Table 13.

Using mobile applications while traveling					
Do you use mobile applications while traveling?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	2	.7	.7	.7
	Seldom	39	13.0	13.0	13.7
	Yes	259	86.3	86.3	100.0
	Total	300	100.0	100.0	

Note. Authors' according to the research

The most popular web-site app appeared air bnb, which gives possibility to book the flat almost all over the world, at affordable price, then comes booking.com 27.7%; 2% of respondents book it directly from the hotel's web-site, which sometimes is cheaper (see, Table 14. Popular applications/ web-sites while traveling).

Table 14.

<b>Popular applications/ web-sites while traveling</b>					
Which application/website do you use to book the hotel?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Airbnb	209	69.7	69.7	69.7
	Booking.com	83	27.7	27.7	97.3
	Directly from Hotel's web-site	6	2.0	2.0	99.3
	Other	2	.7	.7	100.0
	Total	300	100.0	100.0	

Note. Authors' according to the research

According to the research, the most popular web-sites / applications are directly airline companies' web-sites (73.3%), which mostly offer tickets with cheaper price, the second popular app (22.0%) is skyscanner, which gives us ability to search for the cheapest tickets all over the world (Table 15. Web-sites / Applications for buying tickets).

Table 15.

<b>Web-sites / Applications for buying tickets</b>					
Which application/website do you use to buy the ticket?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Directly from airlines web-site	220	73.3	73.3	73.3
	fly.ge	8	2.7	2.7	76.0
	Kiwi	1	.3	.3	76.3
	skyscanner	66	22.0	22.0	98.3
	other	5	1.7	1.7	100.0
	Total	300	100.0	100.0	

Note. Authors' according to the research

The apps which are mostly used by digital travelers are google travel (79%) and 18% answered that, they are downloading apps by country (see, the Table 16. Applications which are used while traveling).

Table 16.

<b>Applications which are used while traveling</b>					
Which application do you use mostly while traveling?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Google Travel	237	79.0	79.0	79.0
	It depends on the country	54	18.0	18.0	97.0
	Other	2	.7	.7	97.7
	Tripadvisor	7	2.3	2.3	100.0
	Total	300	100.0	100.0	

Note. Authors' according to the research

The research showed, that 83% had information about Georgian application and 17 did not (see, Table 17. Information about Georgian applications)

Table 17.

<b>Information about Georgian applications</b>					
Do you have information about Georgian applications?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	51	17.0	17.0	17.0
	Yes	249	83.0	83.0	100.0
	Total	300	100.0	100.0	

Note. Authors' according to the research

Name the web-site, application, platform and etc. what you use firstly while planning to travel: Booking.com, cheap travel, wizzair.com, Maps.me, Tripadvisor, social media, trvelify, youtube. The research also showed that 152 female are using mobile apps and 107 men, in case of seldom frequency 9 female and 30 male and answer „no“ was marked by 2 respondents (see, Table 18. Gender and using mobile applications)



Table 18.

Gender and using mobile applications					
Gender and using mobile applications while traveling? Crosstabulation					
Count					
		Do you use mobile applications while traveling?			Total
		No	Seldom	Yes	
1.Gender	Female	2	9	152	163
	Male	0	30	107	137
Total		2	39	259	300

Note. Authors' according to the research

After all discussed data, the profile of Georgian Digital traveller was created (see, the Table 19. The Profile of Georgian Digital Traveler)

Table 19.

The Profile of Georgian Digital Traveler	
Gender	Female
Age	35-44
Education	Master
Occupation	Full time
Monthly Income	2000+
Frequency of Traveling	Twice in a year / Once in a year
Sources of getting information	Friends / Social Media
Priority while traveling	Both: In Georgia and Abroad
Using mobile apps	Yes
Buying airline's tickets	Directly from the app/web-site
Apps while traveling	Google Travell

The Georgian Agency for Innovation and Technology's is funding various apps and innovations from various field. Since 2019 there were funded projects from hospitality too (see Table 20. Granted Projects from travel/tourism industry).

Table 20.

Granted Projects from travel/tourism industry					
The type of Grant	Year	Beneficiary	The name of the project	Description of the project	Industry
Co-financing grants (100,000 GEL)	2019	Ltd. Travel Guide	Travel Guide	Tourism startup - "Travel Guide" represents an innovative tourism platform, the main goal of it is to develop the tourism sector by introducing innovative technologies.	travel/tourism
Co-financing grants (100,000 GEL)	2020	Ltd. Ofodo	OFOODO	The goal of the project is to create a platform - OFOODO.com, which will provide access to both local and international visitors to food establishments throughout Georgia.	travel/tourism
Co-financing grants (100,000 GEL)	2020	Ltd. Revi Boxes	REVI BOXES	REVI BOXES will be developed in collaboration with both hotel management and F&B management experts, who will ensure efficiency in operations and technical work.	travel/tourism
Co-financing grants (100,000 GEL)	2021	Ltd. Brothers Trail	Mobile travel guide Biliki	The goal of the project is to create a global marketplace for travel itineraries that will help travelers plan their tours and enable them to share and sell the tours they have created.	travel/tourism
Co-financing grants (100,000 GEL)	2021	Ltd. Areal Guide	AReal Guide	Creating a digital guide software platform for museums.	travel/tourism
Co-financing grants (150,000 GEL)	2022	Ltd. eConsul	eConsul	The goal of the project is to create a space that will help the traveler to fill in, store and manage his personal information	travel/tourism

Innovative entrepreneurship grant program in pilot regions (up to 100,000 GEL)	2022	Ltd. Samkhari	Art Winery	The main purpose and essence of Art Winery is to give new life to the field of winemaking, using modern technology, specifically holograms.	travel/tourism
Small grants for pilot regions (up to 30 00 GEL)	2022	Ltd. With Love	Racha with Love	The purpose of the web platform "Racha With Love" is to improve service delivery in the tourism industry and create a technological solution that is tailored to the structure of the Georgian tourism industry.	travel/tourism
Small grants for pilot regions (up to 30 00 GEL)	2022	Ltd. horsetour	Platform horsetours.ge	The goal of the project is the development of equestrian tourism, which means the digitization of the sector and increasing its accessibility, both for the user and for the service provider.	travel/tourism

Note. Authors, according to the research, data received from Georgia's Innovation and Technology Agency

### Conclusions

In conclusion it can be said, that digital technologies, was completely changed the lifestyle of travelers. Travelers nowadays are not booking tickets or hotels at travel agencies as they were doing it before. They prefer to plan everything on their own, as in some cases it is cheaper and also it makes traveling more flexible, customer orientated. The discussed data, also showed that in Georgia, there are Georgian digital apps and GITA has also funded 9 of them, but Georgian travelers are getting used to use it while traveling in Georgia. The research also showed, that in case on Georgian digital apps market will offer web-site or mobile application, which will give possibility to book all hotels in Georgia, as it is booking.com or Airbnb, it can have a positive future. The research also showed, that wide range of applications are on international digital market and they are being developed, with the help of feedbacks.

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## THE EFFECT OF PRODUCT DIVERSIFICATION ON THE ECONOMIC EFFICIENCY OF INDUSTRIAL ENTERPRISES

**Muxtarov Maxmudjon Marifovich**

*Andijan Mechine Building Institute*

*Teacher of the "Economics" department (PhD)*

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### Abstract

This article explores the features of the development of industrial enterprises, their current state today, as well as the influence of the diversification factor on the results of production. The author makes reflections on the development of the country's economy, improving the economic results of the industry and improving economic efficiency.

**Keywords:** Industry, company, efficiency, production, valuation, diversification, stock return, capital return, profitability, modernization.

**Introduction.** Development of industrial enterprises is the main task today. Political and economic aspirations and economic integration of countries are expressed on the basis of industry.

The development of the industrial network directly depends on the geography of the market of industrial products, and overall economic efficiency is ensured on the basis of improving the sale of products. The products of the country's industrial enterprises are in demand among buyers in the domestic and foreign markets and are entering new consumer markets. In 2022, the country's export volume will be 19.2 billion. amounting to soums and increased by 16.3% compared to last year. The main share of exports corresponded to industrial products and reached 26.1%. The export of textiles, non-ferrous metals, iron and steel metals increased by 7.2% compared to last year, that is, the geography of export of products will be more than 70 countries in 2022. Nevertheless, it is necessary to further increase the above indicators based on the effective use of existing production resources [1]. For this, first of all, it is necessary to establish production in accordance with internal capabilities based on a deep study of the demand for industrial products.

Based on these tasks, it is necessary to make effective use of production opportunities, modernize production equipment, organize production in accordance with market demand, ensure competitiveness and increase labor productivity. In this case, it is of urgent scientific and practical importance to study the efficiency of industrial enterprises based on the assessment of their economic status in practice, to determine the factors affecting efficiency, and to study the impact of product diversification on the general economic efficiency.

**Analysis and results.** In the activities of industrial enterprises, the adoption of new types of production based on diversification, the introduction of new technologies and, based on this, are considered a factor that ensures economic efficiency, and this is directly influenced by internal and external factors.

Internal factors include the state of existing technologies, the level of utilization of production capacity, modernization of equipment, innovation, management, and the level of product quality.

External factors are based on the market factor, macroeconomic stability, changes in consumer demand, competition, economic policy of the state, geographical conditions and price policy.

There are different approaches to the impact of diversification on the level of economic efficiency in industrial enterprises, and a number of interpretations have been used in the research work.

A.V. Gladkiy [5], V.G. Shadrina[13], M.P. Narzikulov [9], D. Mamadjonov [8] and Sh.Sh. Shadmanov [12] describes macro-level factors affecting production efficiency as strategic directions, state of infrastructures, geographical location of enterprises, level of territorial development, diversification process and those who studied on the basis of specific features of proportional organization and development of production infrastructure.

Parakhina V.N., Voronova G.V., Momotova O.N. estimated that the diversification of enterprise activities directly depends on the location of production and the degree of specialization of regions based on the following formula [14].

$$D = \frac{d_{VRP}^{otr}}{D_{VRP}^{otr}} \quad (1)$$

In this:

D- level of diversification of the regional economy;

$d_{VRP}^{otr}$ - the share of industry in the gross regional product (GDP);

$D_{VRP}^{otr}$  —the share of foreign industry in the gross domestic product (GDP).

In many studies, V.S.Mkhitaryan, M.G.Polikarpova justified the high possibility of assessment based on the Herfindalya-Hirshmana index. The Herfindalya-Hirshmana index is used to evaluate market competition and is calculated based on the following formula [10] .

$$HI = S_1^2 + S_2^2 + \dots + S_n^2 \quad (3)$$

Here:  $S_1, S_2$  are the ratio of the volume of the company's sold products to the volume of total industrial products.

In the above studies, if the diversification of production was evaluated based on the branch and regional characteristics, the breadth of statistical data and their use cause inconvenience.

Although the presented methods are effective for use in the activities of enterprises, they cannot fully assess the efficiency of diversification of enterprises, but they can be used to estimate the overall diversification coefficient. In our opinion, when approaching diversification from the point of view of economic efficiency, determining this indicator based on the change in the volume of sold products will give a positive result. Therefore, the methodology for assessing the quantitative and qualitative level of diversification for industrial enterprises has been improved.

$$DE_t = \left[ \left(1 - \frac{1}{n}\right) * \sum_{i=1}^n \frac{SQ_t^i}{Q_t^i} \right] - \left[ \left(1 - \frac{1}{m}\right) * \sum_{j=1}^m \frac{SQ_b^j}{Q_b^j} \right] \quad (4)$$

In this case:  $DE_t$ -diversification efficiency;  $n$ -the number of types of products produced by the enterprise during the period of diversification;  $m$ -the number of types of products produced in the initial state;  $SQ_t^i$ - is the volume of products sold after diversification;  $SQ_b^j$ -

volume of sold products in the period before diversification.

Based on the analysis of the considered methods, based on the above information, the evaluation of the efficiency of diversification in the assessment of the economic efficiency of industrial enterprises is an acceptable method.

Based on the above information, we will develop proposals and recommendations for increasing the economic efficiency of industrial enterprises based on the studied indicators and the use of methods for their determination.

The dynamics of production of textile products in Andijan region industry has changed somewhat. In particular, the share of textile products did not change during 2012-2014, it was equal to 14.6% in 2015 and 14.7% in 2021. The increase in the production volume of ready-made clothing products by industrial enterprises will be equal to 8.9% in 2022, which is 5.5 times more than in 2012 and 3.9 times more than in 2016.

Table 1

The share of textile and ready-made clothing products in total industrial products <sup>1</sup>		
Years	On textile products	On ready-made clothing product
2012-y.	8,5	1,6
2015-y.	11,2	2,0
2020-y.	7,7	5,5
2021-y.	8,3	5,8
2022-y.	14,7	8,9

Taking into account the high raw materials, material resources and labor resources of the region's economy, the development of resource-intensive enterprises (with high material resources and labor capacity) creates an opportunity to ensure economic growth. Therefore, it is necessary to diversify the production of textile industry enterprises in the region.

Based on the above information, it is necessary to produce competitive products on the basis of diversification and concentration of resources for the development of the industrial network in the region.

Based on the results of the conducted research, the following conclusions were reached based on the study of the results of the industrial enterprises of Andijan region:

Although the industrial sector is considered one of the leading sectors in the national economy, the economic opportunities of industrial enterprises in Andijan region are insufficient, because the state of raw resources, the level of utilization of production capacity, and the incomplete satisfaction of the demand for products hinder agricultural processing and construction enterprises. expresses the need for development;

In the location of industrial enterprises, taking into account the state of available resources, population location, infrastructure, regional characteristics and level

of specialization, locating enterprises that have a negative impact on the environment in less populated areas (Ulug'nor, Boston);

for the development of the industrial network, the possibilities of diversification of production were evaluated, taking into account the high impact of product consumption, available material and labor resources on the activity of textile enterprises.

Therefore, one of the main factors for improving the realization of products in enterprises is based on diversification. We study the economic efficiency of product diversification based on its cyclical characteristics. We analyze the effectiveness of diversification based on the above determination methodology (3).

$$DE_t = \left[ \left(1 - \frac{1}{7}\right) * \sum_{i=1}^7 \frac{QS_1^i + QS_2^i + \dots + QS_7^i}{Q_t^i} \right] - \left[ \left(1 - \frac{1}{5}\right) * \sum_{j=1}^5 \frac{QS_1^j + QS_2^j + \dots + QS_5^j}{Q_b^j} \right] =$$

$$= \left[ \left(1 - \frac{1}{7}\right) * \frac{964536,8}{999520,1} \right] - \left[ \left(1 - \frac{1}{5}\right) * \frac{291890,3}{317272,7} \right] =$$

$$= (0,857 * 0,965) - (0,8 * 0,92) = 0,091$$

In Skorton Textile LLC, this indicator was equal to 0.83 coefficient in 2022 and 0,74 coefficient in 2020. According to the above methodology, the difference is improved by 0.09 (or) 9.1 percent (Table 3).

<sup>1</sup> Data from Andijan Region Statistics Department.

Table 3

Diversification efficiency (coefficient) in some textile industrial enterprises in Andijan region <sup>2</sup>				
№	Years	2021-y	2022-y	farq
1.	"Skorton tekstil" LLC	0,74	0,83	0,091
2.	"Saxovat Teks" LLC	0,79	0,87	0,083
3.	"Xo'jaobod turon tekstil" LLC	0,76	0,92	0,16

In "Sakhovat Teks" LLC, this indicator was equal to 0.87 coefficient in 2022 and 0.79 coefficient in 2021. As a result, diversification efficiency was 0.08 (8.3 percent), i.e., this indicator was equal to 0.16 coefficient in "Khojaabad Turon Textile" LLC.

**Conclusions and offers.** As a result of our research, it is of scientific and practical importance to study the diversification of the market of industrial products into the following groups

So, diversification of products in production is one of the resources that ensures the balanced development of not only the industrial sector, but also all sectors of our economy, that is:

- expansion of blood circulation;
- introducing new types of products into production;
- ensuring economic development based on marketing and innovative activities has a direct impact.

Therefore, there is a high possibility of mastering a new type of production, modernization of production equipment, supporting innovations and increasing the volume of products based on the diversification of textile products.

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<sup>2</sup> Author's development based on the information of "Skorton Textile" LLC, "Sakhavat Teks" LLC and "Khojaabad Turon Textile" LLC

# MEDICAL SCIENCES

## EPIDURAL ANESTHESIA FOR CAESAREAN SECTION IN A PATIENT WITH BASILAR ARTERY ANEURYSM – CASE REPORT

**Ljubiša Mirić,**

*specialist in anesthesiology, resuscitation and intensive therapy,  
General Hospital Kruševac, Anesthesiology department*

*Kosovska 16, Kruševac*

**Tijana Smiljković,**

*specialist in anesthesiology, resuscitation and intensive therapy,  
General Hospital Kruševac, Anesthesiology department*

*Kosovska 16, Kruševac*

**Jelena Stanisavljević Stanojević,**

*General Hospital Kruševac, Anesthesiology department  
Kosovska 16, Kruševac*

**Ivan Petrović**

*General Hospital Kruševac, Anesthesiology department  
Kosovska 16, Kruševac*

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### Abstract

Pregnancy complicated by the diagnosis of intracranial aneurysm is an example of high-risk pregnancy where maternal and fetal mortality caused by rupture of the aneurysm is 5-12% compared to mortality in the general population which is 0.01-0.09%. The main feature is accidental detection due to non-specific resistant headaches. In this case report we discuss the anesthetic management for cesarean delivery of a parturient with an unruptured aneurysm. The anesthetic technique of choice was epidural anesthesia, L3-L4 level and administration of local anesthetic - levobupivacaine 0.5% with opioid adjuvant - fentanyl. The relationship between the mode of delivery and risk for aneurysm rupture is not well defined.

The decision on anesthetic management is significantly influenced by the physiological changes of pregnancy because they increase the risk of aneurysm rupture as a result of sudden changes in intracranial pressure. Hemodynamic stability is crucial for safe and secure anesthesia and controlling the risk of aneurysm rupture.

**Keywords:** Unruptured basilar artery aneurysm, parturient, epidural anesthesia, caesarean section

### INTRODUCTION

High-risk pregnancies are a significant problem and a challenge for both gynecologists – obstetricians and anesthesiologists because they require a multidisciplinary approach. They are characterized by an increased risk of possible complications and a significant degree of morbidity and mortality.

Pregnancy complicated by the diagnosis of intracranial aneurysm is an example of high-risk pregnancy where maternal and fetal mortality caused by rupture of the aneurysm is 5-12% compared to mortality in the general population which is 0.01-0.09%. (1) The female sex is a significant independent predictor of the formation and growth of aneurysms. According to the International Study of Unruptured Intracranial Aneurysms of 4060 examined patients with 75% were female (2). Hormonal imbalance and physiological changes as a result indicate two periods most vulnerable to the development and progression of aneurysms – pregnancy and menopause. Pregnancy is also characterized by hemodynamic physiological changes, especially pronounced in the third trimester and the term of childbirth. Fluid retention in the body causes an increase in cardiac output, by about 50% in the third trimester (2,3), caused by the development of hypertension accompanied by tachycardia, increased stress on

the wall of the blood vessel, which affects the development or enlargement of an existing aneurysm and an increased risk of rupture.

There are still no clearly criteria for deciding how to complete a pregnancy, but operational technique – cesarean section in the literature is represented with about 78% (3) in untreated aneurysms, while in operationally resolved aneurysms can safely plan vaginal delivery. From an anesthesiological point of view, there are also no clearly defined criteria, but the guiding principle in the decision is the same, avoid possible complications, rupture of the aneurysm. When it comes to untreated aneurysm, asymptomatic without significant progression in pregnancy, regional anesthesia is proposed due to the possibility of monitoring the neurological status of the pregnant woman / mother, while when it comes to symptomatic aneurysms, then there is general anesthesia and simultaneous childbirth and neurosurgical treatment postulate.

### CASE REPORT

Pregnant woman 36 years old, first pregnancy was prepared for caesarean section due to the diagnosis of a basilar artery aneurysm. The diagnosis was made two years before pregnancy on NMR due to nonspecific headaches and pain in the lumbosacral spine (picture No 1) Regularly monitored by a neurosurgeon before and during pregnancy. Without neurological expression



of aneurysm during the entire period. Without significant comorbidities, during pregnancy due to tachycardia, calcium blocker therapy was introduced – Verapamil tbl 40mg. It was suggested by neurosurgeons that the pregnancy end with a caesarean section, with the suggestion that the type of anesthesia be neuroaxial spinal anesthesia. In preoperative preparation by anesthesiologists, it was decided that the anesthesiological approach should be neuroaxial epidural anesthesia. Preoperative preparation involved the control of vital parameters and preload of the patient by infusion of crystalloid 1000ml Sol. Ringer. Epidural space was identified at the L3-4 level using the loss of resistance method and placed an epidural catheter to a depth of 8cm to reach the block level up to Th 4. After checking the position of the epidural catheter with test dose (Lidocaine 2%), a bolus dose of local anesthetic with an

adjuvant (12ml 0.5% levobupivacaine with 2ml fentanyl) was given. At the same time, an infusion of ephedrine (25mg/500ml salt) was started, with the aim of titrating the rate of infusion and thus maintaining stability without sudden variation. The newborn was of satisfactory neonatological status, APGAR 9. The patient was hemodynamically stable during cesarean section and during the first 24 hours postoperatively without any changes in general condition. Postoperative analgesia was provided via the placed epidural catheter – 6ml of 0.25% levobupivacaine with opioid adjuvant. The epidural catheter was removed 48 hours after cesarean section. During the peripartal period without the manifestation of neurological expression of the existence of an aneurysm. The patient in good general condition was discharged home on the third day.



Picture No 1 NMR aneurysm a. basilaris (aneurysm size 2.8 mm)

## DISCUSSION

An intracranial aneurysm is a thinning/enlargement (fusiform aneurysms) or protrusion (saccular "berry" aneurysms) localized on the arterial blood vessels of the brain. According to various studies, it is estimated that they exist in 6% of the adult population. (3,4) The most common localization are the places where the arteries branch – locus minoris resistance. For the formation of an aneurysm, it is necessary that the wall of the blood vessel at the place of its occurrence is altered by birth or by the action of some of the harmful factors (high blood pressure, cigarette smoking, cocaine use, infections of blood vessels, female sex, altered blood stream flow . . . ) (4).

Intracranial aneurysm is characterized by nonspecific symptoms (pain above and/or behind the eye, changes in vision or double vision, unilateral enlargement of the pupil, tingling of half of the face, epileptic seizures) which are most often the result of enlargement and pressure on the surrounding structures – cranial nerves. The anterior, carotid part of cerebral circulation is the most common site of localization of the aneurysm 88.64% (a. cerebri media most often affected 36.21%) versus 11.35% aneurysms of the posterior, vertebro-basilar part (Clinic for Neurosurgery KCS) (5,6). The

importance of vertebrobasilar chain aneurysms (a. basilaris) is characterized by the progressive development of the mass effect in the enlargement of the aneurysm. Aneurysm size and risk for rupture – intracranial hemorrhage are not correlated, Raps et al reported 7 patients with symptomatic aneurysms less than 10mm, Przelomski showed 10 patients, while Račić et al reported 8 patients (7). The third trimester and childbirth itself are the periods of greatest risk for ruptures of the existing aneurysm, in relation to hemodynamic changes. This affects the obstetric decision for the operative termination of pregnancy. During the first 8th week of pregnancy there is an increase in cardiac output by about 20% while the maximum increase of about 60% is expected around the 28th week of pregnancy. In addition to this vasodilation of peripheral blood vessels and lowering peripheral vascular resistance is observed with about 25-30% (7) and is another factor of hemodynamic changes. During childbirth, there is a significant increase in cardiac output by about 15% in the first birth ingenuity even by about 50% in the second birth ingenuity, which is a consequence of the body's response to pain and excitement, sympathetic stimulation – an increase in pressure and pulse. (3,4,7)



The anesthesiological approach to a pregnant woman with a diagnosed aneurysm is directly dependent on physiological hemodynamic and hormonal changes in pregnancy, there are still no clearly defined criteria for choosing the type of anesthesia, but neuroaxial anesthesia stands out because of the possibility of monitoring the neurological status of the patient during labor. Another significant advantage is bypassing sudden hemodynamic variations during general anesthesia. Induction to anesthesia is characterized by the influence of drugs – hypnotics, muscle relaxants. Ensuring the airway – intubation is accompanied by a sudden jump in pressure and pulse and special importance is placed on the known risk of the scenario of difficult airways in pregnant women, the risk of aspiration – a full stomach (8,9,10). According to available data, the risk of aneurysm rupture during the induction to anesthesia ranges from 0.5-2% (2) with a mortality rate of 75%. For the purpose of simultaneous obstetric and neurosurgical work, general anesthesia is chosen, but even then the most important emphasis is on hemodynamic, uteroplacental and intracranial stability. In these patients, the suggestion is to avoid the administration of mannitol and osmotic diuretics until the completion of obstetric work in order to maintain good uteroplacental circulation and avoid dehydration and hypernatremia of the newborn, after obstetric work neurosurgically guided by the basic postulates of maternity care (5). Neuroaxial anesthesia, spinal block, according to literature data, had a slight advantage over the epidural block, as a factor of decision emphasized the technique and speed of the performed block, i.e. the risk of accidental puncture of the dura when performing the epidural block with a wide Tuohy needle and consequently a sudden variation of the intracranial and cerebral perfusion pressure. While a significant advantage of epidural block is better hemodynamic stability and the absence of sudden variations in hemodynamics after giving local anesthetic, less pronounced nausea and urge to vomit thus less strain of the patient, as well as early rapid mobilization without the need for 24 hours bed rest after childbirth. In our review, we showed another significant advantage, the ability to place an epidural catheter and provide prolonged postoperative pain control and thus maintain hemodynamic stability in the first 48 hours, which are considered the highest risk period when pain can be a significant provoking factor.

When deciding on epidural block as the choice of anesthesia, block safety is a very important factor that entails the experience of performing an epidural block in pregnant women without comorbidities, then impeccable and safe checking of motor and sensory block and giving enough time to achieve adequate block before starting operational work. After the birth of the baby, it can be started continuous infusion of remifentanyl on the syringe pump (ml/h or TCI) to achieve adjuvant analgesia. (11,12) According to some studies there is a possibility of using adjuvant short-term doses of remifentanyl infusion until the incision on the uterus when stopping the infusion is necessary to prevent respiratory depression of the newborn.

The progress of radiological examinations and their wider representation in the general population

made it possible to detect many more patients of the generative period with the existence of aneurysms. There are still no official data on the incidence and prevalence of these patients, but the anesthesiological approach is directly related to the fact that anesthesia and surgical treatment can be the moment of manifestation of the first symptoms, and at the same time the complications of the existence of unruptured asymptomatic aneurysms.

#### CONCLUSION

The choice of anesthesia management is based on the safety and security of the patient during the perioperative period. It requires a good plan and consideration of all parameters during decision-making. This is especially important in obstetrics with an emphasis on high-risk pregnancies, because there is always the care of at least two lives, mother and newborn. Intracranial aneurysm in pregnancy is a major challenge and requires multidisciplinary approach with respect to the postulates of hemodynamic, uteroplacental and intracranial stability of the patient. Insufficient number of papers on this topic and defining clear recommendations are an aggravating circumstance and therefore each new patient brings some new knowledge and experience. Our conclusion is that epidural anesthesia in the safe hands of an experienced anesthesiologist is the best choice for caesarean section.

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# PEDAGOGICAL SCIENCES

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## BASKETBALL AS A MEANS OF PHYSICAL EDUCATION

**Nigar Mohammad Ibrahimova***Professor of the "Types of Sports Games"**department of the Azerbaijan State Academy of Physical Education and Sports*<https://orcid.org/0000-0001-5145-0448>[DOI: 10.5281/zenodo.10151234](https://doi.org/10.5281/zenodo.10151234)

### Abstract

Outdoor games are an integral part of the national culture of every nation. Because these games instill motor activity specific to each person, play an important role in his physical and psychological development, and the development of personal qualities. In this regard, outdoor games such as basketball, volleyball, football and so on are not only a factor ensuring the development of the body, but also one of the main means of physical education and sports. Recently, the popularity of basketball in Azerbaijan has been increasing. This is happening as a result of the joint efforts of the National Olympic Committee, the Ministry of Youth and Sports of Azerbaijan and the Azerbaijan Basketball Federation.

**Keywords:** basketball, outdoor games, exercises, physical education, sports

At the present stage of development of our country, the strategic goal is to achieve the complete and sustainable development of the system of physical education and sports in the country, improve with its help the health of children, adolescents and young people, solve pressing social and economic problems in society and organize activities in accordance with the requirements of the modern era. The main directions in this area are the formation of physical culture and sports activities as a healthy lifestyle in the minds of schoolchildren and students, the achievement of a high level of physical education through the formation of abilities necessary for their physical development and physical improvement, and the development of a creatively thinking citizen and personality. The goal here is to develop in each athlete the physical qualities characteristic of the sport. The games are related to each other in many ways. For example, variety of movements, intensity, change in physical activity, etc. Since this process lasts a long time, the athlete is required to have special endurance, speed, strength, agility, and so on. In connection with the technique and tactics of performing tricks taught for this purpose, special training and its elements, as well as systematized movements, are used in the training process.

In order to organize public health, sports activities are organized and conducted in educational institutions. Such important government work is carried out by physical culture groups created under these organizations. The physical culture team is headed by a council. The council creates divisions for sports including basketball, volleyball, football, handball, in accordance with other local opportunities. In each of these divisions, groups or teams are organized depending on the age, gender and level of training of those involved. In many cases, a group combines 2 teams. Boys and girls are included in groups by age. The training is conducted by the trainer who is responsible for the training of the unit. In each created group, at the general meeting of the unit, a representative of the group is elected, and in

the team - a captain, members of 3-7 people. They participate in organizing their teams, drawing up a general work plan and admitting new members to the unit. They also take part in budgeting, overseeing their training, teams' preparation for competitions, etc.

Basketball, like other sports, began to take its first steps in Azerbaijan in 1920. Basketball gradually became the favorite game of Azerbaijani youth, and for the first time it began to be played in Baku - on the courts of the Government House, the swimming school and sailors of the Caspian Fleet. In 1920, basketball was developed in two sports societies: the Unitas sports club and the physical education society.

Since 1923, the sport of basketball has been included in the program of all complex competitions and sports days, and the mass organization of simple sports grounds for basketball has become the focus of attention of most organizations. It is known that in Baku basketball was in third place in popularity after football and volleyball. The first Baku championship took place in October 1924. Beginning in 1924, basketball teams were organized and games were held not only in the city, but also in the districts.

Since then, teams have been created in individual work collectives, departments and enterprises, higher educational institutions, sports societies, and the number of basketball fans involved in training has increased every day. In 1926, about 300 basketball teams and exercises were registered in Baku alone. This was no accident.

In the 1920-1930s, the strongest basketball team in Azerbaijan grew up in the Demir Yolu sports club. It is no coincidence that the team of this club has been awarded the title of champion of Azerbaijan for several years.

In 1931, the Azerbaijani men's team won the Transcaucasian Championship and for the first time won the right to compete as an independent team at the USSR Championship. Starting from this year, the Azer-

baijani men's team has been leading in the Transcaucasus for a long time, and the level of technical and tactical training of our athletes is being modernized and modernized every year.

Since 1934, the republican basketball championship was held for the first time. This was due to the development of basketball in other cities and regions besides Baku. The national teams of Baku, Ganja and Khanlar performed at these competitions. The team of the Baku society "Dynamo" was awarded the name of the first champion of the country. Let's also assume that this company maintained this leadership for the next five years in a row.

As a result of the wide spread of basketball in Azerbaijan and the training of talented basketball players in our republic, starting in 1935, the Azerbaijani national team began to successfully compete in the USSR Championship. From the same year, the women's team of our republic began to test their strength in the USSR championship competitions. The following year, 1936, it can be felt that there has been a significant improvement in the technical and tactical skill of our team, and the results of the official meetings held by both teams can once again prove this. Basketball teams have played approximately 100 international matches. Our republic's men's basketball team was especially strong, winning the right to play in the major league several times.

The spread and development of basketball in Azerbaijan is associated with the name of the Honored Coach of the USSR, Professor T. Abasov, and this talented coach devoted his entire adult life to the noble cause of the development and flourishing of basketball.

Azerbaijani basketball, which experienced stagnation at the end of the twentieth century, entered a new stage of development under the influence of the victories of Azerbaijani athletes at the Olympic Games. The Azerbaijan Basketball Federation (ABF) was created in 1992. Z. Salakhova was elected as the first president of the ABF, and under his leadership, the Azerbaijan Basketball Federation (ABF) was accepted as a full member of the International Basketball Federation (FIBA) in 1994, which gave our team the right to compete in international competitions. competitions under the flag of our independent state. In order to ensure their mass participation, a southern regional branch of the ABF was created in Jalilabad, and a regional center of the ABF was created in Ganja. Thanks to raising international relations to a new level, as a result of the work

done by ABF, Azerbaijani basketball players, starting in 2000, began to regularly participate in international competitions. The Azerbaijani national team participated in this tournament. A representative of the Azerbaijan Basketball Federation was elected a member of the BTBL Council.

Recently, the popularity of basketball in Azerbaijan has been increasing. This is happening as a result of the joint efforts of the National Olympic Committee, the Ministry of Youth and Sports of Azerbaijan and the Azerbaijan Basketball Federation. On their initiative, since 2002, Lithuanian Rimas Kurtinaitis, Olympic champion, world and European champion, has been invited to train our team at the world level. With the arrival of R. Kurtinaitis in Azerbaijan, a new stage in the development of basketball began, and the number of basketball players is increasing every day. He won gold medals at the IV Islamic Solidarity Games held in Baku.

Thus, outdoor games develop speed, agility, speed, and create the basis for physical improvement (especially in a competitive form). The game teaches people how to behave in a team, instills the skills to subordinate their personal interests to the common good. It also teaches one to be strong-willed and skillful, and teaches one to act correctly and independently. Play is also a means of education; it helps the development of speech and intelligence, increases initiative, and affects cheerfulness and dexterity. Outdoor games have been used at all times in accordance with people's lifestyles. In the 17th century, educators realized that these games played a big role in the learning and physical and mental development of children and believed that these games should be widely used in education.

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## WHAT EXTENSIVE READING IS, AND WHY IT IS A GOOD IDEA TO IMPLEMENT IT

Solovev Aleksandr,

*graduate student, Moscow International Academy,  
1/15A, Novomoskovskaya, Moscow, Russia*

Maria Pestova

*PhD (Philology), Associate Professor, Moscow International Academy, 1/15A,  
Novomoskovskaya, Moscow, Russia*[DOI: 10.5281/zenodo.10151268](https://doi.org/10.5281/zenodo.10151268)**Abstract**

The article reviews the body of research on extensive reading and briefly explains main benefits, such as learners' overall language development, automated lower-level skills of word recognition and parsing processes, increased vocabulary knowledge without direct vocabulary instruction, improved writing skills, increased motivation for learning languages, and confidence in reading. Using extensive reading persistently in reading courses creates few demands and challenges for the teacher and doesn't involve time-consuming lesson preparation.

**Keywords:** extensive reading, intensive reading, reading fluency, reading for pleasure.

Teaching young learners to read, oftentimes, the teacher focuses first on reading mechanics and word recognition, and once the necessary level of skill is achieved, young learners are engaged into in-class reading activities, where the teacher, while trying to further build their reading skills, also begins introducing them to strategies, that will allow students to read for particular information. This kind of reading is commonly known as reading to learn and intensive reading. While intensive reading is undeniably important, because its approaches and goals are well-aligned with the Common Core Standards, many researchers consider it crucial to always remember the simple idea, that the best way to learn to read is through reading. Students who read permanently and persistently, discover the pleasure of the process of reading, provided that they are free from the pressure of the lesson's tight timing and the looming after-reading tests (1).

R. Day emphasizes that reading is the interactive process, when readers use all sorts of their individual knowledge about the world and the language to build meaning (2). No two readers will draw identical conclusions about the same text, or have identical experience of reading the same book due to the differences in language proficiency, metalinguistic awareness, speed of cognitive processing, etc. So, reading needs to be given time and space to develop as a skill, and intensive reading-associated learning activities though being useful in their own way, can neither dramatically speed up or, moreover, replace this process. According to Day, such methods as grammar-translation method, or answering comprehension Qs, or discussing the content, though using reading as a part of the lesson, do not teach reading as such.

To briefly define extensive reading (ER), and to distinguish it from intensive reading (IR), we will address the abundant body of research available on the topic. Warning suggests an acronym 'READ' to point out the key characteristics of IR. It stands for 'reading quickly', 'enjoyability', 'adequate comprehension' and '(students) don't need a dictionary' (3). The factual rationale for the latter principle was provided in the study by Day, demonstrating that two groups of readers, with and without a dictionary showed no difference in text

comprehension, but it took the dictionary group took twice longer to finish reading. Reading quickly requires fluency, whose development actually being one of the target skills of ER, can be ensured by choosing books of appropriate difficulty.

Discussing difficulty of books used for ER, all researchers are unanimous that they should be easy. This refers to Krashen's comprehension hypothesis that claims that comprehensible input is an inalienable for language development, and ER should comply with this requirement. To put the demand for comprehensible input in more definite terms, Day and Bamford suggested to base on Krashen's formula, where comprehensible input is  $(I+1)$ , but instead of aiming for the zone of proximal development, subtract one level for the sake of reconsolidating already familiar language knowledge (4). Thus, for ER, comprehensible input will be at the learners' current level, or better, slightly below  $(i - 1)$  (5). In practice, learners can be taught to define their level independently by following a simple procedure: students should pick a book whose title appeals to them and read one page. If their reading speed is under 80 words per minute, and if they encounter more 2 unfamiliar words per page struggling with comprehension at the same time), then they must choose a book at an easier level. To make sure this level suits them, they are recommended to try another book at that level. They can also upgrade their level if the text feels too easy, but their main aim should be to feel comfortable while reading (3).

Simplicity of ER books is vital, because it is one of the things that build fluency. Among others is a thorough selection of reading materials, that should be purposefully written for students' level and contain a lot of high-frequency words and repetition (6). Higher lexical frequency increases the chances that the lexis will be learned and retained for longer. Unless a certain number of recurrent presentations of the word is ensured, it is likely that the word will not be retained even if form-meaning mapping was successful, and the students could fluently recognize it while reading. According to Day & Bamford, a sufficient repetition number is considerably higher than seven to nine times for long-term retention (4), which would look unnatural in not

adapted authentic texts, which lead to the conclusion that authentic texts cannot be used for ER.

Developing fluency allows readers to move away from word-by-word reading. Contrary to the common opinion that slow reading is more conscious reading that helps to enhance comprehension, reading slowly is poor reading. It may prevent information from reaching readers' long-term memory, which, in turn, may hinder information processing (6). Scanning, skimming, predicting by the topic, recognizing signal words are fluency strategies; being taught in-class, they will facilitate independent ER.

In terms of enjoyability, a chance to select a book one likes cannot be overestimated. The importance of providing language learners in ER programmes with the freedom to self-select materials has been highlighted by Grabe. Ateek refers to a study of 70 male EFL Saudi university students' reading speed, which demonstrated that those who self-selected their graded readers showed greater improvements in their reading speed than those who were assigned a text to read (1).

Speaking about adequate comprehension as one of the key characteristics of ER, it is important to mention that comprehension is a strategy-driven skill. Strategies are conscious behavior that needs to be taught through direct instruction, so IR provides a better context for strategy introduction. Nevertheless, being applied frequently enough, strategic behavior becomes automatic and turns into a skill. Research shows that consistently applying strategies helps students become better readers. This is the reason why many researchers promote the necessity to merge intensive and extensive approaches. For instance, Waring argues that ER is still often seen as supplemental to a main program, while it should be a core part of every language curriculum, and all language programs must have an ER component<sup>3</sup>. He urges that ER program should be aligned with the goals, aims and objectives of the school, otherwise, it will lack of direction. Thus, the key to a successful reading program is balancing course work with ER. Too much IR leads to not enough work on developing fluency. Too much ER prevents a learner from noticing certain language, and too much work only on reading skills and strategies will not develop the skill of reading. Insufficient work on vocabulary holds back fast development of reading skills (3).

ER and IR integration wise, one type of activities that can be applied to ER Timed Repeated Reading. It suits ER and IR lessons, but only under the condition that students read already familiar texts. They start from the beginning and read for one minute at a comfortable speed, after which they stop and underline the last word read. Then they go back to the beginning, read for another minute, stop and underline. The procedure is repeated several times. This helps to increase reading rate without urging students to read faster and enhances sight vocabulary, as increasingly rapid recognition of words in a text activates links between the graphic form and phonological information, links together appropriate semantic and syntactic resources, helps students to

recognise morphological affixation and access their mental lexicon (4).

Not needing a dictionary – the last principle postulated by Waring – is directly connected with learners' lexical knowledge and their strategic behavior, when they come across a new word. Some researchers argue that ER is mainly suited for reinforcing partially familiar words rather than building new vocabulary. Nevertheless, this does not exclude the learning and the acquisition of new vocabulary entirely (7). Day claims that the main benefit of old vocabulary reinforcement is learning new meanings of familiar words, and thus, expanding their semantic fields and learning new collocations. Brown et al. cite Horst, Cobb and Meara who claimed that through extensive reading learners can "enrich their knowledge of the words they already know, increase lexical access speeds, build network linkages between words, and...a few words will be acquired (4)". Waring agrees that the percentage of new vocabulary retention in ER tends to be close to insignificant, and concludes that for the purpose of learning new words, a massive amount of graded reading is needed (7) - Day calls the number of 60-70 books per term. Vocabulary learning is a cumulative process and further encounters with the words would reinforce acquisition (8).

In terms of both fluency and enjoyability, as well as improving vocabulary knowledge, simultaneous extensive reading and listening to the same story should be mentioned. Its benefits are many: it helps to increase overall language proficiency, in particular listening comprehension. Comprehension improves due to facilitated correct phrasing, that students can achieve by simply following the prosody of presenter's speech. Young learners are especially prone either to read word-by-word or to break sentences into small incoherent parts, which distorts the meaning, so for them an audio model is particularly crucial. The teacher reading aloud performs this function best, but out of class, hearing the text they are trying to read will definitely help them to unite syntactic segments and will eventually lead to better comprehension.

Also, reading-while-listening proved to be more effective than the reading-only in terms of new vocabulary acquisition. In addition, lower decay of word-retention was noticed in postponed after-reading tests (4).

Reading-while-listening was described as the most comfortable by the majority of students due to the fact that was that segmenting of the text was done by the narrator through intonation. As a result, learners did not have to invest so much into focusing on syntax, and had enough spare working-memory space to better process the content. This, in turn, allowed them to make better inferences to deduct the meanings of unfamiliar words (9).

As Day argues, and all his claims find support in research on ER, ER has many benefits, some of which we have already discussed above. First, gains in overall language development, which was directly or indirectly supported by several studies of ER programs. Day

<sup>3</sup> Waring, R. 2011. Extensive Reading in English Teaching. In Widodo, H. & A. Cirocki (Eds.) Innovation and

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notes that this is an incidental benefit, which does not diminish its significance.

Second, students become readers; more specifically, ER contributes to automatising the lower-level skills of word recognition and parsing processes (10).

Third, increased vocabulary knowledge without direct vocabulary instruction.

Fourth, improved writing skills due to enhanced visual input and availability of multiple revisions of written samples.

And finally, better attitudes and increased motivation for learning languages, as well as renewed confidence in reading. One of basic principles of ER is to read for pleasure, which might translate into general proficiency improvement and an increase in reading motivation. Most importantly, the incidental nature of language learning-related benefits of ER creates very few specific demands for the teacher (11) and requires nearly zero lesson preparation.

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# PHILOLOGICAL SCIENCES

## A COGNITIVE PERSPECTIVE ON THE DELIVERY OF AFFIRMATION IN STYLISTIC DEVICES IN ENGLISH

Ismayilli Turkan M.

Ph.D. of Philosophy,

Teacher of the "English language and Methodology"

department of the Faculty of Foreign Languages, Nakhchivan State University

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### Abstract

The article approached the process of conveying affirmation of stylistic means from a cognitive aspect. It has been emphasized here that metaphor and metonymy are more important and different from stylistic means for cognitive linguistics. In cognitive linguistics, these devices are viewed as mental representations. In the article hyperbole, rhetorical questions, polysyndeton, etc. has been analyzed.

**Keywords:** Cognitive linguistics, stylistic devices, metaphor, mental representations

### Introduction

Cognitive Linguistics is the study of language in its cognitive function, where cognitive refers to the crucial role of intermediate informational structures with our encounters with the world that our interaction with the world is mediated through informational structures in the mind. It is more specific than cognitive psychology, however, by focusing on natural language as a means for organizing, processing, and conveying that information. The main constituting feature of a stylistic device is the binary opposition of two meanings of the employed unit, one of which is normatively fixed in the language and does not depend upon the context, while the other one originates within certain context and is contextual. Nowadays it is impossible to answer the basic questions of linguistics without consideration of the principles underlying human cognitive activity. Scientists in cognitive linguistics have no doubt that language should be viewed as a system connected with other systems of knowledge, rather than as an isolated autonomous entity.

**Main part.** Cognitive linguistics is a branch of linguistics that focuses on how people perceive linguistic categories. In general, the main issue in cognitive linguistics is to try to study language within real language activity, taking into account the human factor. In linguistics and grammar, affirmativeness (affirmation) and negation is a means by which grammar transforms and transfers the positive and negative poles into verb combinations, sentences and statements. The affirmative (positive) form is used to express the authenticity or truth of the main claim, while the negative form indicates that it is false or incorrect. But in cognitive linguistics, this is a broader category. In grammar, we know the distinction between affirmative and negative sentences. According to the rules of grammar, all sentences can be negative or vice versa affirmative. But can all logically negated or affirmed sentences be true? It is not logically correct to deny the sentence *Everybody needs good health*.

The category of affirmativeness is expressed in lexical, grammatical and syntactic language stages. The main parts of speech belong to the identification core of

the affirmative category. Subgroup identification includes words represented by idioms, modal words, exclamations, lexemes, idioms, and phraseological structures. One of its means of expression is stylistic means. Stylistic means are also important in the delivery of affirmation. One of them, hyperbole, also creates a strong affirmative: *My grandmother is as old as the hills* (*My grandmother is very old*) [1].

Hyperbole is an emotional attitude of the speaker towards the object of discussion. However, it should be noted that not all exaggerations are stylistic devices. They are basically ready-made formulas created by a certain emotion in the spoken language. *Haven't seen you for ages!* (*Long time no see!*). Like other stylistic devices, some hyperboles have lost their stylistic medium through frequent repetitions and have become a linguistic unit as a system. *A thousand pardons, to be dressed to kill*, etc.

Euphemisms are figuratively called "whitewashing device". Euphemisms meaning "nice talk" can also be means of affirmation. Here, too, the goal is to "lighten" the pronunciation of negative meanings. As a euphemism, the word "to die" was called "the journey's end" by Shakespeare and "that dreamsleap" by Byron.

Oxymorons, which are stylistic devices in linguistics, can also form strong affirmations in positive contexts.

*Their Geography teacher was horribly beautiful means* (*Their geography teacher is very beautiful*) [3].

Polysyndeton is a stylistic device with an abundance of conjunctions in the sentence. A conjunction purposefully serves to emphasize the connection between parts of a thought with the same characteristics, creating a rhythmic effect. *The heaviest rain, and snow, and hail, and sleet, could boast of the advantage over him in only one respect* [4].

Ellipsis should not be confused with elliptical sentences as a stylistic device. Elliptical sentences occur in laconic conversations.

*Kate: Have a good weekend.*

*Tereca: Same to you. See you next week.* But in the language of artistic works, ellipsis is used to emphasize the most important information by adding emotional



color. The simple verb news is shortened in parallel constructions in English to indicate the opposite feature of the phenomenon referred to. *His face was rather rugged; the cheeks thin* (*His face was very rough; his cheeks were thin*).

An epithet, as a figure of speech that expresses a permanent or transitory quality of a person or thing and characterizes it in terms of subjective perception, usually conveys an emotional meaning and can strengthen obvious affirmatives:

*Since my true love has forsaken me,  
Marti'mas wind, when wilt thou blow  
And shake the green leaves off the tree?  
Since my true love left me  
Martimas wind, when will you blow  
And will you shake the green leaves off the tree?*[2]

By the way, "rhetoric", a word of Greek origin, was the name given to the "teacher of the beauty of speech" in the ancient Greeks and Romans. The main purpose of the art of rhetoric is to be able to convince the listener about the truth of something. The importance of persuasion through the art of words can be seen from the oldest mythological works to the most modern works of literature. For example, in Homer's *Iliad*, masters of the art of words directed the Trojan War. The affirmative function is dominated by rhetorical questions, which also contain a hidden affirmation. Rhetorical questions are "unreal" questions, and the speaker does not actually expect the answer, or in other words, knows the answer to what he is asking. The question is actually stated here. In rhetorical questions, two syntactic meanings occur at the same time. Expresses questions and opinions. In our opinion, the main task of these types of sentences is to convey a message. Rhetorical questions are the communication of the author's thoughts or emotional response to the message being conveyed. It focuses on the falsification of denial and encourages the listener to make his own judgment. Thus, they reflect the thoughts of the speaker in the form of a message. It includes intonation, semantics and contextual particles. Some rhetorical questions are obvious because they discuss commonly known facts because the answer is suggested by the context. These kinds of rhetorical questions are also called rhetorical affirmations and are meant to emphasize a certain point. In Shakespeare's *The Merchant of Venice*, the character Shylock asks several rhetorical questions that are not directly addressed.

*If you prick us, do we not bleed? If you tickle us, do we not laugh? If you poison us, do we not die? And if you wrong us, we shall not revenge?* [5]

Rhetorical questions that do not need an answer stand in the middle between questioning and expressing an opinion. Although sometimes rhetorical questions seem pointless and unnecessary, they seem to be an essential need of everyday language, just as they are often used in fiction. Metaphor and metonymy are two main cognitive mechanisms of imagining. They are not figures of speech in cognitive linguistics, but "transfers" or "reflections" between conceptual models. The difference is that in metaphor the transfer is between differ-

ent experiential models. In metonymy, it occurs between the same cognition.

Paragons – Individuals represent ideals as category members. For example, Ronaldo is undoubtedly the best football player in the world, he is handsome, rich, kind. He is a good father and a successful football player. In other words, in most parts of the world, Ronaldo represents the paragon of football.

Mercedes is a luxury car and represents luxury. Chomsky is a prominent representative of generative linguistics. Paragons represent an entire category and set norms against other members of the category.

The explanation of metaphor for cognitive linguistics is very broad. Cognitive linguistics argues that metaphor is a central pervasive feature of human language and cognition. Metaphors allow traditional coding from sensorimotor domains to be used for cognitive pathways of subjective experience. Thus, the theory of conceptual metaphor explains how one idea or conceptual cognition can be understood under the terms of another. I. Richards noted in his work "Philosophy of Rhetoric" that "*metaphor is not only a linguistic phenomenon, it is a way of thinking of a person*" [6]. Inspired by Richards, J. Lakoff and M. Johnson tried to explain the metaphor from a new aspect. They presented metaphor as a conceptual phenomenon related to human thought and behavior.

In the conceptual approach, metaphors are transitions from a source cognitive pathway to a target cognitive pathway. Sometimes it preserves lexical encoding. According to Lakoff, "the most prominent feature of conceptual metaphors is that they preserve meaning". Love, anger are metaphorical concepts. Concepts specific to our perceptual system are time/quantity/situation/purpose/modality etc. understood through metaphors. These are concepts that normally include the grammaticalization of languages. If they are indeed metaphorical in nature, then metaphor becomes central to grammar. A feature of metaphor is the process by which we understand abstract concepts and carry out abstract reasoning.

Happy is up (Happiness is up, that is, flying from happiness. Here, the concept of happiness is connected with the meaning of "up" space). Metaphor is fundamentally conceptual, not linguistic [6]. Metaphorical language is the surface manifestation of a conceptual metaphor. Metaphorical understanding is based on non-metaphorical understanding. The conceptual metaphor system occurs automatically, involuntarily, and is used with imperceptible effort. Our metaphor system is central to understanding experience. Metaphor similes are more based on our experiences and play an important role in the grammar and lexis of the language.

Metaphorical encodings are universal, some are more widespread and some are culturally based. Virtually, the cognition in which human knowledge is formed is the human body, and this metaphor serves as the source domain. Common target domains are time, emotions and situations.

Consequently, the primary feature of affirmativeness in language should be understood in terms of cognitive coordination. Because affirmativeness is a linguistic category its coordinates are variable. It is closely

related to other linguistic categories. Affirmative action is subjective, epistemic, and speaker-centered. This category is multi-layered, graded and affects wide areas of language. More than any other paradigm, cognitive linguistics may better characterize this highly abstract phenomenon. We must take into account that a person's experience of the surrounding world is collected in his daily speech and emerges during the process of expressing his thoughts and cognition. Since affirmativeness is based on subjectivity, it should be noted that affirmativeness is well expressed by stylistic means, as stylistic means also express the inner subjective and emotional attitude of a person.

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# POLITICAL SCIENCES

## FORMATION OF A PERSONNEL RESERVE OF CIVIL SERVANTS IN LOCAL GOVERNMENTS

**Ganiev Elyor**

*researcher at the Academy of Public Administration  
under the President of the Republic of Uzbekistan*

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## ФОРМИРОВАНИЕ КАДРОВОГО РЕЗЕРВА ГОСУДАРСТВЕННЫХ СЛУЖАЩИХ В ОРГАНАХ МЕСТНОГО САМОУПРАВЛЕНИЯ

**Ганиев Эльёр**

*исследователь Академии государственного  
управления при Президенте Республики Узбекистан*

### Abstract

To implement innovations and improve management efficiency are required new approaches, effective high potential, and highly qualified specialists. For the sustainable development of the territories, the government of the Republic of Uzbekistan is purposefully improving its personnel policy, providing municipal and public services with a strong, highly qualified personnel reserve. We believe that the main task is the scientific substantiation of personnel policy, a high-quality system of work on the formation of a personnel reserve, the development and improvement of the personnel potential of employees, timely updating and assimilation of world experience in local government. Which in turn shows the significance of this article.

### Аннотация

Для реализации нововведений и повышения эффективности управления требуются новые подходы, эффективный высокий потенциал, высоко квалифицированные специалисты. Для устойчивого развития территорий правительство Республики Узбекистан целенаправленно совершенствует кадровую политику обеспечивая муниципальную и государственную службы сильным высококвалифицированным кадровым резервом. Полагаем, что главной задачей является научное обоснование кадровой политики, качественная система работы по формированию кадрового резерва, развитие и совершенствование кадрового потенциала сотрудников, своевременное обновление и усвоение мирового опыта в местном самоуправлении. Что в свою очередь показывает значимость данной статьи.

**Keywords:** personnel reserve, local governments, civil servants, management efficiency, personnel reserve potential, reforms, personnel, principles, monitoring.

**Ключевые слова:** кадровый резерв, органы местного самоуправления, государственные служащие, эффективность управления, потенциал кадрового резерва, реформы, персонал, принципы, мониторинг.

### INTRODUCTION

Global changes are currently taking place in the life of the politics of the Uzbek management system, including views, beliefs, habits, moral values, social roles. And if for some global restructuring is painless, for others it is a huge disaster, leading to restructuring and complete collapse of the established system. To avoid destructuring of the organization and the continuous process of development of the country, personnel reserves are formed. In particular, to attract erudite leaders with more powerful personal potential to improve the efficiency of the country's economic processes. Maximum use of the potential of the personnel reserve serves as an effective tool for strengthening modern Uzbekistan.

The units of effective personnel reserve are state authorities and local governments. However, not only specialists from state and municipal authorities can be in reserve, but also persons from different spheres of society. The main indicators should be high determination and high personal potential of the personnel. In Uzbekistan, events to form a personnel reserve have begun

to take place very often, which reflects the high interest of the state in this issue. The search for new solutions, approaches to the implementation of technologies for managing personnel issues, competent regulatory design, and high-quality work on the formation of a personnel reserve can be the key to the productive solution of many goals and objectives, including the development of human resources.

The main turning point in the system of public civil servants occurred with the adoption on October 3, 2019 of the Presidential Decree "On measures to radically improve personnel policy and the civil service system in the Republic of Uzbekistan."

In accordance with the Resolution, recruitment to the civil service on the basis of an open independent competition began on January 1, 2020 in a pilot mode in certain government bodies, organizations and territories, as well as from January 1, 2021 in all government bodies and organizations. The decree also created the Agency for the Development of Civil Service under

the President, which is the main body in the implementation of personnel policy in the Republic of Uzbekistan.

The consequences of these reforms require the presence of highly professional civil servants, whom we can call “new formative cadres”. The main characteristics and competencies of “new education personnel” are:

- a) a person with global thinking;
- b) capable of systematic and creative thinking;
- c) good communication skills;
- d) democratic view;
- e) customer focus;
- f) open to change and flexible.

The secret of a successful organization lies in the implementation of the reproduction of reserve personnel in the state and municipal service.

Technologies described by V.V. Rudov are divided into three groups:

1. Obtaining confidential holistic information about a candidate for a position using methods: assessment, benchmark, testing, interview, discussion.

2. The second group reflects the current personnel needs for the organization, the formation, planning and development of the necessary personnel;

3. Hiring the right specialist for a compatible position in accordance with the regulatory framework.

To obtain competitive, strong personnel and constant turnover and replenishment of personnel, it is an important point to use developed and well-founded personnel technologies, which contributes to the formation of the attraction of highly qualified professionals.

The entire process of forming a personnel reserve is strictly regulated and must be described in the regulations on the personnel reserve and be based on basic principles.

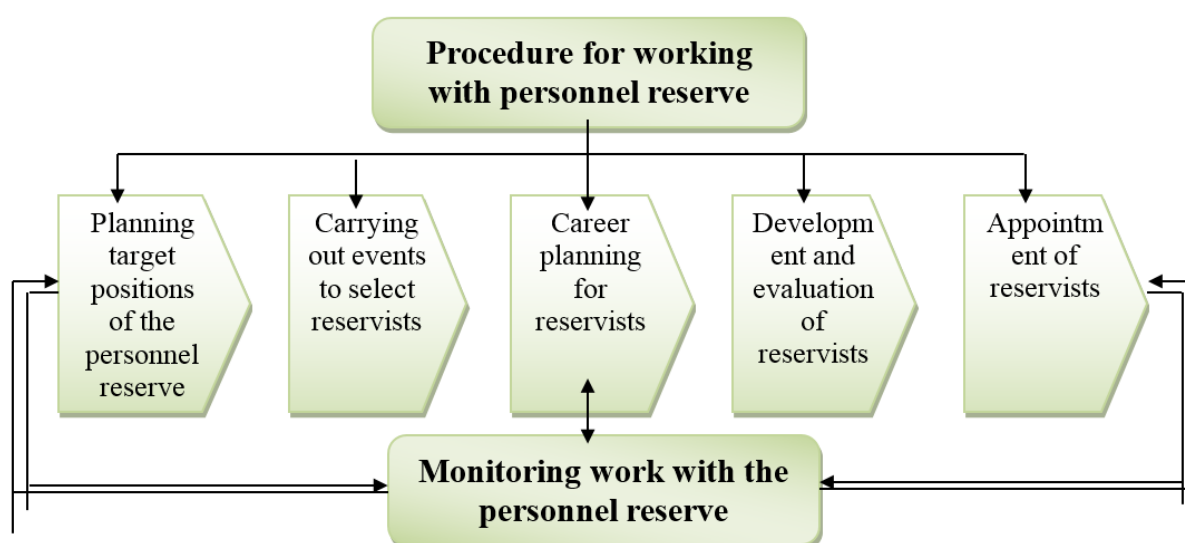


Figure 1. Scheme of work with the personnel reserve in local governments.

A new employee initially undergoes orientation programs (general, special, individual), gets acquainted with the structure of the organization, learns traditions, seminars, and advanced training courses.

Table 1

Principles of forming a personnel reserve

#	Principles	Contents
1	Relevance of the reserve	Need for position
2	Meeting the requirements of the position	Qualification requirements for position
3	Candidate's prospects	Age, management experience in key positions, career dynamics, personal potential
4	Planfulness	Structured and step-by-step personnel development plan

The activity of forming a local government body is very difficult in terms of modeling and forecasting, taking into account all means without exception, both human and material with the possibility of future implementation.

The most powerful candidates, the best of the best, are included in the reserve.

The formation of a professional, powerful personnel reserve is carried out according to the following stages: determining the need for personnel; analysis of personnel capabilities; tender selection for the reserve;

formation of reserves: promotion, training, rotation. Experts in their works define 5 levels of competency expression:

Level 1 - the lowest class of specialists, perform tasks in accordance with their duties;

Level 2 - they perform their work efficiently in accordance with their responsibilities, and in the department as a whole, the line manager, setting tasks, already sees implementation.

Level 3 - middle manager, when setting tasks, he already sees the enterprise as a whole, but sets tasks

from his structural unit, understands his contribution, if he makes his contribution, how it will respond to the overall result.

Level 4 - sees the territory in which the enterprise is located, what benefits it brings to the enterprise. And overcomes obstacles on his own.

Level 5 - expands the territory of the enterprise and helps others improve their quality of life.

The list of personnel reserves in local government bodies mainly recruits applicants from levels 3-4. Recruitment occurs thanks to a commission assessing the specialist's competence. A high level of competencies guarantees results and ways to develop them.

### Conclusion

Based on the analysis of scientific literature and the empirical part of practice, the study showed that the management effect depends on the potential of persons occupying key personnel positions and the predicted turnover of personnel with all the ensuing consequences (training, qualifications, compliance with requirements, internships). Analyzing and structuring experience in local self-government, the quality and efficiency of management largely depends on the personal potential of personnel, their timely training depending on the planned position.

A conscious approach to creating a personnel reserve, as the study shows, in most cases is carried out haphazardly, without taking into account the experience of predecessors. Government managers dealing with issues related to personnel have little interest in developing the personnel reserve, however, the presence of a personnel reserve thanks to the development program allows for the rational use of personnel potential for vacant positions.

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# PSYCHOLOGICAL SCIENCES

## MALADAPTIVE SCHEMAS IN SOCIAL ANXIETY

**Lomaia Magda**

<sup>1</sup> *Grigol Robakidze University, Master*

**Begiashvili Archil**

<sup>2</sup> *Grigol Robakidze University, visiting professor*

**Badrishvili Natia**

<sup>3</sup> *Grigol Robakidze University, affiliated professor*

**Kitiashvili Sofiko**

<sup>4</sup> *Grigol Robakidze University, guest teacher*

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### Abstract

This research paper aims to reveal the intricate relationship between social anxiety and maladaptive schemas as delineated by Young. Specifically, it delves into the association that exists between the degree of social anxiety and 18 distinct maladaptive schemas which are grouped into five domains. The empirical findings from this research highlight the presence of a significant correlation between elevated levels of social anxiety and the negativity/pessimism schema, as well as the overvigilance/inhibition domain. Furthermore, this study establishes a statistically significant relationship between the increased levels of social anxiety and the defectiveness/shame schema. Individuals with high levels of social anxiety scored high/average on the Young's Schemas Questionnaire.

By using the Liebowitz Social Anxiety Scale, it became feasible to identify the situations and interactions that are closely linked to elevated social anxiety levels. The study revealed that social scenarios characterized by formal interactions, such as public speaking or self-presentation in front of an audience, were the most anxiety-inducing experiences for the surveyed participants.

**Keywords:** social anxiety, maladaptive schemas, negativity/pessimism schema, overvigilance/inhibition domain.

It is common for individuals to encounter anxiety in various social contexts, and this is considered a typical human response. The opinions of others hold significance for people. When anxiety reaches excessive levels, it can lead to negative thoughts that impede effective behavior.

Social anxiety, clinically referred to as social phobia, is characterized by an intense fear or anxiety that is related to one or more social situations, associated with excessive sensitivity to perceived scrutiny and evaluation by others, as defined by the DSM-5. Such social situations encompass interpersonal interactions, such as meeting people or engaging in face-to-face conversations, as well as activities performed in the presence of others, including dining in public, working under supervision, and speaking before an audience during presentations or speeches.

Based on the 2020 data provided by the Anxiety and Depression Association of America (ADAA), more than 15 million Americans aged 18 and older experience high levels of social anxiety, accounting for 7.1% of the population. Notably, these statistics are on an upward trajectory. While the current situation in Georgia remains undocumented, there is a discernible rise in referrals to specialists for anxiety disorders. The interest, and willingness to discuss topics about mental health are progressing significantly. As a result, the urgency of addressing this issue is paramount.

It is essential to highlight that the existing body of scientific literature in the Georgian language concerning social anxiety is notably scarce and limited, especially research on maladaptive schemas. Consequently,

there is a dearth of Georgian-language materials related to this topic. The data obtained from this study will contribute to the formation of a new area of research on the issue and the growth of future research interests related to the topic.

The primary objective of this study is to investigate the correlation between social anxiety levels and maladaptive schemas. Specifically, it seeks to ascertain whether the intensity of maladaptive schemas increases as social anxiety levels rise. Additionally, the research aims to pinpoint which among the 18 maladaptive schemas exhibits the most pronounced associations with the social anxiety variable and delineate the specific nature of these connections.

As described by Dobson, schemas are enduring mental representations of objects, individuals, and concepts, encompassing the relationships between them. The development of schemas commences in early childhood and is grounded in the thoughts and ideas acknowledged, articulated, and established by the individual's environment. These schemas evolve as individuals age, with previously acquired information integrating with real-life experiences, either reinforcing or challenging existing schemas. Schemas are directed toward the self, others, and the external world, influencing various cognitive processes. One of the high importance in such processes is memory bias, which can support these schemas.

Based on the research objectives, the Liebowitz Social Anxiety Assessment Scale (LSAS) and Young's Schemas Questionnaire (YSQ-L3) were employed as the measuring instruments. These questionnaires were

combined as two sections within a Google Form and distributed to the selected participants, who were recruited through convenience sampling. The questionnaire's instructions contained essential information regarding the study's purpose, the instruments used, and the overall procedure. Participants were assured that the principles of anonymity and confidentiality would be rigorously upheld.

The Liebowitz Social Anxiety Scale was used to assess an individual's level of social anxiety in social interactions and behavioral responses within social situations. On the other hand, Young's Schemas Questionnaire (YSQ-L3) was utilized to measure all 18 maladaptive schemas. The questionnaire presents statements that essentially convey beliefs, opinions, or assumptions. Respondents were asked to evaluate their agreement with each statement, indicating the extent to which these provisions resonated with their own experiences and beliefs.

The relationship between social anxiety and maladaptive schemas has been studied by numerous authors. For instance, a 2014 Australian study aimed to establish a connection between social anxiety and early maladaptive schemas. This study, comprising 360 participants, revealed that individuals with high scores in social anxiety also scored high in the disconnection/rejection domain. Research has also found that temperament has a significant influence on the choice of coping strategies.

In the context of social anxiety, individuals with a more introverted temperament tend to resort to avoidance behavior as a coping strategy (26, 171-190).

In a 2006 study conducted in Portugal, individuals with social anxiety demonstrated significantly higher scores across nearly all maladaptive schemas when compared to participants who did not exhibit substantial anxiety levels. This study also demonstrated that individuals with social anxiety are less inclined to believe that their need for stable, trustworthy, and empathic relationships will be adequately met (27, 571-584).

A 2008 study discovered that social anxiety is closely associated with the category of schemas related to abandonment, failure, and emotional deprivation. Individuals exhibiting high levels of social anxiety displayed fears of failure, being abandoned by significant others, and fear of being perceived as incompetent. Furthermore, they believed it was essential to conceal their true emotions to avoid rejection from others (Calvete, Orue, 2008).

These findings suggest a robust link between social anxiety and cognitive patterns related to unmet emotional needs, pessimistic social expectations, concerns about abandonment and failure, interpersonal anxiety, etc.

Drawing from the findings of previous studies, it is reasonable to suggest that an escalation in social anxiety levels would likely correspond to an increase in the intensity of maladaptive schemas. Significant relationships can probably be observed with schemas such as abandonment/instability, emotional inhibition, failure, negativity/pessimism, emotional deprivation, defectiveness/shame, and the domain of other-directedness.

In our study, 30 out of the 115 respondents scored above-average levels on the Liebowitz Social Anxiety Assessment Scale (LSAS). None of the respondents reached the maximum score on LSAS, which ranges from 80 to 95 and above. As a result, moderately elevated levels of social anxiety were identified in 26% of the respondents, with 23 being female and 7 being male (Female - 77%, Male - 23%). Furthermore, 11 respondents in the study scored below the minimum threshold for social anxiety. The majority of participants fell within the low and medium levels of social anxiety (63%). The collected data were processed using SPSS.

A correlational analysis of the data was conducted to determine the relationship between the level of social anxiety and the domains of Young's maladaptive schemas. A statistically significant correlation was found between social anxiety and the domains of maladaptive schemas. In particular, the strongest, positive correlation was established between social anxiety and the overvigilance/inhibition domain ( $r = 0.772$ ,  $P < 0.01$ ). Strong positive correlations were revealed between the level of social anxiety and the domains of disconnection/rejection ( $r = 0.626$ ,  $P < 0.01$ ), and other-directedness ( $r = 0.651$ ,  $P < 0.01$ ). Impaired autonomy and performance domain and social anxiety appeared to have a relatively small but significant positive correlation ( $r = 0.407$ ,  $P < 0.01$ ). A weak negative relationship was established between the domain of limited restrictions and social anxiety ( $r = -0.289$ ,  $P < 0.01$ ).

The mean scores for each maladaptive schema of respondents with elevated social anxiety ( $N = 30$ ) were analyzed to assess the prevalence of these schemas. The scale used had a maximum score of six for each schema. Based on the data obtained, a rating of maladaptive schemas was constructed. It was observed that the schema with the highest mean score was negativity/pessimism ( $M = 5.1$ ). Following this, the schema of unrelenting standards ranked second in terms of frequency and severity ( $M = 4.5$ ). The ranking of the remaining schemas is as follows: social isolation/alienation ( $M = 4.3$ ), and mistrust/abuse ( $M = 4.2$ ). Schemas for self-sacrifice, defectiveness/shame, and vulnerability all had identical mean scores of ( $M = 4$ ).

Those schemas, that had a high prevalence among highly anxious participants, were selected and correlation analysis was performed with the variable of social anxiety. For each participant, schema scores were analyzed in relationship to social anxiety scores. The results of the correlation analysis revealed that the negativity/pessimism schema demonstrated the highest positive correlation with the level of social anxiety ( $r = 0.524$ ,  $P < 0.01$ ). Additionally, a statistically significant correlation was observed between the level of social anxiety and the defectiveness/shame schema ( $r = 0.411$ ,  $P < 0.01$ ). The isolation/alienation schema also exhibited a significant correlation with the level of social anxiety ( $r = 0.311$ ,  $P < 0.01$ ). Conversely, the correlation between social anxiety and other schemas, like self-sacrifice ( $r = 0.289$ ,  $P < 0.01$ ), unrelenting standards ( $r = 0.138$ ,  $P < 0.01$ ), mistrust/abuse ( $r = 0.128$ ,  $P < 0.01$ ) and vulnerability ( $r = 0.123$ ,  $P < 0.01$ ) was weaker.

Based on the research findings, it is evident that clear and notable associations exist between social anxiety and several maladaptive schemas, specifically, between social anxiety and the negativity/pessimism schema ( $r = .524$ ). Additionally, the intensity of the defectiveness/shame schema was found to increase in tandem with rising social anxiety levels ( $r = .411$ ). In terms of the distribution of the domains, the most robust association with social anxiety was observed in domain 5, identified as overvigilance/inhibition ( $r = .0722$ ). The research has also established that individuals grappling with social anxiety tend to score significantly higher on the Young's Schemas Questionnaire. Furthermore, with regards to classifying social situations, it was determined that for the majority of respondents, a high degree of anxiety was most closely linked to public speaking, with 30.6% of participants reporting this as a significant source of anxiety.

### Results

#### *Social anxiety and the domains of isolation/rejection and other-directedness.*

A central symptom of social anxiety involves persistent preoccupation, anxiety, and rumination about potentially adverse outcomes that could arise in social situations. This phase is closely associated with what is referred to as prurumination.

Individuals with social anxiety tend to direct their attention predominantly towards negative or potentially negative cues and expectations, as outlined in Heimberg's model. This attention bias can cause positive elements to remain out of focus and go unnoticed.

#### *Social anxiety and defectiveness/shame schema*

According to structural models of social anxiety, individuals are attuned to both external stimuli, such as the presence of an audience, and internal features. Among these internal features, the most intricate and generalized is the self-concept (Campbell 1996). The self-concept, on its hand, is shaped by Bandura's patterns of self-esteem and self-efficacy. It's common for individuals with social anxiety to exhibit low self-efficacy. Concurrently, they engage in persistent self-monitoring of their behavior, with the primary aim of avoiding their most undesirable outcome – the feeling of exclusion or unacceptance. This particular item from Young's schema questionnaire encapsulates an intermediate belief or perspective. On one hand, it conveys low self-efficacy, while on the other hand, it's oriented toward the negative outcome that an individual anticipates as social feedback. This is the reason behind their continuous self-monitoring.

### Recommendations

The findings of this study provide perspective on the design of future research endeavors, which may delve deeper into the specificity and interrelationships of these variables. To enhance the informativeness of research results, it is recommended to further specify the characteristics associated with these phenomena. For instance, researchers could categorize specific cog-

nitive, emotional, and behavioral patterns of social anxiety and investigate the significance of each in greater detail. Additionally, the theory of maladaptive schemas presents a vast realm for research exploration. Within this scope, it would be intriguing to introduce additional variables that could provide further clarity on the connection between the social anxiety phenomenon and schemas.

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# TECHNICAL SCIENCES

## RESEARCH OF THE ELECTROMECHANICAL PART OF A THREE-PHASE ELECTROMAGNETIC EXCITER OF LOW-FREQUENCY MECHANICAL VIBRATIONS

**Guliyev Huseynqulu Bayram,**

*PhD, Doctor of Science,  
Azerbaijan Technical University,  
Baku, Azerbaijan*

**Gasimov Rafail Aslan,**

*PhD.,  
National Aviation Academy  
Baku, Azerbaijan*

**Manafov Elshan Kamil,**

*PhD.,  
National Aviation Academy,  
Baku, Azerbaijan*

**Yusifov R.A.,**

**Huseynov Farid Hikmet**  
*National Aviation Academy,  
Baku, Azerbaijan*

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### Abstract

The article examines a number of features of energy processes in the “three-phase traction electromagnet-capacitor” system with continuous oscillatory motion of the armature electromagnet. It is assumed that the amplitude of mechanical vibrations can be quite large. According to this judgment, regarding the possibility of obtaining low-frequency mechanical oscillations in the range (0÷20) Hz using a three-phase electromagnetic traction system, it should be considered appropriate to consider in detail the processes in the specified device when it is connected according to circuits with series capacitors in a standard network. Such consideration would make it possible to clarify the design conditions of these devices, which helps to improve their design.

**Keywords:** three-phase power system, electromagnetic exciter, low-frequency mechanical vibrations, spectral composition, magnetic flux.

**Introduction.** As is known, one of the widespread vibration exciters of low-frequency mechanical vibrations in the subsonic frequency range is a single-phase electromagnetic exciter [1-4], the winding of which is connected through a series capacitor to a standard power supply network. This single-phase version of the exciter is discussed with the necessary completeness in the indicated literary sources. However, the development of its three-phase analogue requires further study of the processes in this type of device. Due to the fact that the basis for the functioning of the pathogen under consideration is, as already mentioned, the choice of the rational formation of the component of traction force alternating in sign at the frequency of mechanical oscillations, an assessment of these conditions is used for further research [5,6].

The traction force of an electromagnetic exciter of low-frequency mechanical vibrations, as in any traction electromagnet, is associated with the magnitude of the magnetic flux components in the magnetic system of these exciters. Therefore, studying the components of magnetic flux contributes to the success of subsequent research. Since the results of such studies are known for single-phase electromagnetic exciters, it is advisable to turn to such schemes of three-phase exciters of low-frequency mechanical oscillations that would allow a fairly simple comparison of the processes in them with

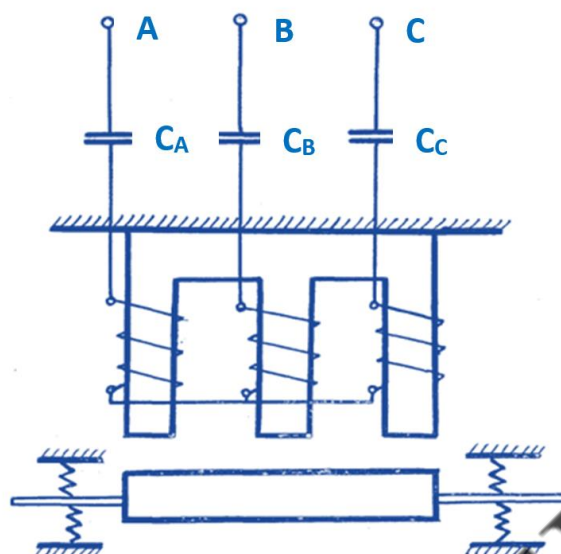
similar ones in single-phase exciters [7-10]. The possibility of obtaining low-frequency mechanical oscillations in the range (0÷20) Hz using a three-phase electromagnetic traction system makes it relevant to take a detailed look at the processes in the specified device when it is connected to an electrical network using circuits with series capacitors. Such consideration would make it possible to clarify the design conditions of a three-phase electromagnetic vibration exciter of low-frequency mechanical vibrations (TEMV LFMV), which helps to increase efficiency and improve their design.

### Selecting a rational scheme for switching on the TEMV LFMV and justifying the possibility of symmetrical loading in its mechanical part

The circuit for a three-phase electromagnetic vibration exciter is shown in Picture 1 [11]. It is assumed that the vibration exciter has identical windings on all three rods of the W-shaped magnetic circuit, which are connected in a star and connected to a three-phase standard power supply network through three identical capacitors connected in series. The armature, making oscillatory movements, moves back and forth and changes the size of the air gap in phase for all three rods. In this case, the three-phase exciter provides a

symmetrical load of the phases of the three-phase circuit, and for subsequent studies, processes in each phase (in each winding) can be considered in isolation.

Let us consider in more detail the symmetry condition in the diagram in Picture 1.



Picture 1. Design diagram of three-phase electromagnetic exciter of low-frequency mechanical vibrations (TEMV LFMV)

The main sign of the symmetry of the load of the phases of a three-phase circuit when connecting the source and consumer according to the star-star circuit without a neutral wire is the condition of the absence of neutral bias voltage:  $U_{00} = 0$

In this case, the sum of phase currents:

$$i_A + i_B + i_C = 0. \quad (1)$$

Turning to identifying the reasons for the presence of such conditions (in particular (1 a)), in our case we note the following. As is known:

$$V_{00} = \frac{E_A Y_A + E_B Y_B + E_C Y_C}{Y_A + Y_B + Y_C}, \quad (2)$$

$\dot{E}_A, \dot{E}_B, \dot{E}_C$  – complex values of phase EMFs. conditional three-phase power supply when connected to a star;  $Y_A, Y_B, Y_C$  – complex values of the phase admittances of a consumer connected in a star.

In our case, the total conductivity of the  $n$  - phase is

$$Y_n = g_n + jb_n, \quad (3)$$

Where  $g_n, b_n$  – respectively, the active and reactive components of the admittance. Because the

$$b_n = b_{Ln} - b_{Cn},$$

Where  $b_L, b_C$  – respectively, the inductive and capacitive components of reactive conductivity, then the inductive resistance of the phase windings of the considered three-phase electromagnetic exciter of low-frequency mechanical vibrations  $X_{Ln} = \omega L_n$  - (where  $\omega$  – angular frequency of supply,  $L_n$  – inductance  $n$  – windings are associated with conductivity values  $b_{Ln}$  - impedance  $n$  – phase of the user.

$$Z_n = \sqrt{r_n^2 + (X_{Ln} - X_{Cn})^2}.$$

Where  $r_n$  – active resistance  $n$  – thought phase

$X_{Cn} = \frac{1}{\omega C_n}$  - capacitive resistance,  $C_n$  – capacity

$n$  – to the condenser. We will also note that

$$g_n = \frac{r_n}{z_n^2}; b_{Ln} = \frac{X_{Ln}}{z_n^2}; b_{Cn} = \frac{X_{Cn}}{z_n^2}; \quad (4)$$

Thus, the numerical values of all conductivity  $g_n, b_{Ln}$  and  $b_{Cn}$  through  $Z_n$  according to (2-4) are related to the value of the inductive resistance  $X_{Ln}$ , defined by inductance  $L_n$ ,  $n$  - winding of the considered three-phase exciter.

But the magnitude of the inductance itself  $L_n$  is connected with the geometrical characteristics of the magnetic wire of the oscillation exciter, in particular, with the size of the air gap  $\delta$ . As you know, the inductance of the windings located on the core (in particular, on the p-core) is determined as:

$$L_n = \frac{w_n \Phi_n}{I_n} = \frac{w_n^2 M_0}{\delta + \delta_\phi}, \quad (5)$$

Where  $w_n$  – number of turns of the  $n$ -th winding;

$\Phi_n$  – magnetic flux coupled to the  $n$ -th winding;

$I_n$  – current in turns of the  $n$ -th winding;  $\delta_\phi$  – a certain amount of air gap (fictitious air gap), the introduction of which makes it possible to take into account the fundamental presence of magnetic resistance of steel.

Based on this, in the absence of magnetic saturation in steel, the value  $\delta_\phi$  significantly small compared

to the actual air gap  $\delta_\phi$  in the magnetic system of the considered TEMV LFMV in  $\delta_\phi \ll \delta$ . In this regard, in (5) it can be omitted as an explicit component, but its presence is taken into account as follows. In picture. Picture 2 shows a section of the magnetic circuit of the exciter in question, containing  $n$  – th rod with winding, air gap and movable armature. It is assumed that the armature performs its oscillatory movements, having a certain average air gap  $\delta_0$ , relative to which it shifts in time by  $x(t)$ .

Then

$$\begin{aligned}\delta(t) + x(t) &= \delta_0 \\ \delta(t) &= \delta_0 - x(t).\end{aligned}\quad (6)$$

At the same time, taking into account the fundamental presence  $\delta_0$ , there are strict inequalities:

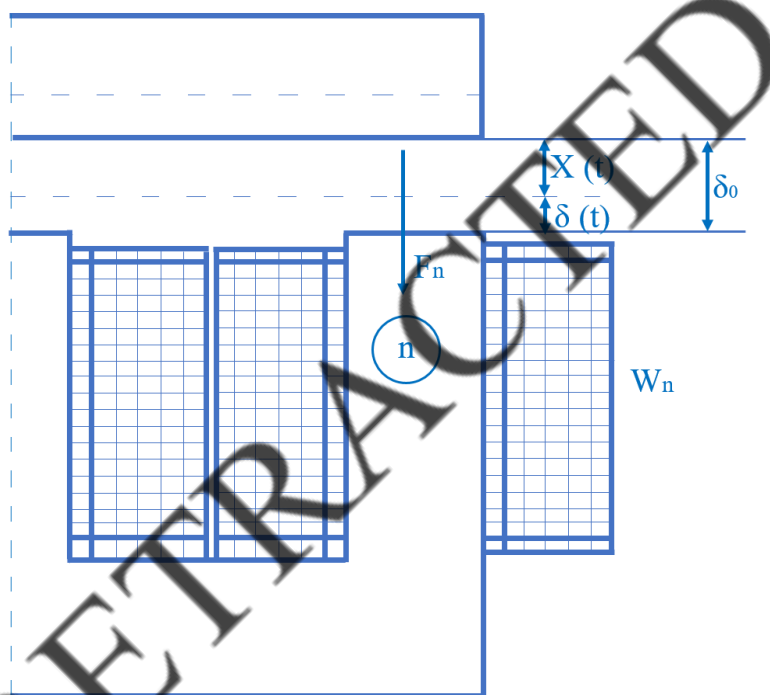
$$\begin{aligned}x(t) &< \delta_0 \\ \delta(t) &> 0\end{aligned}\quad (7)$$

Note that the direction  $x(t)$  is chosen to be positive in the case of attraction of the movable armature to the yoke, that is, according to the conditionally positive direction of the traction force  $F_p$  on the rod with the winding. This subsequently facilitates the physical interpretation of a number of analytical results. Thus, (5) taking into account (6) and (7) has the form

$$L_n(t) = \frac{M^2 M_0 S_M}{\delta(t)} = \frac{K}{\delta(t)}, \quad (8)$$

Where  $K^2 = w^2 M_0 S_M$  - does not depend on time (based on the explanations to (5)).

Turning to (3), (4) and the explanations, we note that  $Y_n$  depends on  $\delta(t)$ .



Picture 2. Section of the magnetic circuit TEMV LFMV

However, at the beginning of this paragraph it was indicated that a three-phase electromagnetic exciter is being considered, the armature of which “changes the size of the air gap of all three rods” [12]. If the geometry of the rods, the number of turns of the windings on them, the capacitances of the capacitors and the structural elements of the armature are the same, the coefficient  $K_b$  (8) and the law of variation of the gap are the same for all three rods. Then:

$$L_A(t) = L_B(t) = L_C(t) = L_N(t) \quad (9)$$

and therefore

$$Y_A(t) = Y_B(t) = Y_C(t) = Y_N(t). \quad (10)$$

In this case (2) will take the form

$$\begin{aligned}U_{00} &= \frac{(E_A + E_B + E_C) \cdot Y_N}{3Y_N} = 0 \\ E_A + E_B + E_C &= 0\end{aligned}\quad (11)$$

The above considerations allow us to see that in the circuit of Picture 1, condition (1 a) is satisfied and, therefore, each of the three phases can be considered conditionally in isolation, taking into account the fact that:

$$E_n - V_{00} = V_{\phi n}.$$

Since according to (10)  $U_{00} = 0$ , then (11) will take the form

$$E_n = V_{\phi n} \quad (12)$$

and consideration of a three-phase design comes down to comparison with a single-phase version of an electromagnetic exciter of low-frequency mechanical oscillations with a series capacitor. Note that condition (6) is satisfied only for the circuit in Picture 1. If the windings of a three-phase exciter are connected in a triangle, it may be damaged. This issue will be addressed in subsequent chapters.

### Spectral composition of magnetic fluxes and currents in the rods and phases of a three-phase electromagnetic exciter

Research carried out according to the scheme in Picture . 1 yielded some results that, when compared with the results of other works, force us to introduce additional adjustments in the interpretation of the ongoing processes. This concerns, first of all, the harmonic composition of the magnetic flux for the n-th (any) TEMV LFMV rod. Let's consider what has been said in more detail. We will consider the formation of an alternating component in the traction force of each of the rods of a three-phase structure at the frequency of mechanical vibrations of the armature to be similar to the same process in a single-phase electromagnetic exciter of mechanical vibrations. Then we will apply the approach of identifying the harmonic components of the current. in the winding, formed in, to establish the necessary harmonic composition of currents in each of the windings of a three-phase design. The essence of the method is that a connection is sought between the harmonic compositions of the current  $i(t)$  and the magnetic flux  $\Phi(t)$ , based on (5) and (8) for a given change in the air gap  $\delta(t)$  by the moving armature and any of the three-rod cores designs, that is:

$$I(t) = k\Phi(t)\delta(t), \quad (13)$$

$$I(t) = I_{\Sigma}(t) = k[\dots + \Phi_{k-1} \sin(\omega_{(k-1)}t + a_{k-1}) + \Phi_k \sin(\omega_k(t) + a_k) + \Phi_{k+1} \sin(\omega_{(k+1)}t + a_{k+1})] \quad (18)$$

In an expression like (16), only two components are considered at a minimum (at frequencies  $\omega_{(k)}N\omega_{(k+1)}$ ). At the same time, their sufficiency was noted. However, studies conducted in three-phase pathogens did not confirm this position. Let us consider the emerging objections in more detail. "Considering that a process characterized by a harmonic composition with a minimum number of components is stationary in the case of an oscillatory system, we will consider it" [13]. At the same time, we note that the harmonic components of the magnetic flux determine the presence of the

$$I_A(t) = I_{\Sigma}(t) = k\Phi_m\delta_0\left[\sum_{g=1}^{\infty} J_k \sin(\omega_{(k)}t + ak) + [1 - \beta \sin(\nu t + \Theta)]\right] \quad (21)$$

Where  $\Phi_m$  - is a certain normalizing value of the amplitude of the magnetic flux of a given phase of a three-phase exciter;

$$J_k = \frac{\phi_k}{\phi_m} - \text{amplitude coefficient of the } k\text{-th harmonic component of the magnetic flux;}$$

monic component of the magnetic flux;

$$\beta = \frac{X_m}{\delta_0} - \text{displacement harmonic amplitude coefficient.}$$

Based on this, after transformation into (21) we obtain:

$$I_A(t) = I_{\Sigma}(t) = I_0 \left[ \sum_1^{\infty} A_K \sin(\omega_{(k)}t + \zeta_k) \right], \quad (22)$$

Where  $I_0 = K\Phi_m\delta_0$  - standard current value  $I(t)$ ,

$$\text{Where } K = \frac{W}{K} = \frac{1}{WMSm} - \text{design factor.}$$

Considering that in the general case

$$\Phi(t) = \Phi_{\Sigma}(t) = \sum_{g=1}^{\infty} \sum_{j=1}^{\infty} \Phi_{jm}^{(g)} \sin(\omega_j t + aj) \quad (14)$$

Where the internal sum is the Fourier series whose fundamental frequencies are  $\omega_n$ .

$$nT_k = mT_{k-1} = \dots = T$$

or

$$n \frac{2\pi}{\omega(t)} = m \frac{2\pi}{\omega(k-1)} = \dots = \frac{2\pi}{\omega} \quad (15)$$

we will apply to  $\Phi(t)$  in (13) for subsequent reasoning  $\Phi_{\Sigma}(t)$ :

$$\Phi_{\Sigma}(t) = \sum_{g=1}^{\infty} \sum_{j=1}^{\infty} \Phi_{jm}^{(g)} \sin(\omega_j t + aj) \quad (16)$$

The number of components in (16) will be set below. Turning to the factor  $\delta(t)$  in (13), we note that it is sufficient to restrict ourselves in (6) to the expression

$$x(t) = X_m \sin(\nu t + \Theta) \quad (17)$$

Practice shows that other harmonics of the Fourier type in (17) have an insignificant influence when studying the basic current components in (13) for a stationary process of operation of the oscillation exciter and can be omitted.

corresponding components of the inductive voltage  $u_{L(k)m}$  on the winding. But it is known that

$$u_{L(k)m} = W\omega_{(k)}\Phi_{(k)}. \quad (19)$$

Thus,

$$u_L(t) = u_{L\Sigma}(t) = \sum_{k=1}^{\infty} W\omega_k \Phi_{(k)m} \cos(\omega_k t + a_k) \quad (20)$$

It follows that in the presence of an experimentally obtained oscillogram of the process, where the voltage,  $u_L(t)$  is recorded, the number of fundamental harmonics in expression (4) can be established.

Carrying out transformations in (18), we obtain:

$A_K, \zeta_k$  - respectively, the amplitude coefficient and phase of the harmonic component then  $I_A(t)$ .

In (22), the quantities included in it are defined as follows. Amplitude coefficient of the  $k$ -th harmonic component:

$$A_k = \sqrt{J_{(k)}^2 + \frac{\beta^2 (J_{(k-1)} - J_{(k-1)})}{4}}. \quad (23)$$

The phase of the  $k$ -th harmonic component of the current  $\zeta_k$  is determined from the following considerations:

$$\zeta_k = p_k + a_k. \quad (24)$$

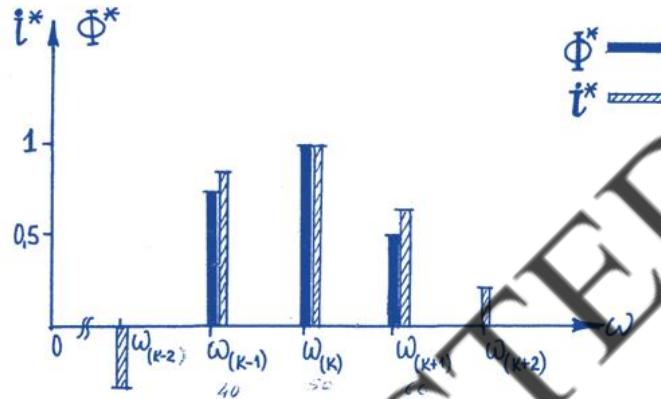
Thus, form (22), taking into account (23) and (24), allows us to see the influence of harmonic components

(through coefficients  $J_k$ ) on the formation of the corresponding harmonic current components (Picture. 3) and, therefore, establishes the correction of current components (belonging to the electrical subsystem) and magnetic flux components (belonging to the magnetic subsystem) [14-16].

$$p_k = \arctg \left[ \frac{\beta(J_{(k-1)} - J_{(k+1)})}{2J_k} \right] \quad (25)$$

Turning to the formation of the alternating component of the traction force of the exciter of low-frequency mechanical vibrations, we note that (remove the

comma) the third harmonic component in the magnetic flux entails changes in the amplitude-frequency characteristics of the traction force. Let us turn to the consideration of the equations for the electrical subsystem of the TEMV LFMV. Due to the fact that both harmonic representations of magnetic fluxes (13) and harmonic representations of currents (22) in the exciter windings were formed above, it is advisable to present these equations with the introduction of the indicated quantities. Then for the diagram in Picture . 1 these equations will take the form



Picture. 3.

*Influence of harmonic components of magnetic flux on the formation of harmonic components of current*

$$\begin{aligned} U_a &= I_a r_a + \frac{1}{C_a} \int I_a dt + W_a \frac{d}{dt} (\Phi_a) \\ U_b &= I_b r_b + \frac{1}{C_b} \int I_b dt + W_b \frac{d}{dt} (\Phi_b) \\ U_c &= I_c r_c + \frac{1}{C_c} \int I_c dt + W_c \frac{d}{dt} (\Phi_c), \end{aligned} \quad (26)$$

$U_{abc}$  – phase voltages according to phases A, B and C;

$r_a = r_b = r_c = r$  – active resistance of phase windings A, B and C;

$\Phi_a, \Phi_b, \Phi_c$  – magnetic fluxes in phase rods A, B and C;

$C_a = C_b = C_c = C$  – capacitance of capacitors in phases A, B and C;

$W_a = W_b = W_c = W$  – magnetic fluxes in phase rods A, B and C.

In this case, the equation of the mechanical part in accordance with (3) will take the form:

$$m \frac{d^2 x}{dt^2} + r_{mex} \frac{dx}{dt} + \frac{1}{\lambda} = F_{\Sigma}. \quad (27)$$

Turning to (26), we note that the equations include both currents in the exciter windings and magnetic fluxes  $\Phi$ . However, taking into account that, in accordance with (22), currents can be represented through components of magnetic fluxes, in equations (26) only

magnetic fluxes can be considered as variables. In addition, taking into account the above considerations about the symmetry of the load of the phases of a three-phase circuit, each of equations (2) can be considered in isolation, taking into account the fact that the magnetic fluxes must have the same harmonic composition, each of the components of which has the same amplitudes with operators of the “sin” type or “cos” of the same frequency, but different phase angles. The latter is related to the following considerations. The composition of magnetic fluxes must necessarily contain harmonic components (which, generally speaking, are dominant compared to other harmonic components), the frequency of which is determined by the frequency of the supply network. Due to the fact that the electromagnetic exciter under consideration is powered from a three-phase network, where shifts of phase voltages between each other at angles of  $120^\circ$  are determined, these phase shifts should also be contained in the arguments of the above-mentioned harmonic components of magnetic fluxes at the supply frequency, which we will further denote  $\omega_k$ . At the same time, the phase shifts of the harmonic components of magnetic fluxes at frequencies do not have such an obvious indication for establishing the presence of the indicated angles in them, characteristic of a three-phase system.

However, special studies carried out made it possible to establish the presence of phase angles of  $120^\circ$  in the harmonic components of magnetic fluxes at frequencies different from the frequency  $\omega_k$ . The main result of these studies is the following experimentally





First of all, we note that in connection with symmetry, that is, equalities, the summation of constant components (the first three terms in (33)) and harmonic components at difference frequencies is carried out. Note that, in accordance with Picture 3, the following frequency components are presented here:

$$\omega_{k+1} - \omega_k = \omega_k - \omega_{k-1} = \nu$$

$$a_{k+1} - a_k = a_k - a_{k-1} = \Theta$$

It follows that

$$\begin{aligned}\omega_{k+1} - \omega_{k-1} &= 2\nu \\ a_{k+1} - a_{k-1} &= 2\Theta\end{aligned}\quad (35)$$

Thus, (35) must also be rewritten, and taking into account these expressions it will take the form:

$$\begin{aligned}F_{\Sigma}(t) &\frac{3}{2}h(\Phi_{k-1}^2 + \Phi_k^2 + \Phi_{k+1}^2) + 3h\Phi_{k-1} \cos[(\omega_k + \Theta)t + (a_k + a_{k-1})] + \\ &+ 3h\Phi_{k+1} \cos[(\omega_{k+1} + \Theta)t + (a_{k+1} + a_k)] + \\ &+ 3h\Phi_k \cos[(\omega_k + \Theta)t + (a_k + a_{k+1})]\end{aligned}\quad (36)$$

or, using the elements of the notation form (21), (22) and (23), in particular we have:

$$F_{\Sigma}(t) \frac{3}{2}h(\Phi_m^2(J_{k-1}^2 + J_k^2 + J_{k+1}^2) + 3h\Phi_m^2 J_{k-1} J_{k+1} \cos 2(\nu t + \Theta) + 3h\Phi_m^2 J_k (J_{k-1} J_{k+1}) \cos(\nu t + \Theta)) \quad (37)$$

Expression (37) can be presented in another form

$$F_{OTH}(t) = \frac{F_{\Sigma}(t)}{F_m} \left( \frac{1}{2} J_{k-1}^2 + \frac{1}{2} J_k^2 + \frac{1}{2} J_{k+1}^2 \right) + J_{k-1} J_{k+1} \cos 2(\nu t + \Theta) + J_k (J_{k-1} J_{k+1}) \cos(\nu t + \Theta) \quad (38)$$

Where  $F_m = 3h\Phi_m^2$  – some normalizing value of the traction force of a three-phase electromagnetic exciter of low-frequency mechanical vibrations. Expressions (37) and (38) show that the harmonic composition of the traction force  $F_{\Sigma}(t)$  acting on the TEMV LFMV armature (and through the latter on the working body of the technological object driven into reciprocating motion) is determined by two main groups of components. The first of them contains components that are independent of time and only attract the armature, as well as components that act on the armature with a frequency of  $2\nu$  (twice compared to the working frequency, equal to  $\nu$ ). All components of this group do not have a working effect on anchor, and in principle should be minimized. The second group is represented by two components that can be combined (which is done in (38)). Their combined force, which is an alternating disturbing force on  $\nu$ , provides the necessary (working) movement of the anchor, and hence the working body. In principle, this force component in its amplitude exceeds the amplitude of the force component that disturbs the armature with double the frequency. Picture 5 shows the spectrum corresponding to (38) with the ratio of the magnetic flux amplitudes in Picture 3 c. Here it is easy to see the dominant position of the group of components traction force having a frequency  $\nu$ . Note that the side frequencies  $\omega=0$  and  $\omega=2$  are spaced from the center line of the spectrum by an equal frequency interval. Thus, already at this stage of considering the processes in the TEMV LFMV, one can note a significant advantage regarding the formation of electromagnetic traction force in it. It should be provided for in minimizing the amplitudes of forces at side frequencies and isolating the main alternating component of the force at the operating frequency, both through the rational choice of the counter parameters  $r$ ,

$L$ ,  $C$  of each phase, and through three-phase power supply with a symmetrical load of a three-phase supply network of standard frequency. It is the latter that makes it possible to cancel a significant group of traction force components due to the presence of phase angles ( $0^\circ$ ), ( $-120^\circ$ ), ( $-240^\circ$ ) in them and to concentrate the transmitted power in a limited number of working components of this force. All this significantly contributes to increasing efficiency of the considered TEMV LFMV.

### Results of modeling the operation of TEMV LFMV

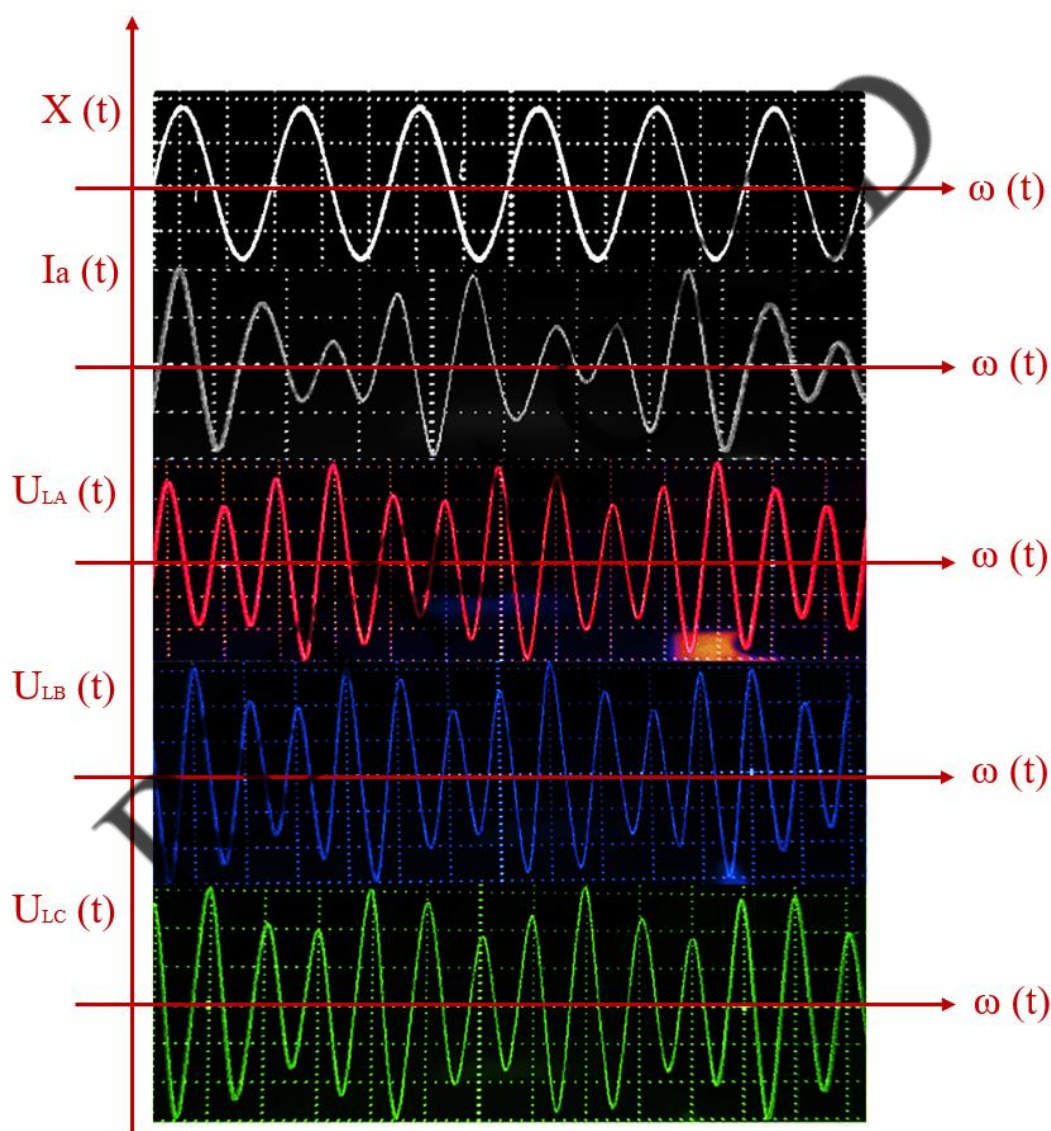
An oscillogram of the operating parameters of the TEMV LFMV is shown in Picture 4. It shows the processes of changing  $\delta(t), I_a(t), u_{LA}(t), u_{LB}(t), u_{LC}(t)$  that is, respectively, changes in the gap, current in phase A, voltage on the coils in phases A, B and C over time, the periodicity of which over the longest period (envelope period) is determined by stationarity mode of armature oscillations (changes in the air gap in  $\delta(t)$ ). Analyzing with the help of the indicated oscillogram the nature of the change in voltages  $u_{LA}(t), u_{LB}(t), u_{LC}(t)$ , we note a “pronounced modulation of the processes” [17]. In this case, the symmetry of the envelopes relative to the abscissa axes ( $\omega t$ -axes) can be traced for all three processes. However, the asymmetry of these envelopes relative to the conventional ordinate axis drawn from the center of each packet of oscillations (rectangle on the oscillogram in Picture 4) is just as clearly presented, which distinguishes the nature of this type of modulated curve from the nature of the beats, which in the classical form are formed by only two oscillations of a sinusoidal shape with identical amplitudes and similar frequencies. The latter, as is known, are characterized by a form in which there is symmetry of the envelopes both relative to the abscissa axis and the ordinate axis



in the above sense. The latter indicates that in the case of the law of change  $u_L(t)$  (Picture. 4), when decomposing them into harmonic components, more than two similar components with different frequencies must be taken into account. The analysis showed that at least three harmonic components should be identified when decomposing  $u_L(t)$ . Confirmation of the validity is that in this case the cyclic graph  $\Phi(b)$  is valid (Picture. 5, a), which is constructed in connection with the recommendations.

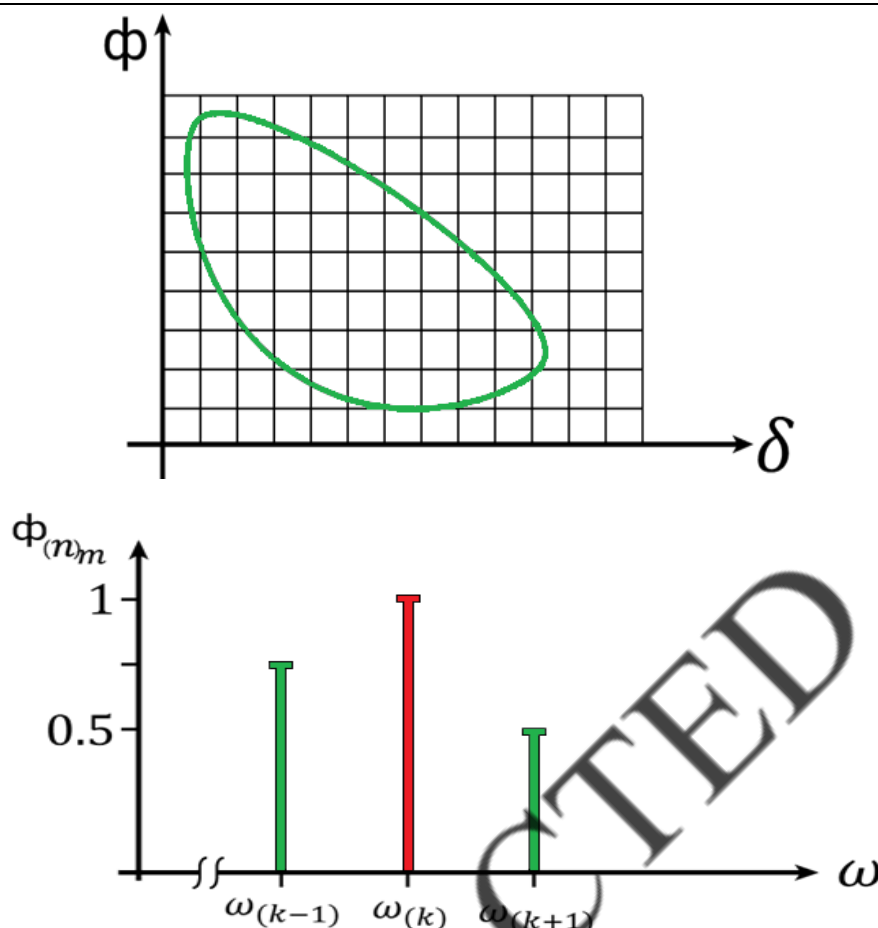
It was found that in such cases the frequencies of the three harmonics should be related to each other as (15). In this case, the period, which is the smallest common multiple of the periods of these harmonics, is the

period of mechanical oscillations of the armature, that is,  $\delta(t)$ . The amplitudes of the harmonic components of the magnetic flux are distributed in accordance with Picture 5, b. From Picture . 5b it is clear that the amplitude of harmonics with a conventionally average frequency should be greater than the amplitude of harmonics with side frequencies. The frequency of this “average” harmonic coincides with the frequency of the mains supply. The curve is formed by the summation of three harmonic components at various combinations of their amplitudes, the frequencies of which are subject to the above condition. It illustrates the correctness of these judgments regarding the shape of the modulated curve envelope with a similar harmonic composition.



Picture. 4.

Regularities of changes in the gap, current in phase A, voltage on the coils in phases A, B and C over time



Picture 5. Patterns of changes in operating parameters of TEMV LFMV  
 a - cyclic graph  $\Phi(\delta)$ ; b - amplitudes of the harmonic components of the magnetic flux

However, when discussing individual issues of filtration in the exciter phases, it is necessary to provide a theoretical justification for the appearance in the harmonic composition of the magnetic flux of precisely three harmonic components that satisfy the above considerations in terms of amplitudes and frequencies. In this case, the frequency values coincide with conditions (37) as in Picture 5. The considered harmonic components of the magnetic flux make it possible to determine the magnitude and harmonic composition of the electromagnetic force of the TEMV NChK, which, in principle, already allows for the possibility of its design. However, a feature of the considered type of exciter of low-frequency mechanical oscillations is a significant difference in the frequency of its supply from the frequency of mechanical oscillations, and frequency conversions occur inside the exciter device and are associated with modulation (parametric) effects. To more fully take into account their influence, it is advisable to turn to the electrical part of the three-phase exciter, dividing it into electrical, magnetic and mechanical subsystems. It is in its electrical subsystem that the restriction of conditions is formed, which determines the presence of a rational range of operating frequencies, which is associated with the fact of resonant filtering, which will be discussed below. For a detailed consideration of these issues, we will compose a convenient form of harmonic representation of currents in the windings of the exciter, and, using it, we will consider

the systems of equation of its electrical subsystem. The indicated form of representation of the harmonic components of the current can be obtained based on (18). In principle, this relationship should be obtained by integrating the equations for the electrical part of the exciter. However, the use of (18) makes it possible to establish a connection between the amplitudes, frequencies and phases of harmonics of currents and magnetic fluxes of a three-phase exciter, taking into account modulation effects in a form convenient for subsequent analysis, and therefore it is advisable to use this particular technique.

## CONCLUSIONS

1. For the rational design of TEMV LFMV, it is necessary to consider in detail the conditions for the formation of currents in its windings and the features of the transfer of average power from the electrical subsystem to the mechanical one. As a result of studies of individual issues of filtration in the exciter phases, a theoretical justification is given for the appearance in the harmonic composition of the magnetic flux of three harmonic components that satisfy the amplitudes and frequencies. The considered harmonic components of the magnetic flux make it possible to determine the magnitude and harmonic composition of the electromagnetic force of the TEMV LFMV, which, in principle, already allows for the possibility of its design.

2. It has been determined that there is a significant difference between the power supply frequency of the TEMV LFMV and the frequency of its mechanical oscillations, and frequency conversions occur inside the exciter device and are associated with modulation (parametric) effects. To more fully take into account their influence, it is advisable to turn to the electrical part of the three-phase exciter, dividing it into electrical, magnetic and mechanical subsystems. It is in its electrical subsystem that the limitation of conditions is formed, which determines the presence of a rational range of operating frequencies, which is associated with the fact of resonant filtering.

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**STUDY OF STEPS IN THE VISUM SOFTWARE FOR CREATING A MACROSCOPIC MODEL FOR PUBLIC TRANSPORT, FOR EXAMPLE FOR THE CITY OF PRILEP****Atanasova Vaska,***Graduate traffic engineer, PhD**Faculty of Technical Sciences***Stojanoska Marija***Graduate traffic engineer, M.Sc**Faculty of Technical Sciences*[DOI: 10.5281/zenodo.10151424](https://doi.org/10.5281/zenodo.10151424)**Abstract**

The PTV VISION VISUM software tool, which is the world's leading traffic analysis, forecasting and data management software that reliably models all road users and their interactions. The subject of analysis in this paper will be the planning of a sustainable urban transport system, in this case the public transport of the city of Prilep with the help of the software tool PTV VISION VISUM. In the paper that is dedicated to public transport, i.e. the steps that must be taken to obtain the sizes, from the creation of an operator, type of public transport, coordination group, placement of stands, lines of public transport, matrixes, uses, rewritings and similarly. The outputs will be shown as a combination of private and public transport and the application of the modal distribution of trips with the help of a legend and a detailed description of the elements of the pad. In addition to the VISUM software tool, the VISSIM tool will also be shown, with the help of which we will simulate the movement of the public city transport in the city of Prilep.

**Keywords:** model, planning, forecast, software, public transport, Prilep.

Macroscopic traffic models for the creation of transport demand are widely used in traffic engineering for the analysis and assessment of the projected transport system, traffic operations, the selection of alternative solutions, forecasts of transport demand, etc. Traffic and planning are closely related to each other, therefore there is an increasing need for traffic engineers to use modern software tools and packages. VISUM works with all non-rail, rail and other public transport systems. It is the only integrated software package that integrates complex transport demand, traffic planning and passenger behavior simulation. It enables sustainable management of public transport quality. Public transport has a great potential for transport planning. The optimal planning process creates a balance between demands (transport demand) and technological capacities (transport supply).<sup>[1]</sup> In this paper, the emphasis will be placed on the public transport in the city of Prilep, by applying the software tool PTV VISION VISUM, where on an already created base and a traffic transport network, we will create the public city transport by setting up stops and public transport lines in Prilep, i.e. modeling, and then a connection with private traffic and a display with simulation.

**1. CREATION OF A MACROSCOPIC MODEL FOR PUBLIC TRANSPORT OF THE CITY OF PRILEP**

Public transportation is a system of transportation of passengers for group trips that is available for use by the general public in contrast to private transportation, with a predefined schedule of driving, along established routes and with the charging of a price for the trip. Public transportation affects everyone. It is an integral and essential part of the contemporary world. In addition,

the pollution of the environment where we live is significantly reduced, because, compared to all world analyses, one bus that can hold 60 passengers actually replaces 20-30 individual motor vehicles, reducing the level of pollution by about 10 times. From an economic point of view, public transport is much cheaper than transport with your own vehicle. In addition to fuel consumption, in this segment parking spaces, which are expensive for daily use, as well as the smaller number of them, as a consequence of the increase in the number of vehicles, must be considered.<sup>[2]</sup>

**1.1 Public passenger transportation in Prilep**

Public city transportation as a department of the Public Enterprise for Spatial and Urban Plans has been operating since April 2014.<sup>[4]</sup> Prilep is the first city in the country to get environmentally friendly and cheaper city transport. Part of the vehicle fleet that is used for transportation is diesel, while there are also four buses that run on methane.<sup>[11]</sup> There are 3 bus lines in Prilep, payment is made through a card, which can be purchased at JSP Prilep, it can be topped up, and control is carried out electronically through a monitored apartment, for people who do not have a card, payment is made with coins of 5 and 10 denars, where he receives a fiscal bill, the vehicles are equipped with video surveillance, double-winged doors, low floors, the possibility of wheelchair access and space intended for disabled people. The vehicles are modernly equipped, 12 meters long, double-winged, with 27 seats, with a ramp for passengers with wheelchairs, that is, they have the capacity to transport 78 passengers standing. The main benefit of these buses is that they do not pollute the environment, because they are Euro 6 standard.<sup>[3]</sup>





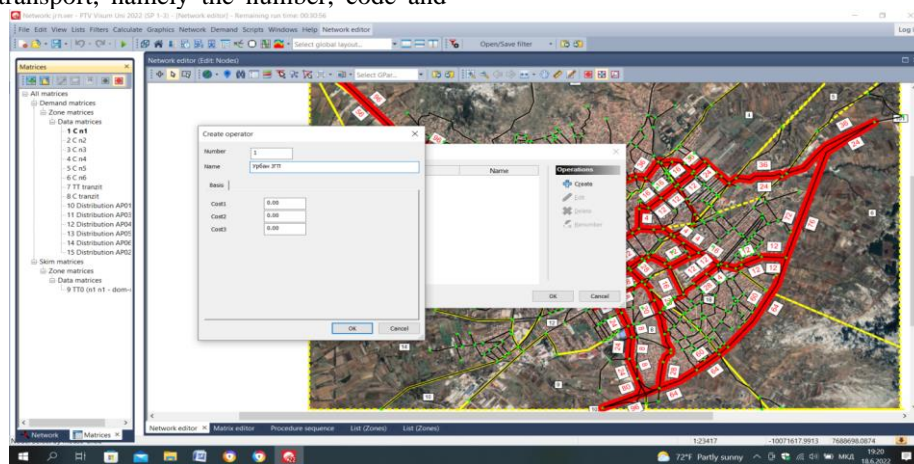
*Pic.1.1.1 Bus for public passenger transportation in Prilep*

## 1.2 Creation of operator, type and coordination group of public city transport

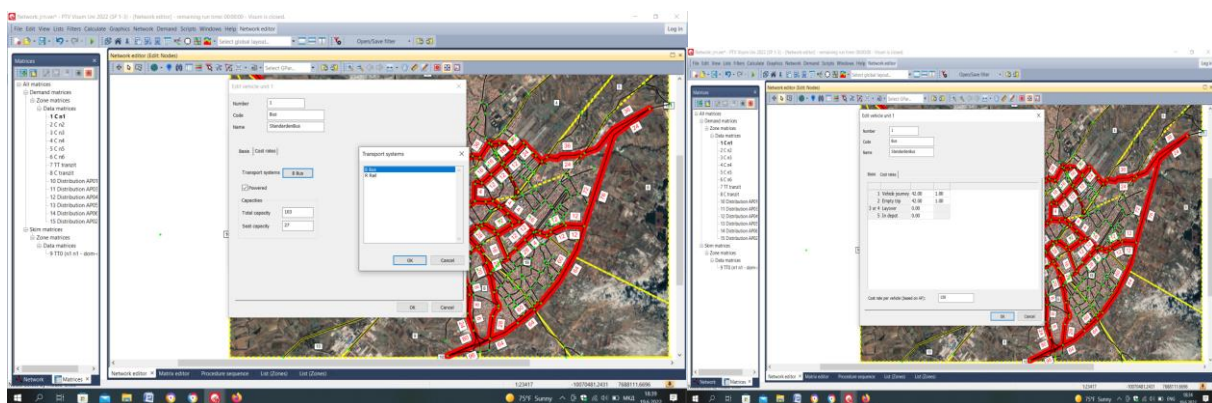
By creating an operator we enter the name, number and costs of the operator. Here we can create multiple types of operators like urban or rural public transport. It is shown in figure 1.2.1 In terms of type, public city transport can be created by bus and combined (eg bus - railway). We enter the characteristics of the type of transport, namely the number, code and

name of the type of transport, type of transport system, seating and standing capacity, costs (costs per hour - kilometer, full trips, empty trips, vehicle parking).

It is shown in Figure 1.2.2 Coordination groups are a fundamental step in advancing the rewriting of route journeys.



*Pic.1.2.1 Creation of an operator of public urban transport*



*Pic.1.2.2 Creation of a type of public urban transport*

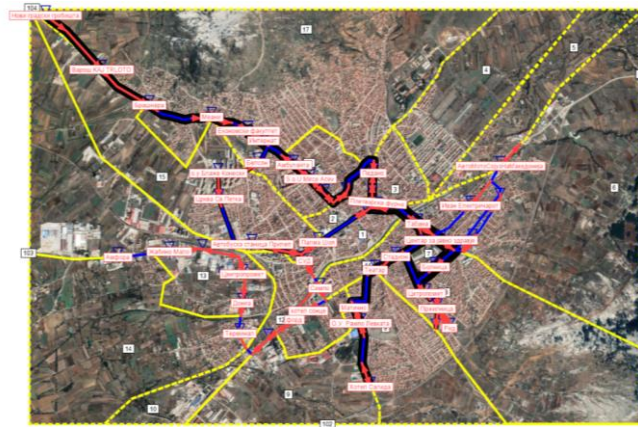
## 1.3 Creation of stops and lines of public city transportation in Prilep

The placement of the stands and the territory in which the stands are located are always created together

because they cannot function without each other. Figure 1.3.1 shows the public transportation stops in Prilep. Drawing a line route is done by selecting the first station and dragging to the end where the line ends, i.e. the last station. Figure 1.3.2 shows all the lines and stops of the public transport in Prilep.



*Pic. 1.3.1 Public transport stops in Prilep have been created*

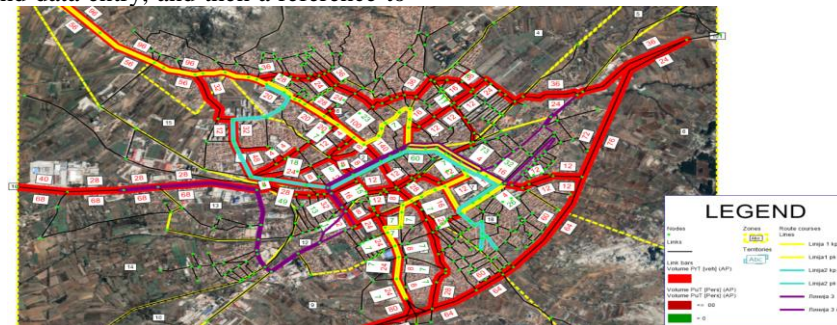


*Pic.1.3.2 Presentation of created lines and stops of public city transport in Prilep*

#### 1.4 Calculation of the modal sizes for public transportation

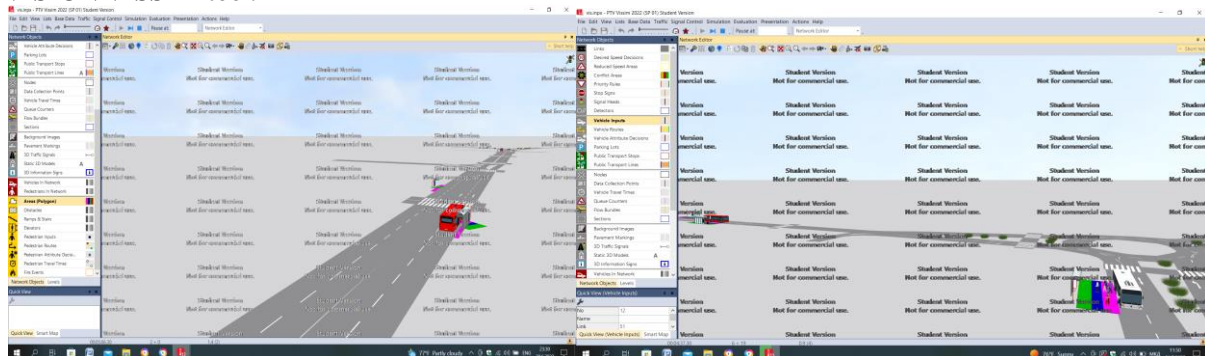
Before the step for the calculation of modal sizes is shown, it is necessary to enter a purpose named as public transport, a period in which we are analyzing it, a travel matrix and data entry, and then a reference to

the matrix. To calculate the sizes we create a skim matrix for public transport and rewrite public transport trips. The calculated sizes are given in figure 1.4.1, together with the private traffic, where the number of lines with different colors, stands, zones and sizes are shown.<sup>[6]</sup>



*Pic.1.4.1 Presentation of the calculated sizes for public and private traffic for the city of Prilep*

Figure 1.4.2 shows images that simulate the movement of public city transport vehicles using the PTV VISION VISSIM tool.



*Pic.1.4.2 Simulation of public city transport vehicles at stops in Prilep city*



## 2. CONCLUSION

Prilep is a city that has a well-built and connected traffic network, where the needs for travel are met with different transportation systems. The development of private journeys along the primary traffic network, train journeys along the built railway network and public city transport according to a pre-determined timetable, price and route of movement.<sup>[8]</sup>

With the help of the software tool PTV Vision VISUM, which is a professional software for traffic planning and detailed display of all modes of transportation, trips with private vehicles and public transportation, a calculation and forecast of the transportation demand for the city of Prilep was performed. To show the modal distribution of trips in a paper, in a pioneering way, the steps for calculating the modal sizes for public city transport were shown, from creating an operator that performs the transport, adding a bus to the section of transport systems, setting up a coordination group, stands by full length, placement of public transport lines, model creation, matrices and calculation of modal sizes for public city transport. All the placed elements were shown through a legend and a simulation of the movement of public transport vehicles in the territory of the city of Prilep. The simulation was done with the software tool PTV Vision VISSIM.<sup>[9]</sup>

By comparing the output results from the calculation of the modal sizes, we can conclude that in this paper the modal distribution of trips is made by analyzing private cars and trucks versus public city transport. We can conclude that private trips on the transport network of the city of Prilep prevail. The largest number of private trips are on the entrance-exit routes of the city and in the central city area, where the most numerous activities for meeting human needs are concentrated. Regarding the public city transport, we can conclude that we have the largest number of trips on the part where the movement routes coincide, that is, 1, 7 and 11 zones. During the period of analysis, the public city transport line number 3 has the smallest amount of passengers transported per hour.

Prilep deserves a modern vision for traffic, a vision for a different modal distribution, a vision for sustainable transport, a vision for a green city, for a greater participation of public, bicycle and pedestrian traffic in the total, and less of the car. We need to plan a city for people, not for cars.<sup>[7]</sup>

We live in a new time and our values should be progressive. Let's learn from positive examples in the world, create new concepts. Software tools and packages are of great importance for traffic engineers because they allow us to review the current situation and forecast future needs, without going out into the field, simulating the movements and seeing the problems.<sup>[5]</sup>

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