

**Міністерство освіти і науки України**  
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**Асоціація викладачів англійської мови ТІСОЛ-Україна**  
**(TESOL-Ukraine)**

**Матеріали Міжнародної науково-практичної конференції**  
**«ЗАГАЛЬНІ АСПЕКТИ ІННОВАЦІЙНОГО РОЗВИТКУ ОСВІТНЬОЇ ГАЛУЗІ В**  
**КОНТЕКСТІ МІЖНАРОДНОГО СПІВРОБІТНИЦТВА УКРАЇНИ. GENERAL**  
**ASPECTS OF INNOVATION DEVELOPMENT OF EDUCATION IN THE**  
**CONTEXT OF INTERNATIONAL COOPERATION OF UKRAINE»**

24-25 квітня 2025 р.

Миколаїв  
2025

**УДК 811**  
**М-34**

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М-34      Матеріали Міжнародної науково-практичної конференції «Загальні аспекти інноваційного розвитку освітньої галузі в контексті міжнародного співробітництва України. General Aspects of Innovation Development of Education in the Context of International Cooperation of Ukraine», 24-25 квітня 2025 р., м. Миколаїв. – Миколаїв : МНАУ, 2025. – с. 117

У матеріалах Міжнародної науково-практичної конференції «Загальні аспекти інноваційного розвитку освітньої галузі в контексті міжнародного співробітництва України», розглянуто різноманітні актуальні питання, пов'язані з професійною діяльністю майбутніх фахівців, проаналізовано досвід інших країн.

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## BRITAIN'S EXIT FROM THE EU

*The article discusses the story of brexit from the perspective of a Brit. Including the background to this story, the possible reasons the vote went the way it did, and the possible consequences for the future.*

**Keywords:** *brexit, European Union, UK, referendum, membership.*

The shot review about “Brexit”. The description of a history.

Anyone who even glances occasionally at the news will have noticed the stories regarding ‘Brexit’. Brexit is a portmanteau (a new word formed of two words to describe a specific theme), which is commonly used now to describe Britain’s exit from the European Union (EU). Attitudes surrounding Brexit have always been of interest to non-Brits, therefore I hope this article will enlighten you about the subject from a British perspective.

Britain’s relationship with the EU has always been a tumultuous one. Britain joined what, what was then called the ‘European communities’ (EC) in 1973, which later changed its name to the EU. It was a Conservative prime minister, Ted Heath, who brought Great Britain into Europe, but following his defeat to the Labour party in 1974, a referendum was called in 1975 on whether to stay in the EC or to leave. In the 1975 referendum, the first ever national referendum in UK history, 67.2% of the electorate voted to remain in the EC. This was a resounding victory, and many would have thought that such a result would cement Britain’s place in Europe. However over the following decades a significant shift in political opinion in Great Britain would see the attitude to Europe turned upside down. The group colloquially known as ‘Europhiles’ (the pro-EU supporters) in 1975 typically belonged to the Conservative party, which is the voice of the centre right of British politics, who originally saw Europe as a great opportunity for increased trade and business; while 66 the Labour party, the centre left party in Great Britain, were skeptical of the terms of Britain’s membership of the EC, believing it a threat to British jobs and worker’s employment. By 2013 though this attitude had shifted, the Labour party were now committed to the European dream, satisfied with the protections given to workers rights in the European treaties, and it was the Conservatives who had become ‘Eurosceptic’ (those who were against the EU), due to what was considered interference by the EU in British domestic law. The then Prime Minister David Cameron promised that if his party (Conservatives) won the 2015 general election, they would hold a nationwide referendum on Britain’s membership of the EU. He subsequently won that election and the referendum was due to take place in June 2016, which would be won by ‘the leave campaign’ by 52-48% of the vote.

The main question asked by non-brits about Brexit is ‘why did Britain vote to leave?’ This is not a simple question to answer, as the reasons are complex, and each voter had his or her own motivation to vote the way they did. However, in general the reasons to vote leave can be boiled down to three main categories, according to research carried out by the ‘Lord Ashcroft Poll’. They are: sovereignty, immigration and culture.

According to the Lord Ashcroft poll, nearly half (49%) of leave voters said that the biggest reason for them wanting to leave the EU was “the principle that decisions about the UK should be taken by the UK”. EU membership was seen by them as taking power away from national bodies, such as parliament, in favour over domination by regulatory bodies – especially the unelected European Commission, and distancing power makers from the people. The second most cited reason for wanting to leave the EU was immigration, making up nearly one third of respondents to the poll. Membership of the EU has as one of its core principles the free movement of people across the continent. For the more developed countries of the EU, of which the UK was a part, this saw levels of immigration rise significantly. The rise of the immigrant population in the UK (200% between 2001-2015 according to Ipsos MORI) has had an enormous impact on British life,

especially among poorer, working class communities. Primarily because of economic competition, for jobs and 7 7 increase in house prices. Additionally it was seen that increasingly immigrants to the UK were failing to integrate into British society, therefore fears were raised in the native population about the status of British norms and culture. The affects of immigration clearly influenced the vote to leave, with areas that had experienced the largest swings in immigration voting more heavily to leave the EU in 2016.

The vote of 2016 created numerous divisions within the UK which might pose threats to the future. Firstly, the closeness of the result itself (52% leave to 48% remain) show that the country itself is very evenly divided on the subject of Brexit. This divide is amplified even more when one looks at the demographics more closely, it begins to show more divides particularly between the nations of the UK.

The referendum was conducted within the United Kingdom, which is comprised of England Scotland, Wales and Northern Ireland. Additionally the British overseas territory of Gibraltar also took part in this referendum. The majority of the electorate in England and Wales voted to leave the EU, whereas in the other nations of the UK the situation was the opposite. In Scotland the result of the referendum looks most likely to become politically problematic, having voted only two years before, narrowly, to remain part of the UK, the result of the 2016 referendum renewed calls from the Scottish nationalists for another independence referendum. So far, such demands look unlikely to be accepted by the UK government in Westminster; however some commentators suggest that the longer Scotland goes without a say on its future, the more likely when an independence referendum comes about, they are to vote to leave the UK. Similarly, in Northern Ireland, Republicans (those who believe that Northern Ireland should become part of the Republic of Ireland) are using the results of the referendum for a united Ireland, and regain EU membership. Although Gibraltar voted, out of all the parts of the UK, most heavily to remain in the EU, it is seen as unlikely to have any serious consequences for its relationship with the UK.

The UK finally exited the EU on January 31st 2020, following the reelection of a conservative majority under Prime Minister Boris Johnson, who pledged to take the UK out of the EU fulfilling the result of the referendum. Until the end of this year the 8 8 UK is in a transition period, while both sides attempt to draw up an agreement for the future relationship between the UK and the EU. By June this year we will know more details about what that arrangement will look like. Until then, this story looks likely to continue to dominate the headlines in the UK and abroad.

УДК 111.111

**Laurent Orieux**

## **L'IMPORTANCE STRATÉGIQUE DE L'ENSEIGNEMENT SUPÉRIEUR AU XXI<sup>e</sup> SIÈCLE**

*In this paper the author discusses about importance of advance education as a priority of the XXI century. The accent is made on the necessity of search of the new educational paradigm, which presupposes formation of the specialist with cultural worldview, the humanized human, highly cultural, highly educational, creative, highly intelligent person, who is oriented not on thoughtless consumption, but on creation of the better world and aiding other people.*

**Keywords:** *advance education, cultural worldview, highly educational person.*

Au début du XXI<sup>e</sup> siècle, la crise spirituelle de la société a commencé.

La domination des valeurs matérielles sur les valeurs spirituelles, la consommation irréfléchie, l'exploitation excessive des ressources naturelles, ont aggravé cette crise.

Ce déséquilibre supplémentaire du système mondial a conduit à sa division en deux parties inégales.

L'éducation est aujourd'hui considérée comme l'un des mécanismes les plus importants de

sa survie. Son but est vu non seulement dans la transmission aux générations futures de l'expérience socialement significative des générations passées, mais aussi dans l'information et l'interaction environnementale de l'homme et du monde.

De plus, aujourd'hui, l'accent dans l'éducation est déplacé, de la formation d'une personne économique, d'un industriel avec une spécialisation étroite, à la formation d'un être humain, hautement spirituel, hautement cultivé, hautement éduqué, créatif, généreux, axé non sur la consommation, mais sur la création un monde meilleur et en aidant les autres.

L'instrument de sa formation est la sphère culturelle, à travers laquelle tous les peuples, quelle que soit leur localisation, pourront rassembler tous les fragments du miroir brisé de la société, car seule la culture peut établir un lien fort entre passé, présent et futur ; réduire le fossé entre riches et pauvres, entre pays riches et pays pauvres ; améliorer les relations interculturelles et créer des opportunités efficaces de communication entre différentes cultures et civilisations.

Les chercheurs modernes soulignent la nécessité de développer un nouveau paradigme de l'éducation, soulignant que l'éducation doit être avancée, capable de préparer les jeunes professionnels aux nouvelles conditions de leur existence dans la société mondiale de l'information. Le nouvel accent mis dans le nouveau paradigme de l'éducation n'est pas seulement sur la qualité de certaines connaissances, compétences et capacités, mais aussi sur le développement de la créativité humaine, la formation de valeurs spirituelles, culturelles, morales, intellectuelles et esthétiques, qui contribueront à un équilibre l'existence humaine dans le monde moderne sera le premier pas vers l'harmonie, le développement durable et le bien-être de l'humanité à l'avenir.

La pierre angulaire du nouveau paradigme de l'éducation est l'idée de développement durable, qui est impossible sans surmonter la crise du système éducatif. Les érudits modernes voient le moyen d'en sortir dans la réorientation de l'éducation de la technologie, de la masse, du rationalisme vers la créativité, l'humanisme, la spiritualité et la culture. Il convient de noter qu'un accent particulier est mis sur le développement de la sphère émotionnelle de l'homme avec l'intellectuel, c'est-à-dire la synthèse de l'esprit et des sentiments, des connaissances et de l'éducation, ce qui, par conséquent, résoudra le problème des érudits répandus. Le sens de l'éducation au XXI<sup>e</sup> siècle est l'enseignement de la créativité par l'activation de la conscience, de la raison et des émotions, qui dans leur unité peuvent assurer le succès du processus d'adaptation à des conditions en constante évolution et souvent inconnues, pour obtenir de meilleurs résultats.

Les composantes du nouveau paradigme de l'éducation devraient être des idées sur sa nature avancée. L'essence de l'enseignement supérieur est de se concentrer sur les besoins à long terme non seulement de l'industrie mais aussi de l'individu et de la société; dans le développement du désir des jeunes de s'améliorer constamment, de tirer leurs propres conclusions et prédictions sur les perspectives à long terme du développement de la civilisation; dans l'amélioration de la qualité de l'éducation et l'inclusion des capacités créatives dans son nouveau paradigme, ce qui contribuera à révéler les capacités du jeune spécialiste à dépasser l'idée fragmentaire du monde, à le voir comme un tout et harmonieux. Cela n'est possible que par le développement de la sphère émotionnelle de l'homme, la révélation de son potentiel créatif. En conséquence, dans le processus d'éducation, les conditions nécessaires seront créées pour la formation d'une personnalité holistique, créative, généreuse, hautement cultivée, hautement spirituelle et hautement éduquée.

#### **Littérature:**

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## SCHOOL AND LEISURE EXPERIENCES OF CHILDREN WITH DISABILITIES IN NORWAY

*This article is deduced from a study done by the Norwegian Department of Education. Its theme is "Integration of Children with reduced functional abilities in the Norwegian primary and junior high school".*

**Keywords:** *physically handicapped children, special adapted education, disabilities, inclusive school, social participation.*

All children get the most out of an education when it is adapted to their level of performance ability, and some children need extra adaption to perform the best according to their abilities. Among those who need extra adaption, are pupils with challenges connected to behavior, reading and writing issues, reduced functional abilities and over average skilled pupils. Adaption according to each pupil's individual needs may include physical adaption, special pedagogical support or special training.

### **Main Points**

80% of primary schools are not sufficiently accessible for physically handicapped children.

About 8% of all pupils are included in some kind of special adaption for the year 2018/19

9

Since 2013-14 there is a decline in the number of pupils who have their special education outside their ordinary class.

### **Premises for an inclusive school**

All children in primary school have a right to attend the school which is in their nearest geographical location or the school that belongs to their parish. The right to attend a school with the children in their neighborhood is important for their belonging and being included in their local environment. The school is also obliged to be accessible for all children.

### **Many pupils chose to attend other schools in fear of lack of resources**

Children cannot be placed in another school without an application or consent from the parents. Parents shall participate in the selection of a different school but most often they have no other real alternatives to choose among. The owner of the school and the priorities of the manager of the school often influences their choice. Many chose to attend other schools in fear of lack of resources in the local school and in fear of their children being isolated.

When a local school is not available, the parents are forced to choose a school at another location within the municipality. This applies to a growing number of pupils and the number of pupils who receives their education outside of the ordinary school is almost doubled over the past 20 years. This applies to both pupils with reduced functional abilities and pupils in general.

80% of primary schools are not sufficiently accessible for physically handicapped children.

A survey accomplished in 2013 showed that almost 80% of primary schools in Norway are not sufficiently accessible for physically handicapped children. Stairs, doors which are too heavy and difficult to open, lack of elevators and lack of accessible restrooms constitute physical barriers in the school buildings.

The school is an important arena and an important cornerstone for the growing up conditions for children and adolescents. It is supposed to be adapted so children are not excluded because of physical hindrances. The school must be furnished in a way that it takes into consideration pupil's with physical handicaps. All children have a right to a workplace which is adapted to their needs.

### **Alternative and complementary means of communication**

But it is however not only physical barriers which may hinder integration. Every year approximately 360 children are born with challenges when it comes to spoken communication. This

means, that in an 18-year perspective it will include 6.500 children. Many of these will need special adaption to be included in a good way in the educational system. Especially there will be a great demand for school employees with special skills when it comes to alternative and complementary means of communication.

### **Special adapted education**

All pupils have a right to special adapted education. The aim of adapted education is that all pupils will have a better day at school and a better environment of learning. The schools must evaluate to test out measures in ordinary classes before they decide if the pupil will go through further consideration with the intention of adapting the pupil to special education. The right is not individual and may therefore not be subject to appeal.

The right to special education is built upon the fact that the pupil doesn't have or cannot have satisfactory advantage of the ordinary teaching offered in the ordinary school. The right to special education is given as an individual decision after an assessment by experts and may therefore be subject to appeal.

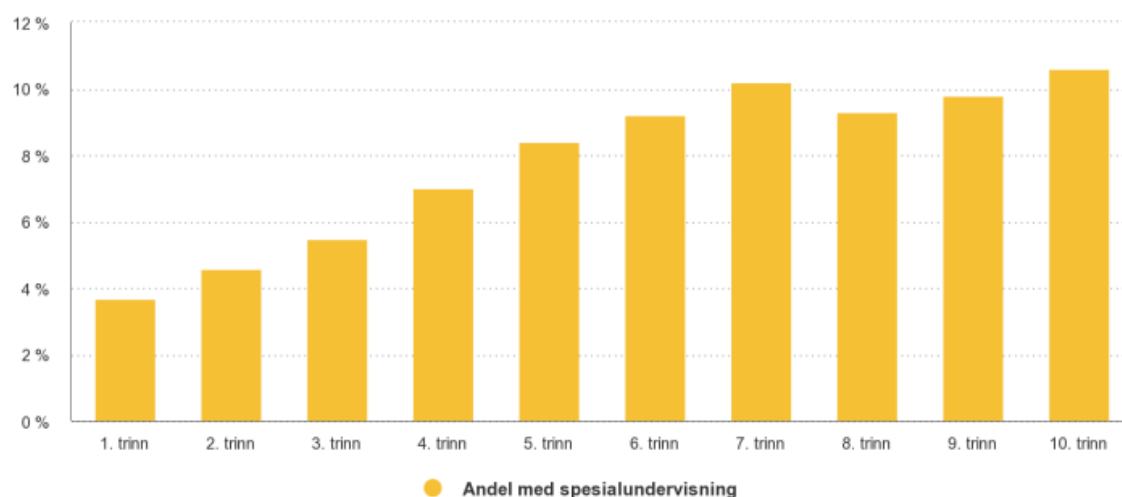
### **The portion of pupils with special education is increasing by the grade**

7.8% of all pupils in the primary school has an individual decision about special education for the year 2018-19. The latest years this portion has stabilized on a little below 8%. The number of pupils who receive special education is increasing with the age and grade. This implies that there are far more pupils in junior high school who receives special education than in the primary school. In the 1st grade in primary school 3.7% of the pupils receive special education, while in the 10th grade (which is the 3rd grade in the Norwegian junior high school), the portion has grown to 11.1%. In addition, there are great differences between sexes. Boys receive in a much higher rate special education than girls. This goes for all grades.

Higher density of teachers may contribute to a smaller demand for special education. The most important condition for this is that the teachers have good competence and that special pedagogical support personnel are available. Including pupils with certain needs in the ordinary classes may also have a positive social effect on all pupils.

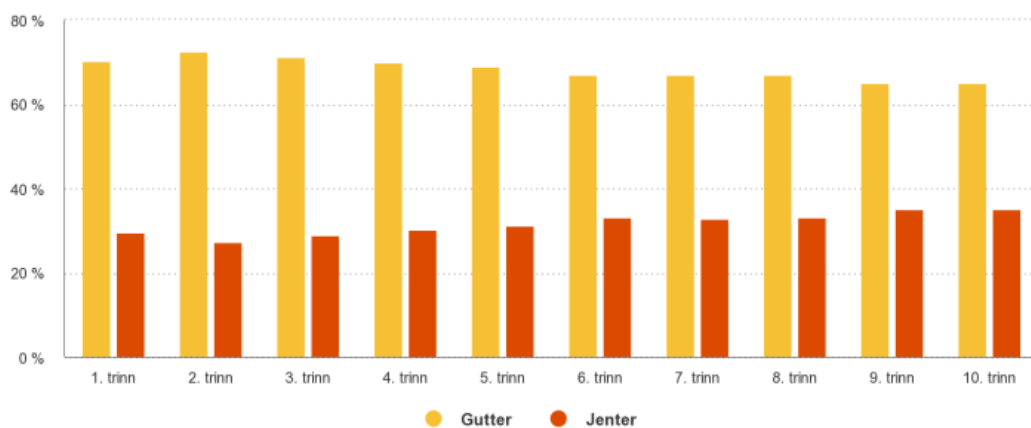
Number of pupils with special education in the Norwegian primary school by grade 1-10. 2018/19

Andel elever med spesialundervisning i grunnskolen, pr. skoletrinn. 2018/19



Kilde: Utdanningsdirektoratet 2019 - GSI

Elever med spesialundervisning i grunnskolen, fordeling mellom gutter og jenter. Pr. trinn.



Kilde: Utdanningsdirektoratet 2019 - GSI

Yellow = boys, red = girls. By grade 1-10.

Skills and the density of teachers reduce the demand for special education

### **How the special education is organized**

An important discussion connected to the special education revolves around the question where the actual teaching takes place – in the ordinary class or outside the class in smaller or larger groups.

57% receives their special education outside the ordinary class.

About 6 out of 10 of the pupils who receives special education, does this outside their ordinary class. This happens either in small groups or alone with a teacher or assistant. During the last couple of years, it has been an increase in the portion of pupils who mainly receive their special education in the ordinary class. In 2013/14 the portion was 28%, while today it is 43%.

4.100 children belong to a permanent department for special education.

Out of the approximately 50.000 pupils who received special education in 2018/19, about 4.100 belonged mainly to a permanent department of special education. This constitutes 8% of all children who receive special education.

The size of the school affects how the special education is organized. The bigger the school, the greater portion of pupils receives special education outside the ordinary class. At the same time there are more pupils who receives special education alone on small schools than on bigger ones.

### **Including children with reduced functional ability in the school.**

Several studies (Finnvold 2013; Kermit et al. 2014; Tøssebro & Wendelborg 2014) prove that children and adolescents with different kinds of reduced functional abilities in a too little degree are included in school and leisure time. It is a trend that children to a larger degree is taken out of ordinary teaching the older they get (Finnvold 2013).

Children and adolescents with reduced functional abilities are to a greater degree taken out of ordinary classes in the transitional years between primary school and junior high school.

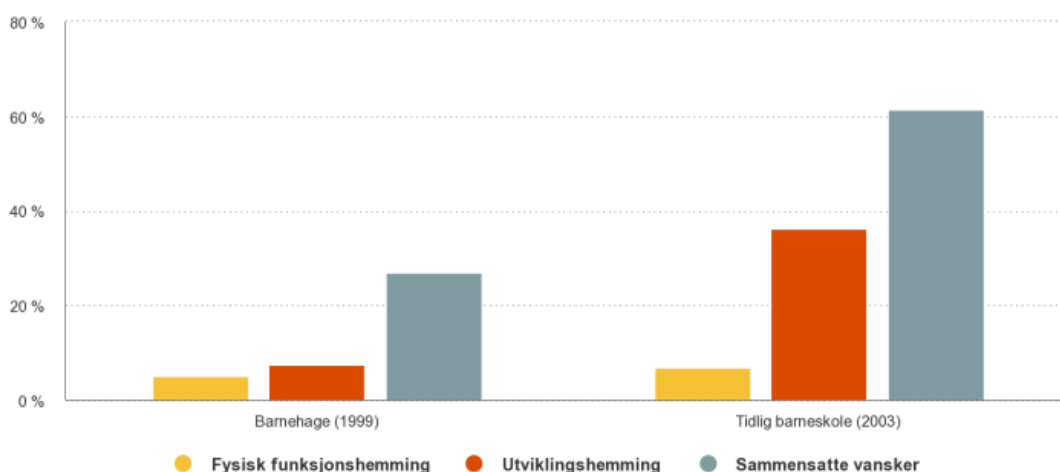
Three times as many pupils is outside an ordinary class in primary school as in the kinder garden. 13 13

From kinder garden to primary school the portion of children to receive teaching in separated groups or class are tripled. The development continues from primary school to junior high school. In junior high school pupils with reduced functional abilities tend to a large degree to receive their teaching on another facility than where their schoolmates are. (Wendelborg 2014).

The number of children outside their ordinary class.

1999 (kinder garden) and 2003 (primary school, early years)

Andel barn utenfor vanlig klasse. 1999 og 2003. Fordelt på type funksjonsnedsettelse



Kilde: Wendelborg 2014

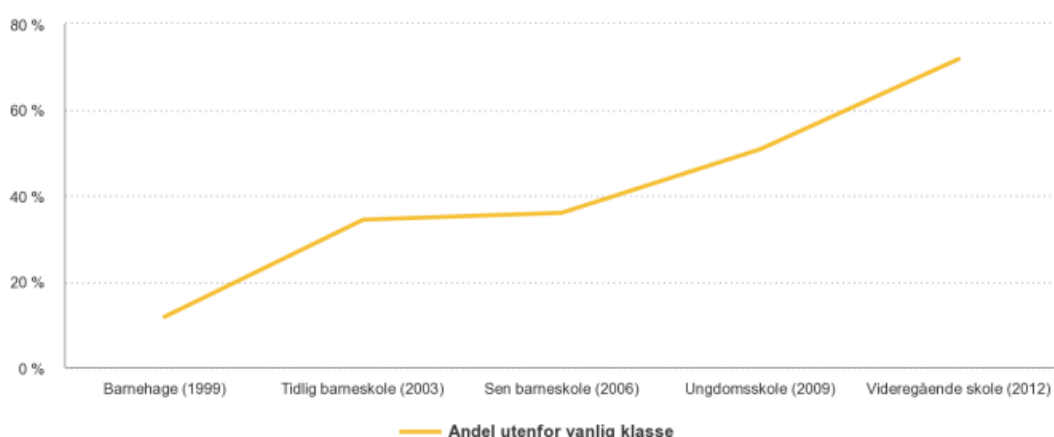
Yellow = physical disability, red = mentally impaired, blue = mixed

For mentally impaired children there is a great degree of reorganizing in the transitional period between kinder garden and primary school. 7.5% of mentally impaired children did not attend an ordinary department in the kinder garden. The portion that was not a part of an ordinary primary school class rose to 36.2% in early primary school age. More than one fourth of children with mixed disabilities does not attend an ordinary department in the kinder garden.

Children with disabilities outside their ordinary class.

From 1999 (kinder garden) until 2012 (high school)

Andel elever med nedsatt funksjonsevne utenfor vanlig klasse. Fra barnehagealder i 1999 til videregående skole i 2012.



Kilde: Wendelborg 2014

Kinder garden 1999, Early primary 2003, Late primary 2006, Junior high 2009, High 2012

The decline in classroom participation apply to all children with reduced functional abilities but is significantly clearer for children with mixed disabilities and mentally impaired than for children with physical disabilities. (Wendelborg 2014).

### Participation in physical education

Children and adolescents with reduced functional abilities have a very varied participation in the physical education – a subject that potentially can improve their functional ability. Lack of participation is often explained by the fact that pupils have no possibility to participate in the activities the physical education prepares for (Elnan 2010).

The everyday school life is for many children the only arena where they meet and interact with other children at the same age. The school is important for development of social belonging and identity. Lack of inclusion in school may also affect the participation in leisure time activities.

**Participation in school is important for participation on other arenas**

Inclusion at school is important both for the benefit of teaching and for active participation and belonging. Children who are taken out of the ordinary school do learn from very early age that they are different. At the same time, they lose the possibility to participate in education, play and the local environment with other children of the same age. (Finnvold 2013, Wendelborg 2014).

### **Less participation in school and leisure time as age increases**

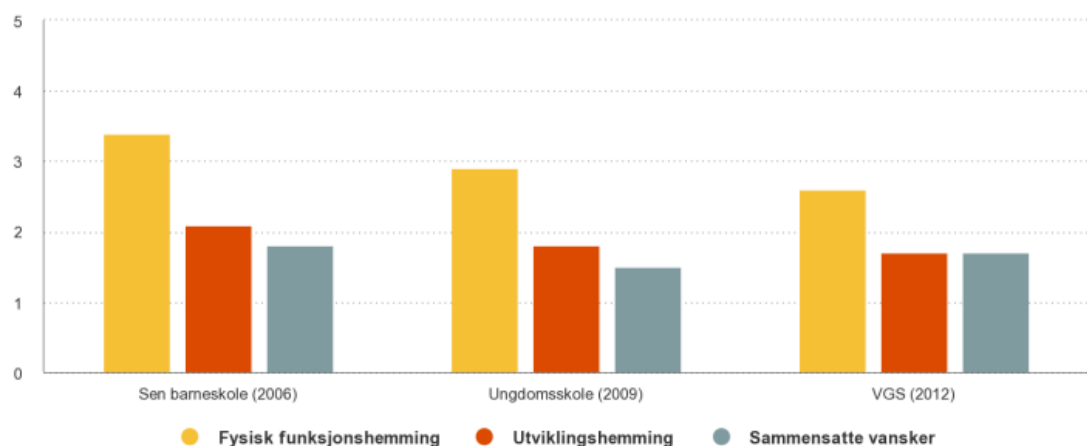
As children with reduced functional abilities grow older, it seems to be an increasing segregation of young people with reduced functional abilities also on the sports arena – parallel to the development in school. They participate in a smaller degree than most children in organized leisure and sports activities (Wendelborg & Paulsen 2014).

### **Social participation in leisure time**

Development of social participation from late Primary to High School

1= little social participation – 5 = much social participation

Utvikling i sosial deltakelse i fritida fra sen barneskole til VGS. Fordelt på type funksjonsnedsettelse. 1= lite sosial deltakelse - 5= mye sosial deltakelse.



Kilde: Wendelborg og Paulsen 2014

Yellow = physical disability, red = mentally impaired, blue = mixed

The social participation is reduced as age increases for children with reduced functional abilities (Wendelborg & Paulsen 2014). Children with mixed disabilities and children who are mentally impaired spend less time with friends in their leisure time than children with physical disabilities. These are also the children which to a larger degree is taken out of ordinary education.

### **Many barriers against participation**

Barriers against participation may be a lack of physical accessibility, financial and human resources, transport and lack of information. Barriers may also be of social character such as an underestimation of own abilities, competence and prejudice in the surrounding environment. (Finnvold 2013; Kermit et al. 2014; Tøssebro & Wendelborg 2014).

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УДК 811.111

**Robert Tanner**

## **APPLICATION OF CAMBRIDGE'S COMPACT FIRST IN TEACHING INTERMEDIATE ENGLISH**

*In this review of Cambridge English: Compact First, Second Edition (B2 Level) by Peter May, I look into what works and what does not work in using this as a text both for teaching English and for preparing for the Cambridge English: First exam. I analyze the book's strategies and classroom integration, concluding that it is effective for the exam but, like many contemporary textbooks, not ideal for the classroom.*

**Keywords:** *Cambridge English, language exam, textbook, English, exam preparation, language instruction*

In preparing members of the faculty at Mykolayiv National Agrarian University for the Cambridge English: First exam, I have been using Cambridge English: Compact First, Second Edition (B2 Level) by Peter May (Cambridge University Press, ISBN: 978-1-107-42842-3) along with its accompanying workbook and teacher's manual. The book uses the multi-faceted approach that is popular in recent language textbooks. In our circumstances, I do not find this approach ideal.

Each chapter of Compact First consists of seven parts: listening, speaking, writing, 2 sections of reading and the use of English, grammar, and revision. All but grammar and revision include some practice or preparatory work and an "exam task," which emulates what the students will encounter on the exam. Furthermore, there are sections in the back of the book that describe in greater detail how each part of the exam works and specific strategies. The grammar section allows the students to review various grammar topics, and further explanations are included in the appendix. More than for teaching English, the book is designed to prepare the students for the exam. The workbook follows the same structure, providing more 18 18 practice in the form of questions and "exam tasks"; it emulates the student's book but without the explanations.

Although the book is targeted to future takers of the Cambridge English exam, the multi-skilled structure is familiar from other contemporary textbooks and was, ultimately, a difficulty. I taught from this book once a week for an 80-minute class, and this was not enough time for the book's strategies. I found that each section took about one class period, but, because we met only once a week, I assigned the writing and grammar sections for homework rather than spend our limited class time watching the students write. Furthermore, the workbook sections did not seem to correspond directly to the student book, so the homework required some tracking, as I assigned sections out of order.

Furthermore, and this is an issue with many of these contemporary language textbooks, the speaking sections require motivated students. I was lucky in having a small group of highly motivated students. I have taught similar books in larger, lessmotivated classes, and the times when the students must pair off and enact a dialogue or discuss a subject are problematic. I found myself able to focus on only one or two pairs during each session, and while I focused on them, the others

lost interest and returned to their phones or personal conversations. Shorter conversational "interludes" might work better for typical classes.

Where this book excels, however, is in its exam prep material. This is to be expected, of course, in an exam-prep textbook. The appendices, which are tied to the various sections of each chapter, offer further preparation for the exam itself, with guidance on what to expect, how to prepare for, and how to do each part of the exam. My students found this to be invaluable for giving them both a familiarity with what would be on the exam and strategies for their preparation and performance.

In my particular situation of having a small class of highly motivated students, this book is not bad. Of course, at the least, I would arrange the workbook so that it better corresponds to the students' book for the assigning of homework, but I would rather the workbook simply be more drills for the grammar. The textbook provides 19 19 lots of opportunities to practice for the exam, but I find that grammar nuances require drilling and drilling.

I would also set the bulk of the writing tasks to be assigned as homework. I see the benefit in doing an occasional writing task in class (to prepare the students for a timed, official session), but with our limited class time, I cannot see doing this for each chapter.

Overall, I am happy enough with this book in the general trend of language textbooks. That said, I do think the trend is a bit too conversation-focused for the large classroom. In my classes of ten or more students, more grammar exercises would be more beneficial, I believe.

УДК 371.311:811.111

Л.В. Айзікова

### **DIGITAL STORYTELLING IN ENGLISH LANGUAGE TEACHING: A MULTIMODAL APPROACH TO LANGUAGE LEARNING**

*Публікація досліджує педагогічний потенціал цифрового сторітелінгу у викладанні англійської мови. У ній висвітлюється фундаментальна роль сторітелінгу в освіті та вивченні мови, підкреслюється його здатність контекстуалізувати мову та сприяти мотивації навчання, вказується, що цифровий сторітелінг поєднує наративні техніки з мультимедійними інструментами для створення інтерактивного навчального досвіду, окреслюються ключові відмінності між традиційним та цифровим сторітелінгом, описується практичне застосування цифрового сторітелінгу в процесі навчання та надаються рекомендації щодо використання цифрових платформ при вивченні мови. У публікації зроблено висновок, що, заохочуючи креативність, співпрацю та автономію учнів, цифровий сторітелінг не лише покращує мовні навички, але й розвиває цифрову грамотність та критичне мислення, а також забезпечує змістовний, особистісний підхід до викладання англійської мови, який відповідає потребам 21-го століття.*

**Ключові слова:** *цифровий сторітелінг, викладання англійської мови, вивчення мови, цифрова грамотність, особистісний підхід, освітні технології.*

*This publication explores the pedagogical potential of digital storytelling in English language teaching. It highlights the fundamental role of storytelling in education and language learning, emphasising its ability to contextualise language and promote engagement, then moves on to digital storytelling, which combines narrative techniques with multimedia tools to create rich, interactive learning experiences, outlines key differences between traditional and digital storytelling, describes practical applications of digital storytelling in the classroom, and recommends digital platforms that support language learning. The publication concludes that by encouraging creativity, collaboration and learner autonomy, digital storytelling not only enhances language skills, but also builds digital literacy and critical thinking, and provides a meaningful,*

*student-centred approach to English language teaching that meets the needs of 21st century learners.*

**Keywords:** *digital storytelling, English language teaching, language learning, digital literacy, student-centered learning, educational technology*

Storytelling has long held a central place in education because of its ability to capture attention, communicate complex ideas through narrative and foster emotional engagement. As a pedagogical strategy, storytelling supports memory retention and encourages students to internalise content in a meaningful way. Research shows that human cognition is deeply rooted in narrative thinking, making storytelling a natural way to learn. In the classroom, stories provide a context for knowledge and allow learners to relate information to their own lives and experiences.

In language teaching, storytelling serves as a dynamic tool for developing different language skills. It provides contextualised language input, allowing learners to encounter vocabulary and grammatical structures in meaningful contexts. In addition, storytelling encourages active participation as students engage in listening, speaking, reading and writing activities centred on narratives. This holistic approach not only improves language skills, but also promotes cultural competence by exposing learners to different perspectives and traditions.

With the rise of digital technologies in education, storytelling has taken on new forms, integrating multimedia elements that enhance learner engagement and interactivity. Digital storytelling combines text, images, video, narration and music to create compelling narrative experiences. Its potential for teaching English is increasingly being recognised in a variety of educational contexts.

Traditional storytelling relies primarily on oral or written language, with the storyteller as the central actor. In contrast, digital storytelling uses technology to enable students to become creators of multimedia narratives. While both forms involve narrative structure and creativity, digital storytelling adds layers of visual and auditory communication that can support learners at different levels. In addition to developing storytelling skills, digital storytelling promotes digital literacy, which is essential in 21st century education.

Effective digital storytelling in the English classroom integrates student-centred approaches. Teachers can implement project-based learning tasks where students write scripts, record audio, create visuals and edit videos to tell stories in English. This process involves multiple drafts, peer feedback and the integration of language skills at all stages. Activities may include personal narratives, retellings of literary texts, or the creation of fictional stories aligned with language objectives. In particular, the process of scripting and voice recording has been shown to improve pronunciation and fluency.

A wide range of digital tools support storytelling in the language classroom. Selecting appropriate tools depends on the learning objectives, available resources, and students' technological proficiency. Beginner-friendly platforms such as *Storybird* and *Book Creator* allow learners to combine illustrations with text, while *Canva* or *Powtoon* enable more advanced video storytelling. Tools like *Microsoft PowerPoint*, *Padlet*, *VoiceThread* and *WeVideo* support collaborative storytelling, allowing students to co-construct narratives and provide feedback. These platforms promote multimodal expression, helping students demonstrate their understanding through a variety of formats.

Digital storytelling fosters language development through authentic use of English in meaningful contexts. It supports differentiated instruction by accommodating diverse learning styles and abilities. Moreover, it encourages learner autonomy, creativity, and collaboration. Research shows that students who engage in digital storytelling improve not only their language skills but also their confidence and motivation. Importantly, digital storytelling allows learners to connect their personal experiences with language practice, enhancing emotional engagement and long-term retention.

As all the above points have proved, digital storytelling bridges traditional language teaching with modern digital practices. It transforms students from passive recipients of information



into active creators of content. By integrating digital storytelling into the English language classroom, educators can cultivate both linguistic and digital skills while encouraging creativity and critical thinking. As education continues to evolve, digital storytelling offers a dynamic, learner-centred approach to language learning that resonates with the digital generation.

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УДК 796

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### ВПЛИВ ФІЗИЧНИХ ВПРАВ НА ПСИХОЕМОЦІЙНИЙ СТАН ЛЮДИНИ

У статті розглядається вплив фізичних вправ на психоемоційний стан людини. Проаналізовано механізми зниження стресу, покращення настрою, вплив на когнітивні функції та формування впевненості в собі. Підкреслюється роль фізичної активності у профілактиці депресивних станів і покращенні загального самопочуття. Регулярні фізичні вправи сприяють зміцненню психічного здоров'я та підвищенню якості життя.

**Ключові слова:** фізичні вправи, психоемоційний стан, стрес, фізична активність.

**Ступінь досліджуваності проблеми.** Проблема впливу фізичних вправ на психоемоційний стан людини є предметом багатьох наукових досліджень у галузі медицини, психології та фізичної культури. Особливо гостро це питання стоїть перед здобувачами вищої освіти, адже навчання - це високе інтелектуальне, емоційне та інформаційне навантаження. За даними Всесвітньої організації охорони здоров'я, Україна посідає перше місце в Європі за кількістю людей з діагнозом «психічні розлади та депресія», і ця цифра щороку зростає, в тому числі через війну. Тривалий стрес від військових дій, економічна нестабільність та невпевненість у завтрашньому дні негативно впливають на психічне здоров'я українців. Тому важливо знайти ефективні способи покращити їхній емоційний

стан. Включення систематичних фізичних вправ у повсякденне життя молодих людей може бути ефективним способом запобігання депресії, підвищення стресостійкості та витривалості нервової системи. У зв'язку з цим важливим є вивчення впливу систематичних занять фізичними вправами на емоційний стан людини.

**Мета дослідження.** Метою дослідження є аналіз впливу фізичних вправ на психоемоційний стан людини та виявлення основних механізмів, за допомогою яких вони позитивно впливають на рівень стресу, настроїв, когнітивні функції та самооцінку. Також дослідження має на меті встановити важливість регулярної фізичної активності для підтримки психічного здоров'я та покращення якості життя.

**Сутність дослідження.** Завдання освітнього процесу з фізичного виховання полягає у формуванні свідомого ставлення студентів до власного здоров'я як найвищої соціальної цінності, оволодіння основами здорового способу життя, збереження та зміцнення фізичного і психічного благополуччя. Ефективна організація рухової активності молоді є запорукою профілактики захворювань, запобігання погіршенню фізичного стану, підвищення фізичної та розумової працездатності.

Фізична активність є ефективним способом відновлення розумової працездатності, котра є надзвичайно важливою умовою для досягнення високих результатів у навчанні та інтелектуальній діяльності (Москаленко, Корж, Єлісєєва, 2017; Stepanova, Kovtun, Afanasev, Kosheleva, Demidova, 2022).

Здобувачі освіти є вразливими з точки зору психології, оскільки до них висувуються високі академічні вимоги та стандарти, інші фактори, які можуть негативно позначитися на їх психічному здоров'ї. Емоційне перевантаження стає чи не головною причиною психологічної напруги серед студентства, так як прямо впливає на здатність зосереджуватися, розумову та фізичну продуктивність, загальний стан здоров'я (Лисенко, 2019). Перебування тривалий час на дистанційному навчанні сприяло зниженню рухової активності здобувачів освіти (Белікова, Колесник, Рудик, 2021; Москаленко, Корж, Єлісєєва, 2017), тому раціонально організовані фізичні навантаження допомагають психологічному розслабленню, запобігають емоційному перевантаженню, виступаючи запорукою психофізичного благополуччя й є важливим чинником забезпечення успішного засвоєння знань, вмінь, навичок та формування адекватного рівня стресостійкості серед студентів (Перекопський, 2016).

Заняття спортом знижують відчуття тривоги, занепокоєння, допомагають подолати стрес, покращують настрої і загальне самопочуття. Фізична активність сприяє виробленню ендорфінів – так званих «гормонів щастя», які позитивно впливають на емоційний стан. Регулярні тренування також допомагають стабілізувати рівень кортизолу, що сприяє зменшенню стресового навантаження на організм. Крім того, заняття спортом покращують якість сну, підвищують рівень енергії та формують впевненість у собі, а гарний настрій і позитивні емоції, на думку науковців, позитивно впливають на імунітет людини (Демідова, Гида, 2019).

Фізичні вправи стимулюють фізіологічні процеси в організмі через нервовий і гуморальний механізми. М'язова діяльність підвищує тонус центральної нервової системи, покращує координацію нервових процесів і сприяє зміцненню нейронних зв'язків. Завдяки фізичній активності активізується кровообіг, що забезпечує кращий транспорт кисню та поживних речовин до клітин мозку, підвищуючи когнітивні функції та стійкість до стресових факторів. Крім того, під час фізичних навантажень посилюється вироблення нейромедіаторів, таких як дофамін і серотонін, що позитивно впливає на емоційний стан і загальне самопочуття. Фізичні вправи забезпечують більшу легеневу вентиляцію і сталу напругу вуглекислоти в артеріальній крові.

Конова Л., досліджуючи вплив занять фізичним вихованням на психологічне здоров'я здобувачів освіти, зазначає, що виконання фізичного навантаження аеробного спрямування циклічного характеру, зокрема швидка ходьба, біг, плавання дозволяють знизити рівень депресії та сприяють зменшенню рівня збудження (Конова, 2009).

Таким чином, фізична активність має багатогранний позитивний вплив на психічну діяльність. Найефективнішими способами боротьби з втомою є прості фізичні вправи, урізноманітнення видів діяльності, правильне та здорове харчування, дотримання гігієни. Фізична активність включає в себе всі види фізичних навантажень, від прогулянок, пробіжок і базових вправ до регулярних тренувань у спортзалі. Під час тренувань люди вчаться краще керувати своїми емоціями та розвивають стійкість до стресу. Фізична активність допомагає створити позитивний внутрішній стан, де людина стає більш свідомою та зосередженою на своїх емоціях. Протягом тренувань, особливо у командах чи групах, виникає можливість вчитися співпрацювати та взаємодіяти з іншими, що сприяє розвитку соціальних навичок та емоційного інтелекту. Крім того, регулярні тренування створюють умови для зниження рівня агресії та імпульсивності, оскільки фізична активність виступає як емоційний вихід для негативних переживань. Людина починає краще усвідомлювати свої емоційні реакції, що дозволяє їй ефективніше контролювати стресові ситуації та розвивати позитивне ставлення до різних викликів життя.

На здобувачів освіти сприятливо впливає мале та середнє фізичне навантаження із застосуванням різноманітних вправ, що включають активні ігри, йогу, аеробіку або заняття на тренажерах. Такі види фізичної активності допомагають підтримувати загальний тонус організму, покращують гнучкість, координацію рухів і витривалість, а також сприяють зменшенню стомлюваності. Вони особливо корисні для здобувачів освіти, оскільки не лише знижують рівень стресу, але й стимулюють покращення настрою та концентрації уваги, що безпосередньо впливає на результативність навчання.

**Основні висновки.** Фізичні вправи є потужним інструментом для підтримки психоемоційного здоров'я. Вони допомагають зменшити рівень стресу, покращують настрій, підвищують когнітивні здібності та сприяють формуванню впевненості в собі. Включення регулярної фізичної активності у повсякденне життя може стати ефективним способом покращення загального самопочуття та якості життя.

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**HEARTWORM DISEASE: A DANGER FOR OUR PETS AND POTENTIAL  
IMPLICATIONS FOR HUMANS**  
**(ДИРОФІЛЯРІОЗ: НЕБЕЗПЕКА ДЛЯ НАШИХ ДОМАШНІХ ТВАРИН І  
ПОТЕНЦІЙНІ НАСЛІДКИ ДЛЯ ЛЮДЕЙ)**

*У публікації проведено опис небезпечної хвороби тварин та людей . Було проаналізовано епідеміологію, передачу, патогенез та клінічні прояви дирофіляріозу у різних тварин.*

**Ключові слова:** *інфекція, паразитарне захворювання, личинка, господарь, здоров'я, серцево-судинна система, симптоми, клінічні ознаки, профілактичні заходи, препарати.*

*The publication describes a dangerous disease of animals and humans. The epidemiology, transmission, pathogenesis and clinical manifestations of heartworm disease in various animals were analyzed.*

**Keywords:** *infection, parasitic disease, larva, host, health, cardiovascular system, symptoms, clinical signs, preventive measures, drugs.*

Heartworm disease, caused by the parasite *Dirofilaria immitis*, is a serious and potentially life-threatening condition that primarily affects dogs and, to a lesser extent, cats. Although human infections are rare, the zoonotic potential of the parasite underscores the importance of understanding its transmission, pathogenesis, and prevention. This report provides an overview of heartworm disease, its epidemiology, clinical manifestations, and the measures necessary for effective prevention and treatment [1].

Heartworm disease is a parasitic infection transmitted by mosquitoes that carry infective larvae of *Dirofilaria immitis*. In dogs, the infection can progress from an asymptomatic stage to severe cardiovascular and pulmonary complications. Cats, although less frequently affected, often exhibit atypical and sometimes severe clinical signs. Humans can also become accidental hosts, although the infection does not progress in the same way as it does in animals. The increasing incidence in various regions highlights the need for comprehensive control and prevention strategies to protect both animal and public health [2].

The life cycle of *Dirofilaria immitis* is closely linked to the biology of its mosquito vectors. When a mosquito takes a blood meal from an infected animal, it ingests microfilariae, which then develop into infective larvae within the mosquito over a period of approximately 10 to 14 days. These infective larvae are subsequently transmitted to a new host when the mosquito feeds again. Environmental factors such as temperature and humidity significantly affect the rate of larval development, making heartworm disease more prevalent in regions with warm climates and abundant standing water, which serves as breeding grounds for mosquitoes. Changes in climate and urban development have contributed to the spread of the disease into areas that were previously considered low risk [1].

Dogs are the primary hosts for heartworm disease. Infected dogs may initially show no symptoms; however, as the worm burden increases, clinical signs begin to appear. Common symptoms include coughing, exercise intolerance, weight loss, and fatigue. In advanced stages, the accumulation of adult worms in the heart and pulmonary arteries can lead to pulmonary hypertension and right-sided heart failure. The progression of the disease is often gradual, which can delay diagnosis and treatment until significant damage has occurred [3].

While cats are less commonly infected than dogs, heartworm disease in felines is often more challenging to diagnose and manage. Cats usually harbor fewer worms, but even a small number can cause a pronounced inflammatory reaction in the lungs. This reaction may lead to a condition

known as Heartworm-Associated Respiratory Disease (HARD), which can mimic other respiratory conditions such as asthma. Due to the lower worm burden and the different pathophysiology in cats, clinical signs are often sudden and severe, sometimes resulting in rapid deterioration of health or even sudden death [1].

Human infections with *Dirofilaria immitis* are rare and typically occur when the larvae are deposited in the skin by a mosquito bite. In humans, the larvae do not develop into fully mature worms. Instead, they often become encapsulated within small pulmonary nodules that are usually asymptomatic and discovered incidentally during routine imaging examinations. Although the clinical significance in humans is minimal, these cases highlight the zoonotic potential of the parasite and the interconnected nature of human and animal health [2].

Prevention is the most effective strategy against heartworm disease. Year-round administration of heartworm preventive medications is strongly recommended for dogs. These preventive treatments, which are available in various forms (oral, topical, or injectable), target the early larval stages of the parasite before they mature into adult worms. In addition to chemoprophylaxis, reducing exposure to mosquito bites through environmental control is crucial. Measures such as eliminating standing water, using insect repellents, and ensuring proper screening in homes can significantly reduce the risk of infection [1].

Treatment of heartworm disease in infected animals is complex and can be risky. In dogs, the standard treatment involves the administration of adulticidal drugs that kill mature worms. However, the death of the worms can lead to an intense inflammatory response and the risk of thromboembolic events. As a result, strict exercise restriction and supportive care are required during the treatment process. In cats, treatment options are more limited, and the focus is primarily on managing clinical signs and preventing complications rather than on aggressive elimination of the parasite [3].

Controlling heartworm disease in pets also has public health benefits. By reducing the reservoir of infection in animal populations, the risk of accidental transmission to humans is minimized. An integrated approach that combines veterinary care, public education, and environmental management is essential for controlling the spread of heartworm disease and protecting both animal and human health [2].

Heartworm disease continues to be a significant threat to the health of our pets, with potentially fatal consequences if left untreated. The gradual progression of the disease in dogs and the unpredictable, often severe clinical manifestations in cats underscore the critical importance of early detection and consistent preventive measures. While the risk to human health is minimal, the occasional zoonotic case reinforces the necessity for integrated efforts in disease control. Ultimately, comprehensive prevention strategies—including regular veterinary care, effective prophylactic treatments, and environmental management—are essential for protecting the well-being of both animals and humans [1].

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**MICROBIAL INHIBITION TEST AS A MODERN METHOD OF IDENTIFICATION  
RESIDUAL ANTIBIOTICS  
(МІКРОБІОЛОГІЧНИЙ СКРИНІНГ ЯК СУЧАСНИЙ МЕТОД ВИЗНАЧЕННЯ  
ЗАЛИШКОВИХ КІЛЬКОСТЕЙ АНТИБІОТИКІВ)**

*У статті приділено увагу методам дослідження залишкової кількості антибіотиків, а саме мікробіологічному скринінгу. Даний тип скринінгу дозволяє оцінити рівень антибіотикорезистентності тест-культур мікроорганізмів, використовуючи порівняльний аналіз впливу різних концентрацій розчинів еталонних антибіотиків.*

**Ключові слова:** залишки антибіотиків, антибіотикорезистентність, тест-штами, мікроорганізми, індикатори.

*The article focuses on the methods of studying the residual amount of antibiotics, namely microbiological screening. This type of screening allows to estimate the level of antibiotic resistance of test cultures of microorganisms using a comparative analysis of the effect of different concentrations of solutions of reference antibiotics.*

**Keywords:** antibiotic residues, antibiotic resistance, test strains, microorganisms, indicators.

Screening methods are used as more affordable and easy-to-use equipment to identify a group of antibiotics or an antibiotic, with or without quantification of this antibiotic. In general, analytical methods for monitoring antibiotic residues can be divided into two classes: confirmatory and screening. Confirmatory methods are used to quantify the concentration of an analyte based on liquid chromatography (LC) in combination with mass spectrometry.

*Microbial Inhibition Test* (MIT) is a method used to detect biologically active substances, in particular antibiotics, by assessing their effect on the growth of test cultures of microorganisms. This method is based on the incubation of medium plates with a suspension of a known concentration of bacterial strains, which is added to the sample under test. If there is an antibiotic in the sample, it will prevent the development of specific colonies, thus opening a halo zone around the sample to be analyzed. This type of screening is widely used to control antibiotic residues in food, feed, biological fluids and the environment, as their uncontrolled accumulation can lead to serious consequences, such as the development of antibiotic resistance, disruption of normal human microflora, allergic reactions and toxic effects [2, 3].

One of the important aspects of microbiological screening is the need for strict standardization of all test parameters, including incubation conditions, temperature, composition of culture media, and concentrations of standard antibiotic solutions, as even minor deviations can affect the accuracy of the results [1, 4].

A key advantage of microbiological screening compared to more sophisticated analytical methods such as liquid chromatography (namely, HPLC) or mass spectrometry is that it is more affordable and does not require expensive equipment, making it convenient for mass use. Sensitive bacterial strains are most often used for research, among which the most common are the genera *Bacillus* and *Micrococcus*. The main disadvantage of microbiological screening is the significant time spent on sample preparation and incubation of test Petri dishes [4].

Microbiological screening methods based on the principle of inhibiting the growth of microorganisms fall into two main categories: petri dish methods and test tube methods. Both approaches are aimed at detecting residual concentrations of antibiotics in the tested samples, but they have significant differences in their implementation, operating principles, sensitivity, and the ability to classify antibiotics [5].

Methods that use Petri dishes are based on the use of agarized nutrient media containing test bacteria that are sensitive to antibiotics. The test samples, which may contain residual amounts of antimicrobial drugs, are placed on the surface of the agar medium. After incubation for 18-24 hours under favorable temperature conditions, a zone of bacterial growth inhibition can be observed around the sample if the concentration of antibiotics in it exceeds the established threshold. If the concentration of residual antibiotics is insufficient to inhibit the growth of microorganisms, there is no inhibition zone [3, 5].

An important feature of the Petri dish method is the ability not only to qualitatively determine the presence of antibiotics in the sample, but also to quantitatively analyze it. In addition, this method provides the ability to identify and classify antibiotics by using several Petri dishes with different pH values and specific bacterial strains. Additionally, special substances can be used to block or enhance the activity of certain groups of antibiotics, which allows them to be assigned to a specific class [1, 4].

Unlike methods that use Petri dishes, test tube methods (*Delvotest*) are based on the use of color indicators that respond to the presence or absence of antimicrobial substances in samples. Test bacteria and a corresponding indicator are added to the agar medium in the test tubes, which can change its color depending on the activity of the microorganisms. Typically, oxidation-reduction indicators or pH indicators are used, which allow for a visually noticeable result [4-5].

Although test tube methods are convenient and fast, they have limited sensitivity to some classes of antibiotics, in particular quinolones, which are widely used in veterinary medicine. In addition, the test tube method does not allow for the classification and identification of antibiotics, as it only indicates their overall presence in the sample [5].

Instead, the Petri dish method, although it takes longer to obtain results, has a significant advantage in accuracy, the ability to quantify residual levels of antibiotics and identify their classes. The use of special nutrient media, different pH conditions, and specific test cultures allows differentiating antibiotics and determining their belonging to a particular pharmacological group [2, 5].

**Conclusions:** Microbiological screening methods play a crucial role in detecting antibiotic residues in various samples, offering a cost-effective and accessible alternative to advanced analytical techniques such as liquid chromatography and mass spectrometry. The Petri dish method, based on bacterial growth inhibition, provides not only qualitative but also quantitative results, allowing for the classification of antibiotics. Despite its longer processing time, it ensures higher accuracy and specificity. On the other hand, test tube methods, while offering faster results, are limited in sensitivity and classification capability. Given the growing concerns about antibiotic resistance and the need for strict standardization, microbiological screening remains an essential tool in ensuring food safety, environmental monitoring, and public health protection.

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УДК 811.111

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**THE IMPACT OF DIGITAL BANKING ON TRADITIONAL FINANCIAL INSTITUTIONS**  
**(ВПЛИВ ЦИФРОВОГО БАНКІНГУ НА ТРАДИЦІЙНІ ФІНАНСОВІ УСТАНОВИ)**

*У статті аналізується вплив цифрового банкінгу на традиційні фінансові установи. Розглянуто особливості цифрового банкінгу та його переваги для фінансового сектору. Проаналізовано особливості цифрового банкінгу в контексті діяльності банків, визначено переваги, недоліки та виклики.*

**Ключові слова:** банк, банкінг, традиційні фінансові установи, фінансовий сектор, цифровий банкінг.

*The paper analyses the impact of digital banking on traditional financial institutions. The features of digital banking and its benefits for the financial sector are considered. The peculiarities of digital banking in the context of banks' activities are analysed, advantages, disadvantages and challenges are identified.*

**Keywords:** bank, banking, traditional financial institutions, financial sector, digital banking.

In recent years, the emergence of digital banking has been one of the most relevant trends in the financial sector. Digital banking is a vivid example of the digitalisation of banking services, which has a positive impact on their development. This way, citizens can access all the necessary services in this area using their own gadgets and the Internet. This simplifies the customer experience and reduces the time that customers used to spend on various transactions. However, while digital banking has had an overall positive impact on the financial and banking sector, its impact on traditional financial institutions is not clear.

Digital banking, as defined by domestic scholars, is the integration of new technologies and financial services entities, which causes significant changes in internal and external corporate and personal relationships, ensuring efficient customer service. In addition, digital banking can be considered a fundamental change in the functioning of financial institutions, which is caused by the overall digitalisation of most modern services and activities of institutions in the financial sector. In fact, digital banking can be considered a set of remote banking services that allow most banking operations to be conducted online at any time and in any place where there is an Internet connection [1; 2].

The following benefits of digital banking for customers and the banking sector as a whole can be noted [1; 2]:

1. increased convenience and accessibility of financial services and the ability to conduct financial transactions;
2. increased speed of service for customers;
3. reducing the cost of maintaining physical branches;
4. expansion of financial services in the context of the ability to introduce modern services related to artificial intelligence and financial technologies;
5. increased security and control in the context of maintaining confidentiality and reducing fraud risks.



It is important to note that most modern banking institutions in Ukraine and the world are already actively implementing innovations related to digital banking. First of all, this concerns the creation of special online applications where customers can use the services of their own bank without having to visit physical branches. In addition, banking institutions that provide services exclusively remotely, i.e., fully operating in the digital banking sector, are also developing and have no alternatives. An example of such a bank in Ukraine is Monobank, which allows customers to use the bank's services easily and quickly, from creating a card to making a transfer or taking out a loan. This is a unique bank that had no analogues in Ukraine before it was established. Similar banks exist in other countries, for example, the international bank First Direct [3].

Digital banking has become a real innovation for financial institutions in the classical sense. Now, in order to carry out basic financial transactions, there is no need to visit a physical bank, just open the appropriate application on your smartphone or computer and do everything you need to do yourself. As already mentioned, digital banking in this form has many advantages for customers, significantly improving the customer experience. These are also benefits for banking institutions themselves. By digitising services, banks are able to retain customers and attract new ones, as more than 50% of bank customers worldwide use digital banking services as their primary method of financial management. With this in mind, banks creating their own mobile applications not only improve the customer experience, but also increase their customer base and their own profits. Digital banking is not only a digital transformation, but also a fundamental change in the way financial institutions and customers interact. All of this is in line with the current peculiarities of society's development in the context of active digitalisation [2].

The negative effects of digital banking on traditional financial institutions arise mainly when banks do not create digital applications or websites as platforms for service delivery. By refusing to digitise, they may lose customers, which will threaten their operations. In addition, the transition to digital banking may not be successful due to an unattractive and non-functional application. In addition, negative consequences are also associated with a reduction in the number of physical branches and a decrease in the number of employees, which also requires changes in the bank's format. Banks are also forced to introduce technical innovations to compete with other traditional and non-traditional financial institutions. This means additional funds and time that they have to spend on adapting to modern conditions.

Thus, digital banking has both positive and negative effects on traditional financial institutions. For the most part, its impact is positive. If banks manage to successfully digitise their services, taking into account all the peculiarities of their customers and their modern needs, the transition to digital banking will bring them many benefits. Therefore, in the future, more and more traditional financial institutions will move to digital banking. This will have a positive impact on the development of the entire financial sector.

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**TEACHING ENGLISH IN CONTEMPORARY UKRAINE: CHALLENGES AND  
PERSPECTIVES**  
**МЕТОДИКА ВИКЛАДАННЯ АНГЛІЙСЬКОЇ МОВИ В СУЧАСНІЙ УКРАЇНІ:  
ВИКЛИКИ ТА ПЕРСПЕКТИВИ**

*У даній роботі розглядаються сучасні підходи до викладання англійської мови в Україні з урахуванням викликів воєнного часу та євроінтеграційних процесів. Досліджуються методи підвищення ефективності навчання в умовах дистанційної та змішаної освіти, застосування цифрових технологій та адаптація міжнародних стандартів до українських реалій. Особлива увага приділяється психологічним аспектам викладання в кризових умовах та формуванню стійкої мотивації учнів. Пропонуються практичні рекомендації щодо інтеграції інноваційних методик у навчальний процес.*

**Ключові слова:** методика викладання англійської мови, дистанційне навчання, цифрові технології, психологічна підтримка, євроінтеграція, воєнний стан, змішане навчання.

*This paper examines contemporary approaches to English language teaching in Ukraine, taking into account the challenges of wartime conditions and European integration processes. The research investigates methods for enhancing learning efficiency in remote and blended education settings, the application of digital technologies, and the adaptation of international standards to Ukrainian realities. Special attention is paid to the psychological aspects of teaching in crisis conditions and the formation of sustainable student motivation. Practical recommendations for integrating innovative methodologies into the educational process are provided.*

**Keywords:** English language teaching methodology, distance learning, digital technologies, psychological support, European integration, martial law, blended learning.

The teaching of English as a foreign language in Ukraine has undergone significant transformation in recent years, driven by both global educational trends and the unique challenges facing Ukrainian society. The ongoing military conflict since 2022, accelerated European integration processes, and the global shift toward digital education have created a complex landscape for English language educators. This paper examines the current methodological approaches to English language teaching (ELT) in Ukraine, analyzing the challenges and opportunities present in the contemporary educational environment and offering evidence-based recommendations for practitioners.

The importance of English language proficiency has increased dramatically in Ukrainian society, now being viewed not only as an academic requirement but as a critical life skill enabling access to global information, international mobility, and economic opportunities. This shift in perspective necessitates a corresponding evolution in teaching methodologies that can address the practical needs of learners while operating within the constraints of Ukraine's current realities.

**Challenges of English Language Teaching in Contemporary Ukraine.** The military conflict has created unprecedented challenges for the Ukrainian educational system. Air raid alerts, power outages, and the displacement of both teachers and students have disrupted traditional educational processes. Language teachers have been forced to develop flexible methodological approaches that can function under unstable conditions while maintaining educational quality.

Research by Mykhailenko et al. (2023) indicates that successful adaptation to these conditions involves developing:

1. Modular lesson structures that can be interrupted and resumed without significant loss of educational continuity
2. Asynchronous learning components that students can access during periods of connectivity

3. Low-tech alternatives for digital activities that can function during power outages
4. Emergency teaching protocols that prioritize essential language skills during periods of severe disruption

**Digital Transformation of Language Education.** The pandemic-driven shift to online learning created a foundation for the continued digital transformation of English language education in Ukraine. However, the infrastructure challenges and digital divide between urban and rural areas present significant obstacles. According to surveys conducted by the Ministry of Education and Science of Ukraine, approximately 30% of students still experience difficulties with reliable internet access during distance learning sessions.

Effective digital methodology in the Ukrainian context requires adoption of learning management systems (LMS) that can function with low bandwidth, development of mobile-first educational resources accessible on smartphones, implementation of blended learning models that combine online and offline components, creation of downloadable resources that can be accessed without continuous internet connection.

**Psychological Dimensions of Language Learning During Crisis.** The psychological impact of prolonged conflict creates unique challenges for language learning. Stress and trauma can significantly affect cognitive processes critical for language acquisition, including attention, memory, and motivation. Research by Boichenko and Kovalchuk (2023) demonstrates that successful language teaching in crisis conditions must incorporate elements of psychological support.

Effective methodological approaches include:

1. Trauma-informed language teaching practices that recognize the emotional state of learners
2. Incorporation of resilience-building activities within language lessons
3. Creation of psychologically safe learning environments that reduce anxiety
4. Development of content that acknowledges current realities while maintaining optimism

**Innovative Methodological Approaches.** Ukraine's ongoing educational reform and alignment with European standards has accelerated the shift toward competency-based language education. This approach focuses on developing practical language skills rather than theoretical knowledge, emphasizing what learners can do with the language in real-world contexts.

The implementation of the Common European Framework of Reference for Languages (CEFR) across Ukrainian educational institutions has provided a standardized framework for assessing language proficiency. However, practical implementation requires redesigning curricula to emphasize communicative competence, developing assessment tools that evaluate practical language application, creating authentic learning scenarios relevant to Ukrainian learners' needs, balancing prescribed educational standards with the flexibility required by current conditions.

**Project-Based Learning in Virtual Environments.** Project-based learning (PBL) has demonstrated particular effectiveness in the Ukrainian context, enabling students to develop language skills while engaging with meaningful content. The virtual adaptation of PBL methodologies has allowed for continued implementation during periods of remote learning.

Successful virtual PBL approaches include:

- collaborative digital projects utilizing shared online workspaces;
- virtual exchanges with English speakers from other countries;
- research projects investigating topics relevant to students' lives and interests;
- creation of digital artifacts that demonstrate language proficiency while developing digital literacy.

**Integration of Content and Language Integrated Learning (CLIL).** The adoption of CLIL approaches, where students learn subject matter content through the medium of English, has gained traction in Ukrainian education. This methodology aligns with Ukraine's internationalization goals while maximizing exposure to authentic language use.

Effective implementation strategies include:

1. Development of subject-specific language scaffolds for various disciplines.
2. Collaboration between language teachers and subject specialists.

3. Creation of bilingual resources that support content comprehension.
4. Gradual implementation beginning with select topics before expanding to full subjects.

**Technology-Enhanced Language Learning Solutions.** The widespread adoption of smartphones among Ukrainian students has created opportunities for autonomous language learning through mobile applications. These tools supplement formal instruction while providing opportunities for practice during periods when traditional teaching is disrupted.

Dashkova and Petrenko (2022) identified key features of effective mobile applications for the Ukrainian context: offline functionality that works during connectivity disruptions, gamified elements that maintain motivation during challenging circumstances, spaced repetition systems that optimize vocabulary retention, progress tracking features that provide a sense of achievement.

**Virtual and Augmented Reality in Language Immersion.** Despite infrastructure limitations, innovative educators in Ukraine have begun implementing virtual reality (VR) and augmented reality (AR) technologies to create immersive language learning experiences. These technologies are particularly valuable when physical mobility is restricted and traditional immersion experiences are unavailable.

Promising applications include:

- virtual reality conversations with simulated native speakers;
- augmented reality vocabulary learning connected to physical environments;
- virtual field trips to english-speaking countries and cultural sites;
- simulated real-world scenarios for practicing situational language.

Based on the analysis of current conditions and methodological innovations, the following recommendations are provided for English language educators in Ukraine:

1. **Prioritize Flexibility and Resilience:** Develop methodological approaches that can function across multiple modes of delivery (in-person, online, hybrid) and adapt to sudden changes in conditions.
2. **Integrate Psychological Support:** Incorporate emotional wellbeing components into language teaching, recognizing that effective language acquisition requires psychological security.
3. **Leverage Low-Tech Solutions:** While embracing digital innovation, maintain a repertoire of low-technology teaching approaches that can function during infrastructure disruptions.
4. **Foster Learner Autonomy:** Develop students' capacity for independent language learning through explicit strategy instruction and self-assessment tools.
5. **Connect to Real-World Needs:** Align language teaching with the practical communication needs of learners in the current Ukrainian context, including international communication, access to information, and professional development.

**Conclusion.** The teaching of English in contemporary Ukraine presents unique challenges that require innovative methodological responses. By combining evidence-based teaching approaches with sensitivity to the current Ukrainian context, educators can develop effective strategies that not only maintain educational continuity but also prepare students for their future roles in an internationally integrated Ukraine.

The ongoing crisis has accelerated educational transformation, creating opportunities to rebuild language education on more modern, flexible, and learner-centered foundations. Through continued professional development, community building, and methodological innovation, Ukrainian English teachers are developing approaches that may serve as models for language education in other challenging contexts worldwide.

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УДК 811.111

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### USE OF DRONES WITH A THERMAL VISION CAMERA FOR ENERGY AUDIT (ВИКОРИСТАННЯ ДРОНІВ З ТЕПЛОВІЗІЙНОЮ КАМЕРОЮ ДЛЯ ПРОВЕДЕННЯ ЕНЕРГОАУДИТУ)

*У статті розглянуто інформацію про використання дронів, оснащених тепловізійними камерами, для проведення енергоаудиту будівель та електричних мереж для швидкого та точного збору та передачі інформації в реальному часі, що значно полегшує роботу та мінімізує використання людської праці.*

**Ключові слова:** *дрони, тепловізійна камера, енергоаудит, енергоефективність, теплові втрати, інфрачервона діагностика, будівлі, тепломережі, автоматизований моніторинг.*

*The article discusses information on the use of drones equipped with thermal imaging cameras for conducting energy audits of buildings and electrical networks for fast and accurate collection and transmission of information in real time, which greatly facilitates the work and minimizes the use of human labor.*

**Keywords:** *drones, thermal imaging camera, energy audit, energy efficiency, heat loss, infrared diagnostics, buildings, heat networks, automated monitoring.*

In modern conditions, where the costs of energy resources are constantly increasing, the issue of their rational use is becoming increasingly important. One of the key aspects of energy efficiency is conducting an energy audit of buildings and engineering networks. Traditional methods of assessing energy losses require significant time and human resources and can be hazardous, especially when evaluating high-rise structures or hard-to-reach objects. This is why the implementation of unmanned technologies with thermal imaging cameras is becoming particularly relevant. Drones enable energy audits to be conducted quickly, efficiently, and with high accuracy, making them an indispensable tool for identifying heat losses. [1]

Ukraine has a number of legislative acts and regulations governing the energy efficiency of buildings, including public buildings. For instance, the Law of Ukraine "On Energy Efficiency of Buildings" and the Ukrainian Building Code contain provisions aimed at improving energy efficiency. The energy efficiency of public buildings in Ukraine is a crucial issue, as energy conservation and sustainable energy consumption are becoming increasingly important tasks in the context of climate change and energy efficiency improvements. Additionally, this issue is closely linked to the ongoing military conflict in Ukraine and the subsequent reconstruction of buildings.

Ukraine is implementing certification and standardization systems to assess and maintain the energy efficiency of buildings. For example, the LEED (Leadership in Energy and Environmental Design) and BREEAM (Building Research Establishment Environmental Assessment Method) certification systems allow for the evaluation and determination of energy efficiency levels in buildings, including public facilities. Raising awareness about energy efficiency and education are essential factors for the successful implementation of energy-efficient projects in public buildings. Overall, the implementation of energy efficiency measures in public buildings in Ukraine is a crucial step toward sustainable development and reducing greenhouse gas emissions. Proper planning, the use of modern technologies, regulatory policies, and financial support are key elements for achieving success in this field. [2]

Drones equipped with thermal imaging cameras operate by analyzing the infrared radiation emitted by objects. Any material emits heat, and this radiation can be captured using a specialized camera. The drone conducts an aerial survey of a given area or building, recording temperature variations on its surface. Areas with abnormally high heat loss appear on thermal images, allowing for the rapid identification of problematic zones. Such zones may indicate poor insulation, roofing damage, or defects in windows and doors. After collecting data, an operator analyzes the obtained thermal maps and draws conclusions regarding the building's energy efficiency.

One of the primary advantages of using drones is significant time savings. Compared to traditional inspection methods, where specialists must physically inspect a building using ladders or even cranes, a drone can complete an inspection within minutes. This is particularly important for large-scale objects such as industrial facilities, warehouses, or residential complexes. Drones also allow inspections to be conducted without direct human contact with potentially hazardous areas, ensuring a higher level of safety. Another major advantage is the precision of imaging: modern thermal cameras can detect even minor temperature deviations, enabling the early identification and resolution of issues before they result in significant energy losses or structural damage.

Drone technology with thermal imaging cameras has a wide range of applications. In the field of energy auditing, it is used to inspect residential, commercial, and industrial buildings. This helps assess the effectiveness of insulation and identify areas requiring additional energy-saving measures. Drones are also actively employed for surveying engineering networks, including heat pipelines and power lines. Thermal imaging analysis enables the rapid detection of heat leaks or electrical overheating, helping to prevent emergency situations and improve energy supply reliability. In agriculture, this technology is used to monitor the condition of greenhouses and grain storage facilities, optimizing heating costs and increasing agricultural efficiency. [3]

Despite numerous advantages, the use of drones in energy auditing has certain limitations. One key factor is their dependence on weather conditions. High humidity, strong winds, or extremely low temperatures can affect image quality and even complicate the drone's flight process. Additionally, the cost of equipment must be considered: high-quality thermal cameras are relatively expensive, which can be a barrier to the widespread adoption of this technology. Moreover, the effectiveness of drones depends significantly on the qualifications of operators, who must not only be proficient in drone operation but also capable of correctly analyzing the collected data. Specialized training or the use of software for automated data processing is required for this purpose. [4]

Thus, the use of drones with thermal cameras for energy auditing is a modern and efficient method for diagnosing energy losses. Thanks to their advantages, such as speed, safety, and accuracy, this technology has significant potential for further development and widespread adoption across various industries. However, for large-scale implementation, further improvements in equipment, cost reductions, and training of specialists capable of effectively handling the collected data are necessary.

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УДК 338.439.02+339.9

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## INFLUENCE OF LEADERSHIP ON THE FORMATION OF AN EFFECTIVE TEAM

*Описано значення лідерства в управлінні та його вплив на ефективність команди. Розкрито ключові риси, які характеризують успішного лідера, та роль лідера у формуванні згуртованої команди. Виділено особливості розвитку лідерських навичок у сучасному бізнес-середовищі та запропоновано стратегії їх вдосконалення.*

**Ключові слова:** лідерство, управління, команда, ефективність, стратегічне мислення.

*The article describes the importance of leadership in management and its impact on team performance. The key features that characterize a successful leader and the role of a leader in forming a cohesive team are revealed. The features of leadership skills development in the modern business environment are highlighted and strategies for their improvement are proposed.*

**Key words:** leadership, management, team, efficiency, strategic thinking.

Effective management of any industry requires educated, active personnel capable of making responsible decisions in a situation of choice and taking responsibility for them, as well as taking initiative and striving for self-improvement and self-development in their professional activities. A modern manager must be a leader, and one that the team follows, which, in turn, allows the business to be successful. The topic of leadership is relevant because the tasks set by enterprises can only be solved if a good team and, in turn, an effective leader interact. Leadership, in turn, is expressed in the impact on the team: it makes them show their strengths and restrain the manifestation of weaknesses.

The term “leader” in English means “director”, “boss”, “manager”. The definition of the term “leadership” has two meanings:

- First, it is the ability of an individual to influence other people to achieve certain goals;
- secondly, a management function that involves using the leader's influence to motivate employees to achieve the organization's goals.

The term “leader” becomes meaningful only in conjunction with the concept of “goal”; there is no leader without a goal. Leaders have several characteristics that characterize them:

- high activity and initiative;
- influence on others;
- acting in accordance with values;
- possession of information;

- are role models;
- are responsible not only for their actions but also for the results of the team [3, p. 184].

The main role in creating a team is played by the leader. A team is a group united by a common goal. An effective team is “one for all and all for one”. In other words, it is a group of people who work as a single organism.

In modern business organizations, the importance of teamwork skills is growing, as the rapid pace of change in commodity and territorial markets dictates the priority of choosing teams that solve urgent business development tasks in a certain period of time. The team leader plays a different role at all stages of team development, and the productivity and efficiency of this team largely depends on his or her ability to competently and competently accompany the team in its growth, providing the necessary resources and support.

Only a leader with the right qualities can create an effective team. A leader is often perceived as a superman, able to foresee the development of the situation, make the right decisions and lead the team even in difficult times and turbulent situations. However, managing a team is far from alchemy and requires mastery of a number of tools that guarantee effective team leadership. A leader must perform the following main functions:

- unite people;
- protect the interests of his team and each of his employees;
- implement changes and innovations;
- organize activities that will achieve maximum results with minimum resources [4].

The leader should do the same work as his team, but should strive to help employees find the internal motivation to achieve it. Where a boss sees his employees as subordinates, a leader sees his employees as part of a team and seeks to empower them to exceed minimum expectations.

Leaders who inspire and empower have a greater ability to influence team actions. Inspiring and empowering people builds loyalty and trust, which are positive qualities that create a strong, productive corporate culture. When everything is based on productivity without developing loyalty and trust, it often negatively impacts team performance [1].

Peter Drucker said: “Management is the art of doing things right, and leadership is the art of doing the right thing.” Indeed, a true leader is able to inspire a team to do great things and create miracles, and if he is also a strategic leader, his team is “doomed to success”. According to P. Drucker, in a close-knit team of like-minded people led by a recognized leader, ordinary people become capable of extraordinary things.

A leader-manager must convince his subordinates that they should not be afraid to take on the most difficult tasks, that they have the right to take risks, and that mistakes often become the key to success. In 604 BC, the sage Lao Tzu said: “The best ruler is the one whom people only know exists. A somewhat worse ruler is the one who is obeyed and loudly welcomed. The worst of all is the ruler who is despised by the people. Don't respect people, and they will stop respecting you. But when a good leader speaks honestly, when his work is done and the goal is achieved, people will say: “We did it ourselves.”

Aristotle taught us that “leadership consists in determining the public good and serving it.” Responsible leaders should be aware of global development trends and try to understand them. They should be proactive not only to improve business efficiency, increase turnover, strengthen brand positions and liberalize legislation, but also to fulfill their role and responsibility to the world.

Leadership is not limited to managing people. It is an art and a science that requires a deep understanding of human psychology, social dynamics and strategic thinking. Leaders must not only be charismatic, but also competent, able to adapt to rapidly changing conditions and make informed decisions. It is important to note that leadership is not an innate quality; it can be developed and improved through training and practice [2, p. 37].

Thus, the results show that effective leadership not only increases team spirit, but also improves interaction between employees, coordination, and conflict resolution. The study demonstrates that leaders with strong leadership skills have a positive impact on the team, creating an atmosphere of trust and cooperation, which ultimately leads to improved team performance.



Practical recommendations include developing leaders' motivational skills, stress management and emotional resilience, and implementing strategies to improve communication and team cohesion.

Leadership is not just a role or a position, it is a responsibility and a privilege. Leaders who understand the importance of their role and strive for continuous improvement can make a difference in the world. It is important to remember that each of us can become a leader in our field if we strive to develop and inspire others to achieve.

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УДК 811.111

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### BIG DATA APPLICATIONS IN CROP YIELD PREDICTION (ЗАСТОСУВАННЯ ВЕЛИКИХ ДАНИХ У ПРОГНОЗУВАННІ УРОЖАЙНОСТІ)

*У публікації досліджується вплив баз даних на прогнозування врожайності, розглядається їх значення в сучасному сільському господарстві. Оскільки попит на продукти харчування зростає, інтеграція різноманітних джерел даних, таких як супутникові зображення, дані про погоду та показники стану ґрунту, стає життєво важливою для підвищення продуктивності. Були виділені передові методи аналітики, включаючи машинне навчання та статистичні моделі, які підвищують точність урожайності шляхом врахування факторів навколишнього середовища. Крім того, було розглянуто роль систем моніторингу в реальному часі з використанням датчиків Інтернету речей, що надає фермерам практичну інформацію.*

**Ключові слова:** *Бази даних, прогнозування врожайності, аналітика даних, машинне навчання, точне землеробство, супутникові зображення, датчики Інтернету речей, екологічні фактори, здоров'я ґрунту, моніторинг у реальному часі, системи підтримки прийняття рішень, історичні дані, стійкість сільського господарства, прогнозне моделювання, тематичні дослідження.*

*This publication explores the impact of big data on crop yield prediction, addressing its significance in modern agriculture. As food demand rises, the integration of diverse data sources, such as satellite imagery, weather data, and soil health metrics, becomes vital for improving productivity. There were highlighted advanced analytics techniques, including machine learning and statistical models, that enhance yield accuracy by considering environmental factors. Additionally, there was examined the role of real-time monitoring systems using IoT sensors, providing farmers with actionable insights.*

**Keywords:** *Big Data, Crop Yield Prediction, Data Analytics, Machine Learning, Precision Agriculture, Satellite Imagery, IoT Sensors, Environmental Factors, Soil Health, Real-time*

Data collection and integration are crucial steps in leveraging big data for crop yield prediction. This process involves gathering diverse datasets from multiple sources to create a comprehensive view of agricultural conditions. High-resolution satellite imagery provides valuable information on crop health, land use, and growth stages, allowing for monitoring changes in vegetation and assessing crop conditions. Accurate weather data, including temperature, precipitation, humidity, and wind speed, are essential for understanding how environmental conditions affect crop growth, sourced from meteorological stations, weather satellites, and online databases. Collecting data on soil properties such as pH, nutrient levels, and moisture content is vital for assessing soil health and its capacity to support crop growth, with soil sensors and laboratory analysis providing this information. Analyzing historical yield data allows researchers to identify trends and patterns, facilitating more accurate predictions; this data can be sourced from agricultural databases, government reports, and local agricultural extension services. Once collected, integration techniques such as data warehousing and data lakes are employed to combine disparate datasets into a unified format, enabling comprehensive analysis and uncovering correlations between different data sources. Effective data collection and integration form the foundation for accurate crop yield predictions, empowering farmers and researchers to make informed decisions and enhance agricultural productivity.

Data analytics techniques play a pivotal role in crop yield prediction by transforming raw data into actionable insights. Advanced analytics approaches, particularly machine learning and statistical modeling, are utilized to analyze the vast amounts of data collected from various sources. Machine learning algorithms, such as regression analysis, decision trees, and neural networks, can identify complex patterns and relationships within the data, enabling more accurate predictions of crop yields based on a multitude of variables. Statistical models help in understanding the underlying distributions of crop yields and the influence of environmental factors, allowing for more precise assessments. These techniques can also incorporate real-time data, providing adaptive models that improve over time as more data becomes available. By applying these data analytics methods, researchers and farmers can gain valuable insights into how factors like weather conditions, soil health, and crop management practices affect yield outcomes. This enables them to optimize farming strategies, enhance productivity, and make informed decisions that contribute to sustainable agricultural practices. The integration of data analytics into crop yield prediction represents a significant advancement in agricultural science, offering the potential to meet growing food demands while ensuring environmental sustainability.

The impact of environmental factors on crop yield is a critical aspect of agricultural science, as these factors significantly influence plant growth and productivity. Key environmental variables include temperature, precipitation, soil quality, and sunlight. Temperature affects physiological processes in plants, such as photosynthesis and respiration; extremes can lead to heat stress or frost damage, both of which can reduce yields. Precipitation is equally important, as it determines water availability for crops. Insufficient rainfall can lead to drought conditions, while excessive rainfall can cause flooding and soil erosion, negatively impacting crop health. Soil quality, encompassing aspects such as nutrient content, pH levels, and organic matter, directly affects a plant's ability to absorb essential nutrients and water. Additionally, sunlight plays a vital role in photosynthesis, with inadequate light exposure limiting plant growth and yield. Understanding the complex interactions between these environmental factors is essential for accurate crop yield predictions. By analyzing historical data and using advanced analytics, researchers can assess how these variables have affected past yields and predict future outcomes under varying conditions. This knowledge helps farmers make informed decisions about crop selection, irrigation practices, and soil management strategies, ultimately enhancing agricultural productivity and sustainability in the face of changing climate conditions.

Real-time monitoring and decision support systems play a transformative role in modern agriculture, particularly in crop yield prediction. By utilizing Internet of Things (IoT) technology, farmers can deploy sensors in the field to continuously monitor various parameters such as soil moisture, temperature, humidity, and crop health. This real-time data collection allows for immediate insights into current growing conditions, enabling farmers to respond quickly to potential issues. For instance, if soil moisture levels drop below a certain threshold, farmers can initiate irrigation to prevent drought stress on their crops. Moreover, integrating this real-time data with big data analytics enhances the predictive capabilities of crop yield models. By analyzing live data alongside historical datasets, farmers can make more informed decisions regarding planting schedules, fertilization, and pest management. Decision support systems can provide recommendations based on predictive analytics, helping farmers optimize their practices for better yields. Additionally, mobile applications and platforms can deliver these insights directly to farmers in the field, making it easier to implement recommendations on the go. The use of real-time monitoring and decision support not only improves the accuracy of crop yield predictions but also fosters more sustainable agricultural practices, as farmers can make proactive adjustments based on the most current data available. This approach ultimately leads to increased efficiency, reduced waste, and enhanced productivity in the agricultural sector.

Case studies and success stories in the application of big data for crop yield prediction illustrate the significant benefits and advancements achieved in agriculture. Numerous agricultural enterprises and research institutions have successfully implemented big data analytics to enhance yield outcomes and optimize farming practices. For instance, some farms have adopted precision agriculture techniques, utilizing data from satellite imagery and sensors to make informed decisions about planting, fertilization, and irrigation. In these cases, farmers have reported substantial increases in crop yields and reductions in resource usage, demonstrating the effectiveness of data-driven strategies. Additionally, case studies highlight how large-scale agricultural organizations have integrated data analytics into their operations, enabling them to forecast crop yields with greater accuracy and manage risks associated with climate variability. These success stories often showcase collaborative efforts between technology companies and agricultural experts, leading to the development of innovative tools and platforms that facilitate data collection, analysis, and decision-making. Furthermore, the sharing of these experiences through agricultural extension services and industry conferences helps disseminate knowledge and best practices, encouraging more farmers to adopt big data solutions. Overall, these case studies serve as compelling evidence of the potential of big data to transform agriculture, providing insights into effective methodologies that can be replicated across different regions and farming systems, ultimately contributing to improved food security and sustainability.

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**STRATEGIC GUIDELINES FOR TOURISM DEVELOPMENT OF TERRITORIAL  
COMMUNITIES OF MYKOLAIV REGION**  
**(СТРАТЕГІЧНІ ОРІЄНТИРИ РОЗВИТКУ ТУРИЗМУ ТЕРИТОРІАЛЬНИХ ГРОМАД  
МИКОЛАЇВСЬКОЇ ОБЛАСТІ)**

*У статті розглянуто потенціал розвитку туризму в Миколаївській області, яка володіє значними рекреаційними та туристичними ресурсами. Підкреслено важливість цього напрямку для соціально-економічного розвитку регіону та підвищення якості життя місцевого населення. Висвітлено потенціал Миколаївської області для туристичного розвитку та необхідність системних заходів для його активізації.*

**Ключові слова:** туризм, розвиток туризму, територіальні громади, Миколаївська область

*The potential for tourism development in the Mykolaiv region, which boasts significant recreational and tourist resources, has been considered. The importance of this direction for the socio-economic development of the region and the improvement of the quality of life of the local population is emphasized. The potential of the Mykolaiv region for tourism development and the necessity of systemic measures to activate it are highlighted.*

**Keywords:** tourism, tourism development, territorial communities, Mykolaiv region

Territorial communities of the Mykolaiv region are a kind of recreational centers. The Mykolaiv region has unused recreational and tourist resources, therefore it is one of the promising ones for the development of tourism in Ukraine. Its potential and opportunities are formed by the sea coast, clean environment, rich cultural and historical heritage [1].

The Program for the Development of Tourism and Resorts of the Mykolaiv region for 2021-2023 determines that the strategic direction of the development of the tourism industry of the Mykolaiv region is to transform it into a competitive, highly profitable, integrated into the world market industry, which can become a significant factor in accelerating the socio-economic development of the region, improving the quality of life of the population, harmonious development and consolidation of society, as well as popularizing Ukraine in the world [2].

However, in modern conditions, the tourist attractiveness of Ukraine has significantly decreased with the beginning of the Great War. At the same time, this affected tourism in the Mykolaiv region, as from the first days of the invasion the region held back the occupiers from attacking Odessa and has since suffered daily Russian shelling.

In 2022, the tourist season in the Mykolaiv region was canceled due to its proximity to the front line, daily enemy shelling, and the occupation of part of the region. In fact, the tourist flow in the region decreased by 82% in 2022. During 2021, 2.34 million people visited the region, while in 2022, approximately 600 thousand tourists visited the Mykolaiv region. As a result, the regional budget received significant funds: if in 2021 the tourist collection amounted to 7.9 million hryvnias, then in 2022 it was less than 800 thousand hryvnias [3].

The Black Sea resorts of the region, in particular the beach areas, remain “potentially dangerous” for tourists. Visiting them is strictly prohibited by the military command of Ukraine [4]. This is primarily due to the fact that there is still a threat of shelling by the Russian military, but at the same time, tourists have the opportunity to visit other tourist locations in the region that are no less attractive.

At the same time, there are many untouched natural sites in the Mykolaiv region that could attract visitors. A positive impetus for the development of tourism can be given by the project “Tourist Priingulya”, the route of which is “Mykolaiv - Maryivka - Pelageyivka - Sofiyivka -

Barativka - Mykolaiv". In addition to this project, the region also has the estate "Ostrivets" (Voznesenskyi district), the guest house - Ostrich farm "Kremenivskyi ostrich" (Veselinivskyi district), Porozhki (Voznesensk), Mygiya (Pervomaiskyi district) and other sites.

Despite the fact that in some tourist places there is a threat of shelling, there are also safe locations where you can travel. One of these is the Aktovsky Canyon, located in the village of Aktove (Voznesenskyi district). It is famous for its granite rocks, between which the Mertvovod River flows. Currently, the Aktovsky Canyon is a completely safe place to relax. This place can be visited not only as a day trip, but also to stay there for a longer period. Not far from the Aktovsky Canyon is the Trikratsky Forest Reserve. There are hiking trails on its territory, the Arbuzinka River stretches along the forest, and the historic estate of the landowner Skarzhinsky is located nearby. Another tourist location in the Mykolaiv region is the village of Mygiya (Pervomaiskyi district), which is called the "small Alps of the Mykolaiv region". It is located on the banks of the Southern Bug. Tourists come here for the Mygiivskyi rapids, Radon Lake and the "Buzkyi Gard" park. Mygiivskyi has a fairly developed infrastructure: campsites, hotels, establishments, as well as equipment rental and instructor services. The next object is the regional landscape park "Tyligulskyi" (Mykolaiv district). It combines the coast and the adjacent water areas of the Tyligulskyi estuary, where you can relax on the beach or visit an oyster farm [3].

Green tourism is also promising for the region. It gives impetus to the revival and development of traditional culture: folk architecture, art, crafts - everything that makes up the local flavor. Rural recreation, by preserving ethnographic originality, represents Ukraine to the world and attracts foreign tourists. As a prerequisite for the successful development of recreation in rural ethnographic areas, it is necessary to consider the formation of an ideology of revival and development of the entire spectrum of traditional culture, from forms of economic activities to the achievements of the spiritual sphere, which will act as favorable factors for individual recreation in ethnographic areas of Ukraine. And thus, due to green tourism, the economy will prosper.

There are many reasons that hinder the development of tourism in the Mykolaiv region. Among them are unfavorable state policy, underdevelopment of tourist infrastructure and a low level of material resources. Therefore, it is necessary to develop the existing tourist resources of the region, attract investments for the development of tourist attractions and conduct an advertising campaign both at the level of Ukraine and on the international market of tourist services. Despite the difficulties faced by the Mykolaiv region due to the war, its development in the field of tourism has the potential for successful revival and becoming an important factor in the socio-economic development of the region.

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## THE IMPACT OF ARTIFICIAL INTELLIGENCE ON SOCIO-ECONOMIC SHIFTS IN THE BANKING SYSTEM OF UKRAINE

*У даній роботі розглянуто вплив штучного інтелекту на діяльність банківського сектору в Україні та позитивні наслідки цього. Вказано на підвищення операційної ефективності, покращення взаємодії з клієнтами та сприяння фінансовій доступності, економічному розвитку і стабільності в Україні.*

**Ключові слова:** штучний інтелект (ШІ), банківська система, автоматизація, цифровізація.

*This paper examines the impact of artificial intelligence on the banking sector in Ukraine and its positive consequences. It points to increased operational efficiency, improved customer engagement, and the promotion of financial inclusion, economic development, and stability in Ukraine.*

**Keywords:** artificial intelligence (AI), banking system, automation, digitalization.

The banking sector around the world is experiencing a paradigm shift due to the emergence of artificial intelligence (AI) technologies. The development of these technologies in the banking sector promises revolutionary changes in customer service and optimization of internal processes. And these changes are already happening.

In order to quickly identify risks and prevent their negative impact, artificial intelligence automatically checks large volumes of data, processing millions of pages per day and providing timely information to employees about cybersecurity violations or the detection of financial fraud.

With the help of smart search and intelligent data classification, banking institutions can create a single information and analytical center with different levels of access; automate the functions of storing, copying and deleting data; ensure high search performance regardless of the size of data stores and maximize the relevance of search results.

With the help of machine understanding of text, speech-to-text conversion, chatbots and auto-classification, companies easily solve problems with an overflowing mailbox, comments on web resources and a large number of calls. Voice and text requests to the support service are analyzed and automatically distributed into certain groups (marked as: “complaints about personnel”, “difficulties with the personal account”, “problems with the mobile application”, etc.), reducing the time for processing consumer requests.

For example, Oschadbank has a voice assistant “Sofia”, which advises customers on a wide range of issues, such as making appointments at branches and redirecting customers to the appropriate specialists depending on their requests. Thanks to the use of “Sofia”, 75% of client requests were automated, the time for their processing decreased, and the overall level of customer satisfaction improved.

By analyzing information on the Internet, banking institutions can extract useful information to attract new customers, check the borrower's reliability, enrich already formed customer profiles with new data, and conduct research.

Significantly less time is spent on reviewing documents using the optical character recognition function. Extraction of important information from loan applications, lease agreements, receipts, and other documents will take place in a matter of seconds.

Thus, the advantages of digitalization are optimization of operating costs, reduction of financial risks, improvement of credit scoring (creditworthiness assessment), and ensuring a high level of security of banking transactions.

But it is worth remembering that the transition to innovative technologies requires not only significant investments, but also a comprehensive approach.

Each financial institution must understand technological capabilities and limitations. Banks must take into account the ethical aspects of using AI, ensuring transparency and fairness in decision-making, guaranteeing the confidentiality of customer data.

To address these challenges and maximize the potential of digitalization, banks must develop comprehensive strategies that include investments in technological infrastructure, staff training, developing digital literacy among customers, and ensuring a high level of security of banking transactions.

To address the growing demand for financial technologies and digitalization, in July 2020, the National Bank of Ukraine approved the Strategy for the Development of Fintech in Ukraine until 2025.

The main objectives of the strategy are to introduce new financial products, ensure consumer protection, reduce transaction costs, and create competitive market conditions for financial services operators.

Every day, financial technologies cover an increasingly wide range of services and products, from digital banking and crowdfunding (collecting funds from a large number of people to finance a new business project organized on a special online platform) to insurance and investment management. Payment systems, acquiring systems (electronic payments from customers via the Internet), cryptocurrencies, brokerage companies and cryptocurrency exchanges use modern technologies to ensure fast, secure and convenient financial transactions.

The growth of neobanks and fintech companies indicates a high potential for innovation in the financial sector, providing customers with more options for choice and access to financial services. This, in turn, stimulates traditional banks to intensify their innovation processes and find ways to integrate digital technologies into all aspects of their activities.

To conclude, we can say that by increasing operational efficiency, improving interaction with customers, and promoting financial accessibility, AI contributes to economic development and stability in Ukraine.

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## ЕКОНОМІКО-МАТЕМАТИЧНЕ МОДЕЛЮВАННЯ ПОТЕНЦІАЛУ ПРОДОВОЛЬЧОЇ БЕЗПЕКИ УКРАЇНИ В КОНТЕКСТІ МІЖНАРОДНОГО ПАРТНЕРСТВА

*У тезах доповіді розглянуто теоретичні та практичні аспекти моделювання потенціалу забезпечення продовольчої безпеки України в контексті міжнародного співробітництва. Проаналізовано сучасний стан продовольчої безпеки країни, виявлено основні чинники впливу на її формування. Запропоновано комплексну економіко-математичну модель оцінювання потенціалу зростання продовольчої безпеки з урахуванням міжнародної інтеграції та партнерства. Визначено стратегічні напрями підвищення ефективності використання наявних ресурсів для гарантування стабільності продовольчого забезпечення населення України.*

**Ключові слова:** продовольча безпека, моделювання, потенціал зростання, міжнародне співробітництво, аграрний сектор.

*The abstracts of the report consider theoretical and practical aspects of modeling the potential for ensuring food security in Ukraine in the context of international cooperation. The current state of the country's food security is analyzed, the main factors influencing its formation are identified. A comprehensive economic and mathematical model for assessing the potential for increasing food security is proposed, taking into account international integration and partnership. Strategic directions for increasing the efficiency of using available resources to guarantee the stability of food security for the population of Ukraine are identified.*

**Keywords:** food security, modeling, growth potential, international cooperation, agricultural sector.

Забезпечення продовольчої безпеки є одним із найважливіших стратегічних завдань України в умовах глобальних викликів сучасності. Проблематика продовольчої безпеки набуває особливої актуальності з огляду на прискорення інтеграційних процесів, зміну кліматичних умов, військові конфлікти та економічні кризи. Виклики, пов'язані з забезпеченням продовольчої безпеки, потребують розробки ефективних механізмів моделювання потенціалу її зростання з урахуванням можливостей міжнародного співробітництва.

Метою дослідження є розробка науково-методичних підходів до моделювання зростання потенціалу забезпечення продовольчої безпеки України на основі використання міжнародного досвіду та співпраці з іноземними партнерами. Теоретичною основою дослідження є системний підхід до розуміння продовольчої безпеки як багатовимірного явища, що охоплює економічні, соціальні, екологічні та політичні аспекти.

Відповідно до сучасних наукових підходів, продовольча безпека має чотири основні виміри: наявність продовольства, доступ до продовольства, використання продовольства та стабільність продовольчого забезпечення [1].

Методологічний інструментарій моделювання потенціалу забезпечення продовольчої безпеки України включає:

- багатофакторний аналіз складових продовольчої безпеки;
- економетричне моделювання залежностей між показниками аграрного виробництва та рівнем продовольчої безпеки;
- сценарне прогнозування розвитку продовольчої системи з урахуванням зовнішніх факторів;
- оптимізаційні моделі для визначення раціональної структури агровиробництва.

Розроблена концептуальна модель визначає потенціал забезпечення продовольчої безпеки як функцію від низки змінних:



$$P = f(R, T, I, M, E),$$

де  $P$  - потенціал забезпечення продовольчої безпеки;  $R$  - ресурсне забезпечення аграрного сектору;  $T$  - технологічний рівень виробництва;  $I$  - інституційне середовище;  $M$  - рівень міжнародної інтеграції;  $E$  - екологічні фактори.

Аналіз сучасного стану продовольчої безпеки України свідчить про наявність суттєвих викликів. За даними Глобального індексу продовольчої безпеки (*Global Food Security Index*), Україна посідає середні позиції у світовому рейтингу, демонструючи відносно високі показники доступності та наявності продовольства, але нижчі показники якості та безпечності харчових продуктів [2, 3].

Основними проблемами забезпечення продовольчої безпеки України є:

- незбалансованість харчового раціону населення;
- висока імпортозалежність за окремими групами продовольства;
- недостатній рівень впровадження інноваційних технологій в агросекторі;
- проблеми логістичної інфраструктури;
- вразливість продовольчої системи до зовнішніх шоків.

Проведений кореляційно-регресійний аналіз демонструє сильний зв'язок між рівнем продовольчої безпеки та обсягами інвестицій в аграрний сектор ( $r = 0,86$ ), розвитком переробної промисловості ( $r = 0,78$ ), а також інтенсивністю міжнародного торговельного співробітництва ( $r = 0,72$ ).

На основі проведеного дослідження розроблено комплексну економіко-математичну модель оцінювання потенціалу зростання продовольчої безпеки України, яка враховує вплив міжнародного співробітництва. Модель базується на багаторівневому підході й охоплює такі складові:

1. Модель прогнозування виробництва основних видів сільськогосподарської продукції з урахуванням інвестиційного та технологічного потенціалу:

$$Q_i(t) = \alpha_i + \beta_i \times I(t-1) + \gamma_i \times T(t) + \delta_i \times L(t) + \varepsilon_i,$$

де  $Q_i(t)$  - обсяг виробництва  $i$ -го виду продукції в період  $t$ ;  $I(t-1)$  - обсяг інвестицій в попередній період;  $T(t)$  - індекс технологічного розвитку;  $L(t)$  - обсяг задіяних земельних ресурсів;  $\alpha_i, \beta_i, \gamma_i, \delta_i$  - параметри моделі;  $\varepsilon_i$  - випадкова складова.

2. Модель оцінювання впливу міжнародного співробітництва на продовольчу безпеку:

$$FS(t) = \sum(w_j \times FS_j(t)),$$

де  $FS(t)$  - інтегральний індекс продовольчої безпеки;  $FS_j(t)$  - часткові індикатори продовольчої безпеки;  $w_j$  - вагові коефіцієнти значущості часткових індикаторів.

При цьому часткові індикатори продовольчої безпеки визначаються як функції від параметрів міжнародного співробітництва:

$$FS_j(t) = f_j(IC_1(t), IC_2(t), \dots, IC_n(t)),$$

де  $IC_k(t)$  - показники, що характеризують різні аспекти міжнародного співробітництва (обсяги експорту та імпорту продовольства, прямі іноземні інвестиції, трансфер технологій, участь у міжнародних проєктах тощо).

3. Оптимізаційна модель раціонального використання потенціалу забезпечення продовольчої безпеки:

$$\max FS(X) = \sum(c_i \times x_i)$$

при обмеженнях:

- $\sum(a_{ij} \times x_i) \leq b_j$  для всіх  $j$  (ресурсні обмеження);
- $x_i \geq d_i$  для всіх  $i$  (забезпечення мінімальних потреб у продовольстві);
- $x_i \geq 0$  для всіх  $i$ ,

де  $X = (x_1, x_2, \dots, x_n)$  - вектор невідомих, що характеризує структуру виробництва;  $c_i$  - коефіцієнти цільової функції;  $a_{ij}$  - коефіцієнти витрат ресурсів;  $b_j$  - обсяги доступних ресурсів;  $d_i$  - мінімальні потреби у продовольстві.

Апробація розробленої моделі на статистичних даних України за 2015-2022 роки підтвердила її адекватність та дозволила визначити ключові фактори зростання потенціалу забезпечення продовольчої безпеки. За результатами моделювання встановлено, що

збільшення обсягів міжнародної технічної допомоги аграрному сектору на 10% здатне забезпечити приріст інтегрального індексу продовольчої безпеки на 3,5-4,2%. Підвищення рівня інтеграції України до глобальних ланцюгів постачання продовольства може забезпечити додатковий приріст продовольчої безпеки на 2,8-3,5%.

Сценарне моделювання показало, що найбільш перспективними напрямами міжнародного співробітництва для забезпечення зростання потенціалу продовольчої безпеки України є:

- залучення іноземних інвестицій у модернізацію агропромислового комплексу;
- імплементація міжнародних стандартів якості та безпечності харчових продуктів;
- участь у міжнародних програмах розвитку стійких агропродовольчих систем;
- адаптація кращих практик управління земельними ресурсами;
- розвиток транскордонних логістичних мереж.

На основі проведеного дослідження запропоновано стратегічні напрями підвищення потенціалу забезпечення продовольчої безпеки України в контексті міжнародного співробітництва: інституційні перетворення (удосконалення нормативно-правової бази регулювання аграрного сектору, гармонізація національних стандартів з міжнародними вимогами, розвиток механізмів державно-приватного партнерства), технологічна модернізація (впровадження ресурсозберігаючих та екологічно безпечних технологій, розвиток біоекономіки та циркулярних моделей виробництва, цифровізація аграрного сектору), розвиток інфраструктури (модернізація логістичних мереж та складського господарства, розбудова інфраструктури зберігання та переробки сільськогосподарської продукції, створення експортно орієнтованих кластерів), розширення міжнародної співпраці (поглиблення участі в міжнародних організаціях аграрного спрямування, розвиток науково-технічного співробітництва, диверсифікація експортних ринків сільськогосподарської продукції).

Отже, проведене дослідження підтверджує значний потенціал зростання продовольчої безпеки України за умови ефективного використання можливостей міжнародного співробітництва. Розроблена комплексна економіко-математична модель дозволяє оцінити цей потенціал та визначити оптимальні шляхи його реалізації.

Результати моделювання свідчать, що міжнародне співробітництво є важливим каталізатором зростання потенціалу забезпечення продовольчої безпеки. Основними механізмами впливу міжнародного співробітництва є трансфер технологій, залучення інвестицій, розширення експортних можливостей та імплементація кращих управлінських практик.

Запропоновані стратегічні напрями підвищення потенціалу забезпечення продовольчої безпеки дозволять Україні більш ефективно використовувати наявні ресурси для гарантування стабільності продовольчого забезпечення населення та зміцнення позицій на світовому ринку продовольства.

Подальші дослідження доцільно спрямувати на розробку детальних механізмів імплементації запропонованих стратегічних напрямів з урахуванням регіональних особливостей та галузевої специфіки аграрного сектору України.

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**FINANCIAL CHATBOTS AND THEIR APPLICATION IN ACCOUNTING AND  
TAXATION  
(ФІНАНСОВІ ЧАТ-БОТИ ТА ЇХ ЗАСТОСУВАННЯ В ОБЛІКУ ТА  
ОПОДАТКУВАННІ)**

*В даній роботі розглядається роль фінансових чат-ботів у сфері обліку та оподаткування. Висвітлено їхні функції, переваги, можливі ризики та перспективи розвитку для підвищення ефективності фінансового управління.*

**Ключові слова:** цифровізація, фінансові чат-боти, облік, штучний інтелект, автоматизація.

*This paper examines the role of financial chatbots in the accounting and taxation sectors. It highlights their functions, benefits, possible risks, and development prospects for improving the efficiency of financial management.*

**Keywords:** digitalization, financial chatbots, accounting, artificial intelligence, automation.

In today's digital economy, the automation of accounting and tax administration is gaining particular importance. One of the most promising solutions is the introduction of financial chatbots - software assistants that use artificial intelligence and machine learning to process financial requests, perform calculations and provide consultations.

Financial chatbots operate in real time, ensuring a quick response to user requests. They can integrate with accounting systems, banking services, electronic document management and CRM platforms, which allows you to significantly reduce the time spent on performing routine operations. The main functions of such bots include keeping records of income and expenses, automatic tax calculation, reporting and reminders about tax payment deadlines [1].

The use of financial chatbots in accounting allows enterprises and private entrepreneurs to minimize the human factor in financial processes. For example, a bot can automatically distribute payments by category, generate analytical reports and control cash flows.

Special attention should be paid to the use of financial chatbots in tax administration. They can be used for automated verification of tax returns, calculation of tax burden and interaction with tax authorities. For example, in some countries chatbots have been introduced that help citizens correctly fill out tax returns, analyze possible tax benefits and provide personalized recommendations for optimizing tax expenses [2].

In addition to commercial use, financial chatbots can be an effective tool for government agencies in the field of tax control and audit. They are able to automatically detect risky transactions and analyze large amounts of financial data. This significantly increases the transparency of tax processes and reduces the level of fraud.

Financial chatbots also contribute to increasing users' financial literacy. Thanks to the interactive format, they can explain complex financial terms, provide advice on budgeting and optimizing expenses. For example, a user can ask the bot a question about changes in tax legislation or the features of preparing financial statements, and receive an answer in an accessible format. This is especially useful for small businesses and sole proprietors who do not always have access to professional accountants or financial consultants [3].

In addition, the use of financial chatbots significantly improves customer service in financial institutions. Banks, insurance companies and other financial organizations actively use bots to automatically serve customers, promptly provide information on account balances, lending conditions and the procedure for submitting tax reports. This reduces the waiting time for a

response, reduces the workload on financial institution employees and increases the overall quality of service [1].

Chatbots play a special role in financial planning and forecasting. Using historical data on income and expenses, they can analyze the financial condition of an enterprise or individual, offering optimal options for distributing funds. For example, a bot can identify unprofitable expenses, advise on investing in promising assets or calculate future tax liabilities, helping to avoid penalties.

Despite the numerous advantages, the use of financial chatbots also has certain challenges. The main risks are related to the security of personal and financial data, as bots work with confidential user information. Therefore, it is necessary to ensure an appropriate level of cyber protection, including multi-level authentication and data encryption [2].

The prospects for the development of financial chatbots include improving their analytical function through the implementation of artificial intelligence and the use of blockchain technologies to increase the level of security. In the future, they may become full-fledged financial assistants that will not only automate accounting, but also predict financial risks, analyze business profitability and offer optimal financial management solutions [1].

Thus, financial chatbots are an important element of accounting and taxation automation, which allows you to significantly increase the efficiency of financial management. They help businesses and individuals reduce the time spent on financial transactions, reduce errors, and ensure timely fulfillment of tax obligations. Despite the challenges associated with data security and algorithm updates, their development and improvement will contribute to the further digitalization of the financial sector.

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УДК 811.111

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#### GLOBAL FOOD SECURITY CRISIS

*Було проаналізовано загрози глобальної продовольчої безпеки та роль України у її забезпеченні. Виділено вплив війни, кліматичних змін та економічних криз на продовольчі системи. Розглянуто шляхи міжнародної співпраці для зміцнення продовольчої безпеки.*

**Ключові слова:** продовольча безпека, Україна, війна, кліматичні зміни, сільське господарство, міжнародна співпраця.

*The threats to global food security and Ukraine's role in its provision were analyzed. The impact of war, climate change, and economic crises on food systems was highlighted. Ways of international cooperation to strengthen food security were considered.*

**Keywords:** food security, Ukraine, war, climate change, agriculture, international cooperation.

The issue of food security is one of the most critical in the modern world, as ensuring the population has access to high-quality and nutritious food directly impacts public health and the sustainable development of nations. The war in Ukraine, a country with significant potential in agricultural exports, has further complicated the global food supply situation. The shortage of food, driven by climate change, political conflicts, and economic crises, threatens the stability of food systems in many countries and necessitates the search for new approaches to address this problem.

Food security is the subject of active discussion in research, particularly by the United Nations and its Committee on World Food Security. According to their data, approximately 690 million people worldwide are already suffering from hunger, and this number is expected to continue rising due to population growth, especially in Africa and Asia. International organizations such as FAO are studying the impact of climate change, pandemics, and political conflicts on global food supply. Great importance is also attached to innovative technologies in agriculture, which can help ensure stable crops in the face of climate challenges.

Food security, which underpins national security, is a crucial component of sustainable development as it ensures proper nutrition for the population. The emergence of food crises, which regularly occur due to various factors such as crop failures, unfavorable climatic conditions, and disruptions in logistics systems and infrastructure, leads to imbalances in both national food systems and national economic systems. The war in Ukraine has added tension to an already complex food supply situation in several countries and highlighted the challenges related to food security worldwide.

Given Ukraine's strong export potential, reinforced by favorable natural and climatic conditions and the use of innovative technologies, our country can be considered a key player in ensuring global food security.

Food security is defined as a person's access to safe and nutritious food and is a comprehensive concept that encompasses various aspects of the food system, including production, processing, distribution, and consumption. The United Nations Committee on World Food Security defines it as a situation where all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and preferences for an active and healthy life [2]. Some regions are more vulnerable to food insecurity due to a lack of fertile land and capital to purchase sufficient amounts of food. However, external factors, such as global health issues like the COVID-19 pandemic or political conflicts, threaten the food supply to other countries.

Political and armed conflicts, economic upheavals, extreme weather events, and rising fertilizer prices are some of the factors that exacerbate the global food crisis. Physical and financial access to food has a significant impact on global food security. Ensuring access to food is a complex task, especially for millions of people in low- and middle-income countries [3].

As of the beginning of 2020, the total number of people suffering from hunger worldwide was about 8.9% of the global population, which equaled approximately 690 million people. At the same time, more than 2 billion people were unable to access adequate nutrition due to a lack of safe and nutritious food. It is projected that by 2050, the world population will grow to 9.7 billion people, with the main increase expected in developing countries, particularly in Africa and Asia. This will lead to an increase in undernutrition, especially in Africa, where food production cannot keep up with population growth. A similar situation is observed in South Asia, where GDP per capita growth lags behind population growth. The multifactorial causes of hunger are often interconnected, making their analysis and resolution more complex. These factors include poverty, lack of investment in agriculture, geographic limitations, population distribution, historical factors related to colonization, political and economic factors, global trade and economy, armed conflicts and instability, market and pricing issues, and food waste. Many countries are increasingly taking measures to combat hunger, such as emergency food aid, nutrition for children under two years old, school feeding programs, and support for small farms and private farmers. [5].

The collaboration of government agencies, market participants, and international organizations can partially address the issue of food security in Ukraine and globally. Ukraine

continues to increase agricultural production, which is also linked to investments in this sector over the past decade.

Thus, the modern world faces the need not only to increase food production but also to ensure that the population has access to high-quality and nutritious products produced through environmentally friendly methods. The work on innovative, comprehensive solutions aimed at enhancing overall food security both today and in the future forms the foundation of the economic policy of any country. Some of the most pressing challenges for modern agriculture, which significantly impact global food security, are climate change and military conflicts. The consequences of climate change can be mitigated through modern technologies that enable agricultural producers to achieve stable harvests and maintain production volumes even in challenging climatic conditions. However, military conflicts and complex political situations lead to the destruction of agricultural enterprises and the complete destabilization of global food supply. To minimize the consequences of the food crisis, it is essential to protect and support agricultural production in Ukraine as soon as possible in the context of wartime, using the country's influence on global food policy. This can be achieved through Ukraine's leadership in global markets for certain types of agricultural products, as well as by strengthening cooperation with international and intergovernmental organizations, including the FAO, to transform food systems.

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УДК 811.111

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### PROJECT MANAGEMENT AND STRATEGIC PLANNING

*У роботі розглядаються основні аспекти управління проектами та стратегічного планування, їх принципи, методології та взаємозв'язки. Аналізується роль управління проектами в реалізації стратегічних цілей організації, а також важливість стратегічного планування для ефективного відбору та реалізації проектів. Особлива увага приділяється інструментам управління, управлінню портфелем цінних паперів та компетенціям керівників. Підкреслюється важливість поєднання будь-яких двох напрямків для довгострокового розвитку і конкурентоспроможності компаній в сучасному динамічному бізнес-середовищі.*

**Ключові слова:** управління проектами, стратегічне планування, project management, стратегія, управління портфелем, Бізнес-аналіз, корпоративна культура, конкурентоспроможність, методології управління, Agile, SWOT-аналіз.

*This paper examines the core aspects of project management and strategic planning, their principles, methodologies, and interrelationships. It analyzes the role of project management in implementing an organization's strategic goals, as well as the importance of strategic planning for*

*effective project selection and implementation. Special attention is paid to management tools, securities portfolio management, and managerial competencies. The paper emphasizes the importance of combining these two directions for long-term development and competitiveness of companies in today's dynamic business environment.*

**Keywords:** *Project Management, Strategic Planning, project management, Strategy, Portfolio Management, Business Analysis, corporate culture, competitiveness, management methodologies, Agile, SWOT analysis.*

Project management and strategic planning are two key aspects of management that determine the success of organizations in a modern business environment. Project management is an integral part of the successful development of organizations in the modern world [3]. They ensure the efficient implementation of corporate goals, optimize resources and increase competitiveness. Good governance and compliance with established quality standards for civil society organizations are a sustainable practice in European countries and it is an effective tool for promoting organizational development [1]. The combination of these two areas allows companies not only to effectively implement individual projects, but also to ensure long-term development.

Project management is a system of methods and approaches that are used to organize, plan, execute and monitor projects. A project is defined as a temporary enterprise aimed at creating a unique product, service or result. The most important phases of project management are the initiation, planning, execution, monitoring and completion. At each of these stages, managers must ensure that the project goals are consistent with the overall strategy of the company. Various methods such as Agile, Scrum, Waterfall, Kanban and PRINCE2 are used to successfully complete projects. The choice of methodology depends on the complexity and specificity of the project. Strategic planning is an integral part of the management of an organization, as it defines the main directions of its development. The use of the project management methodology ensures the effectiveness of implementing goals in accordance with certain deadlines and the planned budget and resources [2]. It includes the formulation of the mission and vision of the enterprise, the establishment of long-term goals, the analysis of the external and internal environment, the development of strategies and mechanisms for their implementation. Strategic planning helps organizations to adapt to changes in the market environment, efficiently distribute resources and achieve competitive advantages. The most important tools for strategic planning include SWOT analysis, PEST analysis, Porter's Five Forces Model, the Balanced Scorecard (BSC) and scenario planning. The connection between project management and strategic planning is obvious. Each individual project must correspond to the strategic goals of the enterprise, and strategic planning determines the direction of selection and project management. Project management makes it possible to put the strategy into practice and translate it into concrete actions, while strategic planning provides a common framework for making decisions on priorities, resources and investments. One of the most important aspects of a successful combination of project management and strategic planning is project portfolio management. It is a process of selecting, prioritizing and managing several projects that correspond to the strategic goals of an organization. As a result, resources can be efficiently divided between projects, duplicate efforts can be avoided and the greatest benefit for the company can be achieved. With modern information systems such as Microsoft Project, Jira, Trello or Asana, you can automate project management and improve team performance. Successful strategic planning and project management require competent managers who are able to make informed decisions and work under uncertainty and risk. Important skills in this area are analytical thinking, leadership qualities, communication skills, adaptability and result orientation. In addition, corporate culture is an important factor that promotes innovation, cooperation and continuous learning.

Project management and strategic planning are important components for the success of an organization. They make it possible to effectively manage changes, ensure stable development of the company and achieve the set goals. The combination of these two approaches helps companies to be flexible, competitive and prepared for the challenges of the future. In today's fast-changing



world, the ability of organizations to effectively combine strategic vision with fast project workflows is the key to long-term success.

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УДК 811:111

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### **SURGICAL TREATMENT OF WOUNDS IN VETERINARY MEDICINE: TRADITIONAL AND INNOVATIVE METHODS (ХІРУРГІЧНЕ ЛІКУВАННЯ РАН У ВЕТЕРИНАРІЙ: ТРАДИЦІЙНІ ТА НОВІТНІ МЕТОДИ)**

*У статті розглядаються основні методи хірургічного лікування ран у ветеринарній практиці. Аналізуються традиційні методи первинної та вторинної хірургічної обробки, а також сучасні інноваційні методи, такі як використання біоматеріалів, регенеративної медицини та лазерної хірургії. Оцінюється ефективність кожного підходу та їх роль у прискоренні загоєння ран у тварин.*

**Ключові слова:** хірургічне лікування, ветеринарія, рани, регенеративна медицина, лазерна хірургія, біоматеріали.

*The article discusses the main methods of surgical treatment of wounds in veterinary practice. Traditional methods of primary and secondary surgical treatment are analyzed, as well as modern innovative methods, such as the use of biomaterials, regenerative medicine, and laser surgery. The effectiveness of each approach and its role in accelerating wound healing in animals are evaluated.*

**Keywords:** surgical treatment, veterinary medicine, wounds, regenerative medicine, laser surgery, biomaterials.

Wounds in animals are a common problem in veterinary practice. They can result from mechanical injuries, bites, surgical interventions, or other traumas. Wound treatment is a complex process that requires a careful approach, as improper management can lead to infectious complications, delayed healing, or even loss of function of the affected area. The main objectives in wound treatment are infection prevention, stimulation of tissue regeneration, and minimization of pain syndrome. Effective treatment depends on timely diagnosis, the correct choice of surgical method, and the application of modern technologies to improve tissue healing [5].

Today, the primary principle of therapeutic measures for wounds is to improve conditions for the wound healing process and maximize tissue and overall organism protection. Treatment of all types of wounds, except for surgical ones, begins with adherence to the correct algorithm of actions for injuries. The patient is examined, an anamnesis is collected (how and when the wound occurred, complaints, and general information). If the patient is unstable, the wound is treated as much as possible, stabilization and examination of the animal are conducted. Only after these steps is a decision made regarding surgical intervention [1, 3].



Traditional methods of surgical wound treatment include primary surgical treatment and secondary wound healing. Healing by primary intention is always a priority, as it occurs in a short time with minimal scarring. This process involves mechanical wound cleaning, removal of necrotic tissues, and primary suturing.

Secondary wound healing occurs through contraction and epithelialization and is intended for contaminated and infected wounds with skin defects that cannot be closed using conventional surgical methods. Secondary tension involves open wound management, the use of antiseptics and dressings, and secondary suturing after granulation [2, 3].

The foundation of modern methods of surgical treatment of open wounds is moist wound management. Maintaining optimal moisture in the wound is crucial, and the main means for achieving this are modern collagen and hydrogel dressings for different phases of the wound process. There are dressings with a high absorption capacity for highly exudative wounds, such as "Sorbalgon" (a sterile calcium alginate fiber dressing), "HydroClean+" (a hydroactive dressing for rapid wound healing), "Suprasorb" (polyurethane foam), and "Hidrocoll" (a moisture-retaining dressing). Proteolytic enzymes such as Chymotrypsin, which breaks down necrotic tissues, hydrogels, polyurethane films, atraumatic dressings, and antimicrobial coatings are also used [1, 6].

A new approach to wound treatment includes laser surgery and regenerative medicine. Laser treatment reduces the risk of infection, accelerates tissue regeneration, and decreases pain and inflammation. In regenerative medicine, stem cells are used to restore damaged tissues, and growth factor therapy stimulates regeneration and accelerates healing. Another promising method for replacing damaged areas is 3D bioprinting of tissues for wound closure [4, 7].

Thus, the application of modern methods of surgical wound treatment in veterinary medicine significantly improves the prognosis for animals, shortens rehabilitation time, and reduces infection risks. Traditional methods remain the foundation of treatment, but innovative technologies such as biomaterials, laser surgery, and regenerative medicine open new opportunities in veterinary surgery. Further research in this area can enhance the effectiveness and accessibility of innovative methods.

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**ANALYSIS OF THE EFFECTIVENESS OF TAX REFORM IN UKRAINE: IMPACT ON THE DEVELOPMENT OF THE AGRO-INDUSTRIAL COMPLEX**

*У статті представлено детальний аналіз податкової реформи в Україні. Дослідження визначає останні зміни в податковій системі в умовах воєнного стану. Окреслено вплив податкової реформи на розвиток агропромислового комплексу. Важливим є подальше вдосконалення сучасного податкового законодавства з урахуванням потреб аграрного сектору.*

**Ключові слова:** аграрний сектор, агропромисловий комплекс, податки, податкова реформа, податкове законодавство.

*This paper presents a detailed analysis of tax reform in Ukraine. The study identifies recent changes in the tax system under martial law conditions. The impact of tax reform on the development of the agro-industrial complex is outlined. It is essential to further improve modern tax legislation, considering the needs of the agricultural sector.*

**Keywords:** agricultural sector, agro-industrial complex, taxes, tax reform, tax legislation.

Over the past few years, Ukraine has been gradually implementing tax reform, which has become a necessity under martial law conditions. In fact, the reform of the tax system has been ongoing since the country gained independence in 1991 and began its independent development. Over more than 33 years of independence, new needs for improving the tax system have continuously arisen, considering current challenges and issues. The modern tax reform is directly related to the problems caused by the full-scale war. The introduction of changes to the tax system inevitably affects the national economy, including the development of the agro-industrial complex. Given the crucial role of the agricultural sector in Ukraine's economic development under the difficult conditions of full-scale war, it is essential to assess the effectiveness of tax reform in terms of its impact on the agro-industrial sector and its growth.

It should be emphasized that tax regulation of the agro-industrial sector has several distinctive features. In this context, tax reform aims to ensure a high level of food security for the state, fill the domestic market with affordable and high-quality food products, and create sufficient competitive conditions for the sale of agricultural products in both domestic and foreign markets. Until January 1, 2017, an essential mechanism for stimulating the development of the agricultural sector was a special VAT taxation regime. However, after its cancellation, questions arose about how to tax enterprises operating in the agricultural sphere. Before the full-scale war, agricultural producers were subject to corporate income tax under general conditions at a rate of 18%, and they also paid value-added tax under the standard rules. Until 2021, certain export-related transaction-specifically, those involving soybean and rapeseed were temporarily exempt from VAT. Additionally, a simplified taxation system was introduced for specific categories of entrepreneurs [1].

It can be stated that despite the relative productivity of the agricultural sector's development before the full-scale war, tax reform during this period was not sufficiently effective, as the tax system in this context had numerous shortcomings. These shortcomings generally hindered the optimal development of the agricultural sector, despite its existing prospects and opportunities. Under martial law conditions, the issues in tax legislation persist, as the problems that existed before the war remain unresolved. Due to the full-scale war and its impact on the agricultural industry, these issues have only intensified, negatively affecting entrepreneurs. Since the introduction of martial law, several changes have been made to tax legislation [2; 3]:

- Providing entrepreneurs with the opportunity not to fulfill tax obligations, including the submission of necessary documents and tax payments, if they lack the required resources to do so. This applies particularly to businesses whose registered location is in temporarily occupied territories or active combat zones. Agricultural producers are also included in this provision;
- Implementation of a simplified taxation system, including the introduction of a single tax for the third group of individual entrepreneurs (FOP) at a rate of 2% of income. Some agricultural producers could also fall into this category. Additionally, all entrepreneurs were exempted from paying the unified social contribution (USC) for the duration of martial law;
- As of January 1, 2025, additional changes to tax legislation were introduced, including an increase in the military tax, the implementation of monthly reporting for personal income tax (PIT), a twofold increase in the minimum land tax, and a 14% increase in the minimum tax obligation for agricultural land, among other adjustments.

It is also worth noting that most agricultural producers today do not have favorable tax conditions, as their place of registration is not in the temporarily occupied territories (TOT) or in the combat zone. Despite the strategic importance of their activities to the Ukrainian economy, in most cases they pay taxes on a general basis, in particular, the simplified taxation system was abolished, in the context of which entrepreneurs had the opportunity to pay a single tax of 2%. New taxes have also been introduced and the size of existing ones has been increased. In the current conditions, the activities of agricultural producers are particularly difficult, and exports are not always effective, especially due to damage to port infrastructure and border blockades. Therefore, the current tax reform does not have a fully positive impact on the development of the agricultural sector.

Thus, in the current conditions, the implementation of tax reform does not create favorable conditions for the development of the agro-industrial complex. Currently, there are no effective taxes that would allow rationalizing the tax burden on agricultural producers, thereby enabling them to obtain greater profits. Also, there is currently no effective state support for the agricultural sector. Therefore, the tax reform requires further improvement.

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УДК 811.111

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### INTERNATIONAL COOPERATION AS A CATALYST FOR INNOVATION IN UKRAINIAN EDUCATION

*Розглянуто сучасні тенденції розвитку освітньої галузі в Україні в контексті міжнародного співробітництва. Досліджено роль міжнародних програм та проєктів у впровадженні інновацій в українську освіту, зокрема, цифровізацію, проєктне навчання та інклюзивну освіту. Охарактеризовано вплив міжнародної співпраці на підвищення якості освіти, розвиток академічної мобільності та залучення інвестицій в освітню інфраструктуру.*

**Ключові слова:** цифровізація, блокчейн, освіта, інклюзія, академічна мобільність.

*Current trends in the development of the education sector in Ukraine in the context of international cooperation are considered. The role of international programs and projects in introducing innovations in Ukrainian education, including digitalization, project-based learning, and inclusive education, is explored. The impact of international cooperation on improving the quality of education, developing academic mobility, and attracting investment in educational infrastructure is characterized.*

**Keywords:** digitalization, blockchain, education, inclusion, academic mobility.

The modern world is characterized by rapid changes, especially in education, where international cooperation is becoming an important factor in the development of educational systems. Faced with challenges, Ukrainian education has the opportunity to use international experience to implement innovations that will improve the quality of education. It is important to analyze international cooperation in Ukrainian education as a catalyst for innovation. Adapting to global changes requires the integration of international practices and new technologies. This study will help identify opportunities to improve the educational process and develop effective development strategies.

International cooperation in education includes interaction between countries, educational institutions, and organizations to share knowledge and technology. The main goals of this cooperation are to improve the quality of education, develop innovative approaches and cultural exchange. In Ukraine, international cooperation has deep roots, having begun after gaining independence in 1991. Active integration into the international educational space has included agreements with European countries and the United States, exchange programs such as Erasmus Mundus, and participation in projects such as Horizon 2020. The COVID-19 pandemic has accelerated adaptation to distance learning. The forms of international cooperation are diverse: academic exchanges, joint programs, and international projects. Conferences and seminars also facilitate the exchange of experience.

Thus, international cooperation in education contributes to the development of the educational sector in Ukraine and the integration of educational institutions into the global educational space, opening up new opportunities for students and teachers and improving the quality of education in the context of globalization. Innovations in education can be interpreted as new ideas, methods, technologies and approaches that are implemented to improve the educational process, increase the efficiency of learning and development of students. This includes the use of modern information technologies, interactive teaching methods, new forms of organizing the educational process, and the adaptation of educational programs to meet the needs of society and the labor market. Changes in pedagogical practices, the development of new courses and programs, and the introduction of assessment systems that better reflect students' knowledge and skills are also important components of innovation in education [1].

Current trends in Ukrainian education show the growing role of digitalization, including online courses, e-textbooks, and distance learning platforms. Inclusive education is becoming increasingly relevant as attention is being paid to the needs of all students, including children with special educational needs. Project-based learning, which promotes critical thinking, creativity, and teamwork, is gaining popularity. The interdisciplinary approach allows for the integration of knowledge from different subjects, forming a holistic worldview of students, while globalization opens up new horizons for cooperation with international educational institutions.

Ukrainian education faces challenges such as insufficient funding, which limits innovation, and unequal access to quality education between urban and rural schools. Innovations play a key role in improving the quality of education by enhancing student motivation through modern technologies and interactive methods. Individualization of learning takes into account the needs of each student, and new assessment methods help to adjust the learning process in real time. Innovations also prepare students for the modern labor market by developing critical thinking, creativity, and teamwork. Modern programs develop key competencies that allow students to adapt to changes in society. Thus, innovation is an important factor in the development of Ukrainian

education, opening up new opportunities for students and teachers and emphasizing the need for continuous improvement of the educational process [2].

International cooperation in education plays a key role in the implementation of innovations, ensuring the exchange of experience and knowledge between countries. This allows successful practices to be adapted to local conditions, in particular through participation in international conferences, seminars and trainings, which opens up access to new teaching methods, technologies and educational standards. In addition, international programs and projects often provide funding to help implement innovative ideas, including grants for research, development of new teaching materials, or modernization of educational infrastructure. This is especially important for countries with limited education budgets, such as Ukraine. An important aspect of international cooperation is the formation of a network of partnerships between educational institutions, research organizations, and businesses. This allows attracting specialists from different fields to develop innovative solutions in the field of education, and joint research and projects contribute to the integration of new technologies into the educational process. Several successful international projects have been implemented in Ukraine, which have become vivid examples of such cooperation.

Among the important projects in Ukrainian education is the E-School, initiated with the support of UNICEF, which introduces electronic learning materials and distance learning platforms, modernizing the educational process. The Global Goals program, implemented jointly with the Ministry of Education and Science of Ukraine, integrates the principles of sustainable development into the curriculum, promoting the development of critical thinking among students.

The Erasmus+ program supports exchanges between Ukrainian and European universities, improving the quality of education and international cooperation. The Inclusive Education for All project introduces inclusive practices in educational institutions. International partnerships greatly expand opportunities for Ukrainian educators and students, enhancing the professionalism of teachers and preparing students to work in a global environment. They also stimulate the reform of the educational system by introducing new standards and teaching methods. Participation in international projects attracts investment in education, which is critical for modernizing infrastructure and introducing new technologies.

The modern development of information technology opens up new horizons for improving the protection of information in accounting systems. In particular, the introduction of artificial intelligence and machine learning allows automating the processes of detecting and responding to threats. These technologies are able to analyze large amounts of data in real time, identifying anomalies that may indicate unauthorized access attempts or other threats. In addition, cryptographic methods continue to evolve, with new encryption algorithms emerging that increase the level of security. For example, quantum cryptography promises to revolutionize data protection by using the principles of quantum mechanics.

Blockchain technologies are also gaining popularity in accounting systems, as they ensure transparency and immutability of records, which can significantly reduce the risks of fraud and data manipulation. However, along with the development of the latest technologies, the number of threats related to information security is also growing. Cybercrime is becoming increasingly sophisticated, with attackers using a variety of attack methods, such as phishing, malware, and social engineering. Targeted attacks on specific organizations have become commonplace as cybercriminals use detailed information about their infrastructure [3].

In addition, the growth in the number of Internet of Things (IoT) devices creates new challenges for information protection, as many of these devices have security weaknesses. Threats from internal users are equally important: poor access policies and insufficient employee training can lead to accidental or intentional information leaks. New challenges in the field of information security can be expected in the near future.

Organizations will need to constantly adapt their security systems to new technologies and attack methods. Given the increase in data breaches, governments may introduce new laws and regulations that will require organizations to improve their information security. Automation of security processes will become an important element for effective threat management, which will

reduce the workload of IT professionals. Collaboration across sectors is also important, as organizations must work together to share information about threats and best practices [4].

The study confirms that protecting information in accounting systems is critical to ensuring the integrity, confidentiality, and availability of data. The introduction of the latest technologies, such as artificial intelligence, blockchain, and advanced cryptographic methods, can significantly improve security. However, the growth of cyber threats requires constant adaptation and improvement of security measures. Organizations should implement policies to regularly update software and security systems, train employees on threats and protection methods, and use multi-level authentication to reduce the risk of unauthorized access to sensitive data. Investing in threat monitoring and analysis systems will help to detect and respond to potential attacks in a timely manner, which is a key aspect in the modern world of information security.

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УДК 811.111

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#### THE NEGATIVE INFLUENCE OF AGRARIAN ACTIVITIES ON THE ENVIRONMENT (НЕГАТИВНИЙ НАСЛІДКИ ВІД СІЛЬСЬКОГО ГОСПОДАРСТВА ДЛЯ НАВКОЛИШНЬОГО СЕРЕДОВИЩА)

*У публікації на основі аналізу та порівняння наукових джерел описано негативний вплив рослинництва і тваринництва на навколишнє середовище; запропоновано превентивні заходи, що дозволять зменшити ризики сільськогосподарської діяльності на навколишнє середовище.*

**Ключові слова:** тваринництво, рослинництво, антибіотики, добрива, екологічні зв'язки, екологічна криза, превентивні заходи.

*The publication, based on the analysis and comparison of scientific sources, describes the negative impact of crop and animal production on the environment and proposes preventive measures to reduce the risks of agricultural activities on the environment.*

**Keywords:** animal husbandry, crop production, antibiotics, fertilizers, ecological connections, environmental catastrophe, preventive measures.

Animal husbandry and crop production are transitional areas of activity between the biotic (living component of the biosphere) and the abiotic (non-living component). From the former, they involve living organisms as objects of activity; from the latter, they incorporate various technological processes aimed at obtaining products from living beings and further transforming them into food and household items beneficial to humans. Their importance is unparalleled: the global population is growing exponentially, and to ensure high-quality food for a large number of people, the development of the agricultural sector will become a priority. To obtain a higher percentage of raw materials, producers use auxiliary means – antibiotics for animals and fertilizers for plants [1].

However, these profit-driven methods also have a negative side:

- Antibiotics accumulate in meat and later enter the consumer's body. Since these drugs have a non-specific effect, meaning they destroy all microorganisms without exception, not only pathogenic microflora disappear but also physiological microflora, which is essential for the proper functioning of the digestive, excretory, and immune systems. As a result, the human body becomes colonized by harmful microbiota that are resistant to antibiotics [2].

- Fertilizers, in turn, are not fully absorbed by the plant's root system and remain in the soil. The soil microflora is unable to break down such a large number of substances, leading to changes in soil characteristics, including disruptions in the water balance, alterations in pH levels, and fluctuations in microbiota composition. Additionally, an increased concentration of fertilizers blocks plants' free absorption of minerals due to their chemical binding.

Another danger to the environment is the destruction of ecological connections, as synanthropic animals and plants (those cultivated by humans) become competitors to their wild counterparts. For example, domestic cats hunt field rodents and birds, which could otherwise regulate the population of more dangerous pests capable of destroying crops and transmitting diseases to humans. Meanwhile, agricultural plants absorb water and mineral nutrients from the soil, leaving nothing for wild-growing species. This is not always beneficial, as wild plants can play a positive role by protecting the soil from degradation through their root systems or providing shelter for potential pollinators such as bees [3].

All these negative factors, according to scientists, may soon lead to an environmental catastrophe, raising the question of the very existence of life on Earth. To prevent the worst-case scenario, professionals in the fields of crop and livestock production must strictly adhere to the following measures:

- limiting the use of antibiotics;
- applying fertilizers based on soil microbiota;
- restricting the area for livestock grazing and the cultivation of agricultural plants;
- ensuring proper care for domestic animals to reduce their hunting of other species [4].

In conclusion, it can be stated that agriculture has a significant negative impact on the environment. However, we must learn to implement preventive measures to mitigate this negative effect.

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## THE ROLE OF BUSINESS ENGLISH IN EFFECTIVE LEADERSHIP COMMUNICATION

*Розглянуто роль ділової англійської мови в ефективній комунікації лідерів. Визначено основні аспекти мовних навичок, що впливають на управлінську діяльність, зокрема усне та письмове спілкування, міжкультурну комунікацію та адаптацію до цифрових середовищ. Аналізуються виклики, з якими стикаються керівники, що не є носіями англійської мови, а також надаються стратегії для покращення рівня володіння мовою.*

**Ключові слова:** професійна англійська, лідерська комунікація, управління, міжнародний, цифрові технології, мовні бар'єри, штучний інтелект.

*The role of business English in effective leadership communication is examined. The key aspects of language skills influencing managerial activities are identified, including oral and written communication, intercultural communication, and adaptation to digital environments. The challenges faced by non-native English-speaking leaders are analyzed, and strategies for improving language proficiency are provided.*

**Keywords:** business English, leadership communication, management, international, digital technologies, language barriers, artificial intelligence.

In today's interconnected global economy, proficiency in Business English has become a cornerstone for effective leadership communication. As the "lingua franca" of international business, English enables leaders to navigate cross-cultural interactions, articulate strategies clearly, and build robust professional relationships. Moreover, as remote work and virtual collaboration continue to rise, Business English proficiency has become even more crucial in ensuring clarity in digital communication channels such as emails, video conferences, and instant messaging [1].

Effective leadership hinges on clear and concise communication. Leaders proficient in Business English can convey their vision, strategies, and goals to a diverse workforce, ensuring alignment and fostering collaboration. This proficiency is particularly vital in multinational corporations, where English serves as a common ground among professionals from varied linguistic backgrounds. Mastery of Business English enhances a leader's ability to engage in negotiations, manage international teams, and participate in global conferences, thereby broadening their influence and effectiveness[2].

Additionally, effective leadership communication extends beyond verbal and written interactions. The ability to understand and interpret non-verbal cues, such as tone, body language, and cultural subtleties, plays a crucial role in fostering trust and credibility. Leaders who develop a strong command of English along with an awareness of these nuances can build stronger relationships with stakeholders across different regions [1].

To harness the full potential of Business English, leaders should focus on several key areas:

Speaking and Presentation Skills	Engaging in public speaking workshops or joining organizations like Toastmasters can help leaders refine their ability to articulate ideas confidently and persuasively.
Business Writing and Email Communication	Crafting clear and professional emails, reports, and presentations is essential. Leaders might consider enrolling in specialized Business English courses that emphasize writing skills tailored to business contexts.



Cultural Intelligence	Understanding cultural nuances and etiquette enhances cross-cultural communication. Leaders can benefit from cultural competence training to navigate diverse business environments effectively.
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Source: compiled by the author based on [1], [2], [3]

Non-native English-speaking leaders may face challenges such as language barriers, cultural misunderstandings, and confidence issues when communicating in global settings. To overcome these obstacles, continuous learning and deliberate practice are crucial. Some key strategies include:

- Using language learning platforms (e.g., Duolingo, Babbel, or specialized business English courses).
- Engaging with native speakers through professional networks, mentorship programs, or language exchange initiatives.
- Watching business-related content (TED Talks, leadership podcasts, and business news reports) to familiarize themselves with business jargon and communication styles.
- Encouraging an inclusive workplace culture, where linguistic diversity is embraced, and employees are supported in their language development/

Additionally, AI-powered language tools like Grammarly, DeepL, and real-time translation apps can assist leaders in refining their business communication, making interactions more precise and impactful [3].

Mastering Business English is not merely about language acquisition; it's a strategic leadership imperative for those aiming to excel in today's global business environment. By investing in language proficiency, cultural intelligence, and digital communication adaptability, leaders can enhance their communication effectiveness, build stronger international relationships, and drive organizational success in a rapidly evolving marketplace. In essence, fluent and articulate communication in English empowers leaders to inspire their teams, negotiate confidently, and navigate the complexities of global business with ease [1].

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УДК 811.111

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### **АКТИВІЗАЦІЇ ПРОЦЕСІВ ОСВІТНЬО-ЄВРОПЕЙСЬКОЇ ІНТЕГРАЦІЇ УКРАЇНИ ТА РОЗВИТОК КОМУНІКАТИВНИХ ЗДІБНОСТЕЙ ЗДОБУВАЧІВ ВИЩОЇ ОСВІТИ НЕМОВНИХ ВУЗІВ**

*У статті розглядається активізація освітньо-європейської інтеграції в умовах сьогодення на основі законів України про вивчення іноземної мови. Стаття досліджує питання розвитку комунікативних здібностей здобувачів вищої освіти немовних ВНЗ, що сприяє їх професійній діяльності.*

**Ключові слова:** освітньо-європейської інтеграція, розвиток комунікативних здібностей, немовні ВНЗ, професійна діяльність.

*The article examines the activation of educational-European integration in the current conditions based on the Ukrainian laws about the study of foreign language. The article examines the issue of developing communicative skills of higher education students in non-language universities that contributes to their professional activity.*

**Keywords:** educational-European integration, development of communicative skills, non-language universities, professional activity.

Інтеграція нашої країни у Європу вимагає інноваційних підходів до навчання мов з метою оптимізації навчального процесу. Входження України в європейське співтовариство передбачає її інтеграцію у спільний економічний, політичний, культурний, освітній і науковий простір. Вже багато років Європа живе під знаком Болонського процесу, спрямованого на формування загальноєвропейської системи вищої освіти і наукових досліджень, тому формування спільного освітнього простору набуває все більше реальних обрисів. Здійснюються спеціальні європейські проекти і програми («Лінгва», «Еразмус», «ТЕМПУС» та інші [3, с. 78]), їх мета, з одного боку, – це обмін знаннями, методами навчання й виховання, а з іншого – формування спільних поглядів на картину світу, його існування й перетворення.

У Болонській та Сорбонській деклараціях багато спільного. По перше, це загальна мета (а саме, створення загальноєвропейського простору вищої освіти), а також підходи, які мають всі підґрунтя для інтеграції зусиль навчальних закладів і міністерств. Серед проектів найдоступнішими є такі: «Допомога різним країнам та членам ЄС в оновленні вищої освіти», «Вища освіта для демократичного суспільства», «Побудова університету завтрашнього дня: політика та практика вищої освіти в Європі», новий закон «Про Вищу освіту» [1]. Метою навчання іноземній мові у немовних ВНЗ України є оволодіння іноземною мовою як засобом комунікації для успішного виконання подальшої професійної діяльності.

Так 27 червня 2024 року набув чинності Закон «Про застосування англійської мови в Україні». Метою цього Закону є сприяння забезпеченню застосування англійської мови як однієї з мов міжнародного спілкування на всій території України у публічних сферах суспільного життя, визначених цим Законом [2]. Цей закон прагне до активізації процесів європейської та євроатлантичної інтеграції України, утвердження міжнародного іміджу держави у світових глобалізаційних процесах, підвищення рівня її конкурентоспроможності, інвестиційної та туристичної привабливості.

Розвиток комунікативних здібностей передбачає: розвиток міжособистісних стосунків у професійній сфері; опанування технологій конструктивного діалогу; вміння говорити і слухати, встановлювати зворотний зв'язок у процесі спілкування, спілкуватися за допомогою невербальної комунікації тощо.

Здобувачі вищої освіти на початковому етапі вивчення іноземної мови мають занижений рівень розвитку слухового диференційного відчуття, що порушує сприйняття звукового образу слів. Половина здобувачів вищої освіти немовних ВНЗ не вміють визначити лексичний матеріал під час побудови власних висловлювань, не вміє наводити асоціації у словесних парах тематично пов'язаних слів. В результаті відбувається невміння висловити потрібну кількість фактів, говорити грамотно та логічно, швидко розпочинати розмову або розвивати дискусійний діалог. Розвиток комунікативних здібностей здобувачів вищої освіти при навчанні читання фахових текстів буде реалізований комплексом вправ, у якому будуть враховані індивідуально-особистісні особливості здобувачів вищої освіти, що допоможе оволодіти певним обсягом професійно-орієнтованої іншомовної інформації, яка необхідна здобувачу немовного ВНЗ, а також покращити швидкість та якість її вивчення для подальшого використання.

Отже сучасна лінгвістика характеризується тенденцією до розгляду реального комунікативного аспекту, що стало основною передумовою формування новітніх напрямів мовознавства – когнітивної лінгвістики та прагмалінгвістики. Мотивацією для вивчення іноземної мови є професійна потреба стати високо-кваліфікованим фахівцем, який вміє спілкуватися іноземною мовою та здійснювати обмін інформацією у сфері ділового та професійного співробітництва.

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УДК 811.111

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#### PROBLEMS ENCOUNTERED BY STUDENTS IN LISTENING

*One of the most important skills for communicating in real life is the ability to listen. It is becoming increasingly vital to develop when studying a foreign language. Everyone understands that hearing a message is not the same as listening to it, listeners must comprehend the message and respond appropriately. The study finds the difficulties of the first year English majors in listening abilities. Background knowledge, length and speed of the text, unfamiliar vocabulary, and different accent are the major listening comprehension difficulties. Basing on these difficulties, English learners can find out suitable learning ways to improve their listening skill. It may also be useful for those who are interested in this field.*

*Однією з найважливіших навичок спілкування в реальному житті є вміння слухати. Розвиватися під час вивчення іноземної мови стає все більш життєво важливим. Кожен розуміє, що почути повідомлення – це не те ж саме, що його прослухати, слухачі повинні зрозуміти повідомлення і правильно відреагувати. Дослідження виявило труднощі першого року навчання англійської мови в навичках аудіювання. Базові знання, довжина та швидкість тексту, незнайома лексика та різний акцент є основними труднощами розуміння на слух. Грунтуючись на цих труднощах, ті, хто вивчає англійську, можуть знайти відповідні способи навчання, щоб покращити свої навички аудіювання. Це також може бути корисним для тих, хто цікавиться цією сферою.*

Listening is the most fundamental of the four language skills. Learners can be exposed to a lot of authentic input through listening, and if the input is comprehensible, it would lead to improvement of other areas of language such as pronunciation, speaking and even reading and writing (Anderson and Lynch: 1988). It is widely recognized today that listening is an active skill, or rather, a cluster of various sub-skills, which are both learnable and teachable. Listening is regarded as an essential element of foreign language proficiency, and plays an important role in foreign language programs. Listening is an important part of daily life. People listen for a variety of reasons, including studying, enjoyment, working, and so on. Due to the complex and intricate nature of listening comprehension in a second or foreign

language, listening is said to be the most difficult of the four language skills that all language learners are expected to acquire.

### **Problems encountered by students in listening.**

**Background knowledge** Lack of background knowledge is an obstacle during the learning process. Buck (2001) describes background knowledge as general non-linguistic knowledge about the world we live in and how things work within it including knowledge of the target culture, knowledge of current affairs, arts, politics and literature. Therefore, students need to prepare the listening materials based on topics which are political issue, business report, daily conversation and etc. Moreover, Anderson and Lynch (2000) state that lack of social - cultural, factual and contextual knowledge of the target language can also present an obstacle to comprehension because language is used to express culture. Even if listeners can understand the surface meaning of the text, they may have considerable difficulties in comprehending the whole meaning of the passage unless they are familiar with the context. Nonverbal clues such as facial expressions, nods, gestures, or tone of voice can also be easily misinterpreted by listeners from different culture. To conclude, the learner's background is an outstanding agent in listening comprehension. Having background knowledge is a key feature to the successful understanding of any kind of listening materials.

### **Length and speed of listening.**

When students listen to long parts and keep all information in their minds, their level can play a big impact. Lower-level students find it challenging to listen for more than three minutes. Learners will have an easier time understanding short listening passages and will be less tired. Moreover, there are some barriers to effective listening comprehension process. First, listeners cannot control the speed of speech. The biggest problem with listening comprehension is that listeners are not able to control how quickly speakers talk. Second, listeners cannot have words repeated and this can cause critical difficulties for them. Students cannot replay a recording section. Teachers decide what and when to repeat listening texts and it is very difficult for teachers to know whether or not their learners understood what they have heard. Third, listeners do not have a wide vocabulary. Speakers may choose words that are unfamiliar to the listener. Fourth, listeners may lack contextual knowledge. Listeners may find it easier to communicate if they have mutual knowledge and are familiar with the texts. Finally, it is not very easy for listeners to concentrate on the listening text. Sometimes a shortest break in attention can prevent comprehension. If the listening passage is interesting for listeners, concentration will be easy for them.

### **Unfamiliar vocabulary.**

Sometimes learners make mistakes when listening text has much specialized terminology vocabulary. Specialized terminology vocabulary is some words specialized for particular areas. If learners do not have rich and plentiful vocabulary, they will be confused when listening. In reality, the speakers may use synonyms, antonyms to explain the word. Underwood (1989) points that, for students listening to a foreign language, it is certain that they cannot know all words in the speech like mother tongue. Therefore, when they hear an unknown word which can be like a suddenly dropped barrier, they may stop and think about the meaning of word. Also it is quite easy for students to recognize familiar words in listening texts. When students understand the meaning of words, it can increase their interest and motivation, as well as improve their listening comprehension. Many words have several meanings, and if they are not used correctly in their proper situations, students will become confused.

### **Different accent.**

Listeners have tendency to get familiar with the accents which they mostly listen. If listeners are exposed to standard British or American, they will be faced problems in understanding other accents. All of us know that many countries speak English, such as British English, American English, Australian English, Japanese English and so on. Therefore, learners find it hard to distinguish which words the speakers are mentioning when listening to a new accent for the first time. In addition, Buck (2001) indicates that when listeners hear an unfamiliar accent, such as

Indian English for the first time after studying only American English, they will encounter essential difficulties in listening. That causes students confused in learning English listening. Too many accented speeches can lead to an important reduction in comprehension. Also 66% of listeners referred speakers' accents as one of the most important factors that impact on listening comprehension Goh (1999). Unfamiliar accents of both native and non-native can cause serious problems in listening comprehension. This will interrupt the whole listening comprehension process and at the same time an unfamiliar accent makes comprehension impossible for listeners.

In the future, other researchers should be done widely English majored and English non-majored. From there, teachers can find out appropriate teaching methods and listening becomes more interesting to students.

As a matter of the research, listening is extremely important not only in language learning but also in daily communication. Background knowledge, poor vocabulary, the length of the spoken text, the rate of speech, and a strange of accents were all issues that students face when learning listening skill.

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- УДК 338.2:346.7

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#### GREEN ECONOMY AND ROLE IN FORMING MODERN ECONOMIC LAW (ЗЕЛЕНА ЕКОНОМІКА ТА ЇЇ РОЛЬ У ФОРМУВАННІ СУЧАСНОГО ГОСПОДАРСЬКОГО ПРАВА)

*Розглянуто концепцію зеленої економіки та її вплив на формування сучасного господарського права. Проаналізовано екологічні стандарти, екологічне підприємництво та правові механізми стимулювання сталого розвитку. Визначено ключові напрями адаптації господарського законодавства до викликів екологізації економічної діяльності.*

**Ключові слова:** зелена економіка, господарське право, екологічна відповідальність, правове регулювання.

*The concept of green economy and its influence on the formation of modern economic law are considered. Environmental standards, ecological entrepreneurship and legal mechanisms for stimulating sustainable development are analyzed. Key areas of adaptation of economic legislation to the challenges of greening economic activity are identified.*

**Keywords:** green economy, economic law, environmental responsibility, legal regulation.

Green economy is a trend in economic science that has emerged over the past two decades, which views the economy as dependent on the natural environment in which it exists, and as a part of this environment.

The concept of a green economy includes ideas from many other areas of economic science and philosophy, such as feminist economics, postmodernism, resource-based economics, ecological economics, environmental economics, anti-globalization, and international relations theory.

Schematically, the features of this economy can be summarized as follows:

- use of renewable resources;
- closed cycles of resource use;
- material components in harmony with the ecosystem;
- stable industrial metabolism;
- dematerialization of metabolism;
- effective energy storage;
- a regime of constant self-optimization of technical systems;
- a regime of constant self-improvement of socio-economic systems;
- not exceeding ecological thresholds;
- preservation of biodiversity and ecosystems;
- priority of reproduction of human individuality.

The theory of green economy is based on three axioms:

- It is impossible to expand the sphere of influence infinitely in a limited space.
- It is impossible to demand satisfaction of an infinitely growing range of needs within the framework of limited resources.
- Everything on the surface of the Earth is interconnected [1].

Environmental pollution in developed countries, including the impact of energy production on the environment, attracts special attention from both the public and government authorities. More and more countries are subsidizing their citizens to purchase electric cars, switch to solar panels, or refuse to operate or build thermal power plants. Energy consumption is associated with all types of human economic activity, including heating homes, cooking, driving a car, industrial and agricultural production.

The situation in Ukraine is completely different. While other parts of the world are abandoning thermal power plants, Ukraine is increasing purchases of coal for thermal power plants. The combustion of fossil solid and liquid fuels leads to emissions of pollutants such as sulfur dioxide, carbon dioxide and carbon monoxide, as well as nitrogen oxides, dust and soot. Open-pit coal mining and peat extraction change and sometimes destroy natural landscapes. Spills during the extraction and transportation of oil and petroleum products can destroy all life on vast territories [2].

Green economy is an important element for the development of economic law, since its principles directly affect the regulation of economic activity. It contributes to the formation of new legal norms and mechanisms that encourage environmentally friendly economic activity. One of the important aspects is the introduction of environmental standards for economic activity, which requires a revision of traditional approaches to legal regulation. Commercial law is gradually adapting to the need to establish requirements for the rational use of natural resources, reduce the negative impact of production on the environment and introduce environmental innovations.

The green economy stimulates the emergence of new forms of entrepreneurial activity focused on environmental responsibility. This has created a need for special legal regulation of ecological entrepreneurship, in particular in defining legal mechanisms to support businesses that use renewable resources, reduce environmental pollution and develop a circular economy. Against this background, commercial law is changing and includes new legal instruments, such as tax breaks for environmentally responsible businesses, environmental certificates and licenses, greenhouse gas emission quotas.

The development of commercial law under the influence of the green economy is reflected in the positive development of contractual regulation of environmentally oriented activities. New types of contracts have appeared that provide for responsibility for compliance with environmental

standards, restrictions on the use of environmentally unfriendly technologies, obligations for waste disposal, etc. Therefore, there is a need to improve the legislation regulating the environmental aspects of economic activity, provide legal certainty for companies and stimulate the development of "green" business [3,4].

As a result, the green economy forces to change economic legislation and adapt to new challenges. Among them are the introduction of mechanisms of legal liability for violations of environmental standards, the formation of new principles of state control over compliance with environmental legislation, and the strengthening of public-private cooperation in the field of sustainable development.

Thus, the green economy is a powerful driver of change in economic law and contributes to adaptation to modern environmental challenges. Its principles influence the development of new legal norms, regulatory mechanisms and tools to encourage environmentally friendly business practices. The implementation of environmental standards, the development of "green" entrepreneurship and the improvement of contractual regulation are key areas of these changes. As a result, the green economy is a prerequisite for a balanced legal system that not only ensures sustainable economic development, but also harmonizes the economic and environmental interests of society.

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УДК 796

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### ВПЛИВ СОЦІАЛЬНОГО ОТОЧЕННЯ НА РУХОВУ АКТИВНІСТЬ ЗДОБУВАЧА ВИЩОЇ ОСВІТИ

*У цій статті розглядається соціальний вплив батьків та друзів здобувачів вищої освіти на фізичну активність. Фізична активність студентів з великою ймовірністю залежить від прикладу та підтримки батьків та друзів. Студент стає цілеспрямованим, мотивованим, йому легше долати перешкоди на шляху до фізичної активності.*

**Ключові слова:** здобувачі вищої освіти, рухова активність.

Фізична робота є природною потребою організму. Нормальна життєдіяльність серцево-судинної, дихальної, ендокринної систем, тканин організму можлива лише за певної організації різноманітного фізичного навантаження. [1]

Як показали дослідження, сумарна рухова активність студентів у період навчальних занять складає 56-65%, а під час іспитів ще менше – 39-46% від її рівня, коли на канікулах. А саме рівень фізичного навантаження під час канікул відображає природну потребу молодих людей у рухах. Тобто в наявності дефіцит рухів у більшості студентів протягом 80% часу

навчального року. Надзвичайно високі фізичні навантаження у студентів, орієнтованих на високий рівень спортивних досягнень, вони виконують на день до 38 тисяч локомоцій. [1,2]

Важливе соціальне завдання полягає у визначенні оптимального рівня рухової активності студентів. Мінімальні межі повинні характеризувати той рівень рухів, який необхідний збереження нормального функціонального стану організму. Йдеться про руховий режим гімнастичного характеру.

Оптимальні межі визначають рівень фізичної активності, при якому досягається найкращий функціональний стан організму, високий рівень виконання трудової та суспільної діяльності. Максимальні межі повинні застерігати від надмірно високого рівня фізичних навантажень, який може призвести до перевтоми, перетренування, різкого зниження працездатності, одностороннього розвитку особистості. Цілком природньо, що ця межа обумовлена вимогами різних видів спорту, рівнем тренуваності та ще багатьма факторами.

Наші дослідження переконливо показали, що надмірно високі рухові навантаження не забезпечують повноцінного відновлення рухової активності, у тому числі й високо тренуваних студентів - спортсменів. Ефект понад відновлення спостерігається при оптимальних навантаженнях, які відповідають рівням фізичної підготовленості. Нейтральні за впливом малі м'язові зусилля.

Коріння багатьох серйозних захворювань, що обмежують життєдіяльність людини, сучасна медицина пов'язує з недостатньою фізичною активністю, яка особливо низька у більшості представників розумової праці. Так, у педагогів вузів та вчителів шкіл вона становить у середньому за день 2,1-4,3 тисячі кроків .

Багато вітчизняних та зарубіжних авторів науково обґрунтували норми рухової активності сучасно людини – 10-14 тисяч кроків на день (7-10км.). До такої норми навіть до половини її не дотягує більше половини студентів. Вимірювання показують, що суб'єктивна оцінка подоланого за день маршруту майже вдвічі перевищує реальну. Перевірити це можливо за допомогою крокоміра.

Соціальний вплив є одним із факторів, пов'язаних з фізичною активністю молоді, і характеризується впливом батьків, друзів та родичів на фізичну активність. Цей вплив може відбуватися як безпосередньо через соціальну підтримку, так і побічно через моделювання поведінки [2].

Моделювання людської поведінки є однією з побудов теорії соціального навчання і передбачає, що поведінка формується і модифікується в результаті спостереження за поведінкою та навчання соціально значущих людей [3]. Це означає, що фізична активність батьків та друзів є зразком для заняття спортом студентів. Як наслідок, молоді люди, батьки та друзі яких регулярно займаються спортом, з більшою імовірністю будуть активнішими. Батьки та друзі можуть виявляти різні способи соціальної підтримки (заохочуючи, стимулюючи, коментуючи, спостерігаючи, практикуючи разом), що сприятливо впливає на практику заняття спортом у молоді. Понад те, підтримка близьких може надавати опосередкований вплив, підвищуючи сприйняття своєї ефективності. Отже, дуже важливо дослідити механізми, за допомогою яких батьки та друзі можуть впливати на фізичну активність студентів. Це важливо для розробки більш ефективних заходів щодо підвищення рівня фізичного навантаження молодого покоління [4].

Анкетування з питань фізичної діяльності проводилось за допомогою раніше протестованого запитальника. Студенти повідомляли про частоту (дні на тиждень) помірних та інтенсивних фізичних навантажень, що виконуються протягом 7 днів. Рівень фізичної активності визначався підрахунком кількості тренувань на тиждень. Студенти були класифіковані відповідно до рекомендацій Всесвітньої організації охорони здоров'я – фізично активними вважалися ті, хто повідомляв про фізичну активність  $\geq 3$  дні на тиждень [3].

Соціальний вплив характеризувався двома показниками: практика фізичної активності та соціальна підтримка з боку батьків та друзів. Фізична активність батька, матері та друзів оцінювалася питанням: «Протягом звичайного тижня, скільки днів ви займаєтесь фізичними



вправами? Студенти повідомляли, чи їх близькі надають будь-яку соціальну підтримку (стимулювання, спільна практика, спостереження, запрошення, коментування практики, надання транспорту) протягом типового тижня.

Фізичне навантаження друзів безпосередньо і достовірно пов'язане з рівнем фізичної активності студентів обох статей. Так само рівень заняття спортом батьків мав прямий зв'язок із фізичною активністю молодих людей. Таким чином, якщо у студента поганий настрій, апатія, втома після навчання, проблеми в особистому житті, то підтримка друзів та батьків практично завжди стимулювала на заняття фізичними вправами, збільшувалося бажання самовдосконалюватись та розвиватися.

Результати цього дослідження показали, що батьки та друзі надають соціальний вплив на рівень фізичної активності студентів як за допомогою моделювання поведінки, так і шляхом надання моральної підтримки. У цьому досвіді було помічено, що молоді люди, у яких близькі люди частіше займалися спортом, мали вищий рівень фізичної активності. Молоді люди у віці 17–21 років с більш покладаються на друзів. Соціальна підтримка батьків і друзів була прямо, позитивно і достовірно пов'язана з рівнем фізичної активності серед студентів. Тобто чим частіше друзі та батьки підтримували, підбадьорювали, хвалили тощо, тим швидше у молодих людей підвищувався настрій та бажання займатися спортом.

Робимо висновок, що батьки та друзі мають соціальний вплив на фізичну активність студентів. Активні в спорті батьки та друзі, крім того, що є прикладом для наслідування, також зазвичай надають велику соціальну підтримку. Нарешті, велика підтримка з боку родичів і друзів була пов'язана з підвищеним рівнем самооцінки. Як наслідок, збільшувалося бажання займатися спортом з великою старанністю. Для підвищення інтересу до спорту студентів та стимулювання їх до фізичного навантаження, слід залучати батьків та друзів до занять фізичною культурою та спортом, до сприяння та створення можливостей для спільної практики, освіти щодо важливості їх соціальної підтримки для фізичної активності студентів та рекомендації щодо надання різних форм.

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УДК 811.111

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#### **THE BASICS OF FORMATION AND MANAGEMENT OF AN INVESTMENT PORTFOLIO**

*У роботі розглядається процес формування та управління інвестиційним портфелем, який є важливою складовою фінансового планування. Описано основні етапи цього процесу, зокрема визначення мети інвестування, оцінка ризиків, диверсифікація активів, вибір інвестиційних інструментів та регулярне ребалансування портфеля. Також*

звернуто увагу на різні типи інвестиційних портфелів, такі як консервативний, агресивний, збалансований та спеціалізований, кожен з яких має свої переваги та рівень ризику. Акцентує важливість постійного моніторингу та коригування портфеля для досягнення фінансових цілей та мінімізації потенційних ризиків в умовах змінюваного ринку.

**Ключові слова:** диверсифікація, ризики, доходність, стратегії інвестування, типи портфелів, фінансові цілі.

*The paper examines the process of forming and managing an investment portfolio, which is an important component of financial planning. The main stages of this process are described, in particular, determining the investment goal, assessing risks, diversifying assets, choosing investment instruments and regularly rebalancing the portfolio. Attention is also paid to different types of investment portfolios, such as conservative, aggressive, balanced and specialized, each of which has its own advantages and level of risk. It emphasizes the importance of constant monitoring and adjustment of the portfolio to achieve financial goals and minimize potential risks in a changing market.*

**Keywords:** diversification, risks, profitability, investment strategies, types of portfolios, financial goals.

Investment portfolio is one of the key components of financial planning and capital management in a market economy. It is a set of financial assets, such as stocks, bonds, real estate, or other instruments, that an investor selects to achieve the optimal balance between risk and return. Proper portfolio formation and management help reduce risks, ensure stable income, and achieve financial goals.

An investment portfolio consists of assets owned by individuals or legal entities and is used to achieve specific financial objectives. The main tasks of a portfolio may include: capital accumulation – focused on maximizing asset value by a certain time; income generation – aimed at ensuring regular passive income from investments; savings preservation with minimal risk – designed to protect funds with minimal financial losses, where profitability is a secondary concern [1].

Investment goals determine the portfolio formation strategy. Capital protection is suitable for those who aim to preserve funds while avoiding risks. Capital growth focuses on high returns but involves significant fluctuations. Regular income ensures stable payments through dividends or bonds. Medium-term goals combine different approaches, considering investment horizons and risk levels. The choice of investment portfolio type depends on the defined goals, as each type has its own advantages and level of risk. Investment portfolio types include [2]:

1. Conservative portfolio – a portfolio focused on capital preservation and stable income. It minimizes risks, but its profitability is usually lower than the market average. Composition: stocks of stable companies, low-volatility funds, bonds, gold, and cash. A conservative portfolio is suitable for those who want to avoid significant financial fluctuations. It is a good choice for long-term investing when the priority is preserving funds rather than maximizing profits;

2. Aggressive portfolio – an option for investors willing to take risks for high returns. The main assets include stocks of fast-growing companies, startups, cryptocurrencies, and active investment funds. The profitability of such a portfolio is potentially higher than the market average, but it also comes with increased volatility. This portfolio is suitable for experienced investors with a high risk tolerance;

3. Balanced portfolio – a compromise between stability and potential growth. It combines elements of both conservative and aggressive strategies, allowing for risk reduction while maintaining stable returns. A balanced portfolio is ideal for investors who seek steady income but are not afraid of moderate risk. The key is to maintain a balance between different asset types, avoiding overexposure to either high-risk or overly conservative investments;

4. Specialized portfolio – involves concentrating investments in a specific industry. This could include stocks of companies in a particular economic sector or thematic investment funds. For example, one might invest solely in technology companies or healthcare enterprises. The risk level depends on the chosen sector: the tech industry is more volatile than, for instance, healthcare. Such a portfolio requires in-depth market analysis and continuous monitoring. It is suitable for investors who have expertise in a particular field and are willing to actively manage their investments.

Tetiana Yermolenko writes about how to start investing in Ukraine and build a personal investment portfolio. She highlights the key stages of this process that help achieve success in investing. How to start investing [3]:

Step 1: Define your investment goal. A clear goal is the foundation for successful investing. Determine whether you want to save for education, retirement, or other purposes. This will help maintain motivation and avoid impulsive decisions;

Step 2: Assess your risks. Understand how much you are willing to lose for the sake of high returns. High returns always come with high risks. If you are not ready to take risks, choose more stable assets;

Step 3: Diversify your assets. Spread your investments across different asset types. This helps reduce risks and increase the chances of stable income;

Step 4: Choose assets for investment. After assessing your goals and risks, select specific assets: stocks, bonds, real estate, cryptocurrencies, etc. Each asset has its own characteristics and risks;

Step 5: Rebalance your portfolio. Regularly review and adjust your portfolio to ensure it aligns with your strategy and goals. The market is constantly changing, so it is important to maintain the right asset allocation;

Step 6: Continuously monitor and adjust. The investment process does not stop. It is essential to track the market and adjust your portfolio based on changes in economic conditions and your personal circumstances.

Building and managing an investment portfolio is a key step in achieving financial goals. Important aspects include clearly defining your objectives, assessing risks, diversifying assets, and regularly adjusting the portfolio according to market changes. Properly applying these steps allows investors to reduce risks, maintain a stable income, and achieve desired results in a market economy.

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УДК 811.111

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#### **BIOENERGY IN UKRAINE (БІОЕНЕРГЕТИКА В УКРАЇНІ)**

*У статті подана інформація про біоенергетику в Україні як вона розвивалася. Чому саме вона може покращити життя наших фермерів і не тільки. Перспективи її розвитку на рівні інших альтернативних джерел енергії. А також сучасні проблеми та перспективи*

використання біоенергетики в Україні. І чому саме біоенергетика може покращити життя аграрно-промислового комплексу України.

*The article presents information regarding the evolution of bioenergy in Ukraine. What enables you to enhance the lives of our farmers and beyond? Prospects for its advancement are comparable to other alternative energy sources. Current challenges and future potential for the advancement of bioenergy in Ukraine. And why Ukraine's industrial and agricultural complex may benefit from bioenergy itself.*

Bioenergy is a branch of energy production based on the use of biofuels derived from biomass. Biomass refers to biologically renewable organic substances that undergo biological decomposition, including agricultural (crop and livestock) waste, forestry residues, and waste from industries technologically linked to forestry, as well as the organic fraction of industrial and municipal waste.

For Ukraine, bioenergy represents one of the strategic directions for the development of the renewable energy sector, given the country's high dependence on imported energy resources—primarily natural gas—and the significant potential of biomass available for energy production. Unfortunately, the development of bioenergy in Ukraine still lags significantly behind European standards. As of today, biomass accounts for 1.78% of the country's total final energy consumption. Annually, Ukraine utilizes approximately 2 million tons of coal equivalent of biomass of various types for energy production. Wood accounts for the highest percentage of economically viable biomass utilization—80%, whereas other biomass types (except sunflower husks) have significantly lower utilization rates. The energy potential of cereal straw and rapeseed straw is the least exploited, at approximately 1%.

Ukraine harvests over 50 million tons of cereal crops annually, generating large volumes of straw and plant residues as by-products of agricultural production. The annual technically accessible energy potential of solid biomass in Ukraine is equivalent to 18 million tons of oil equivalent, and its utilization could save approximately 22 billion cubic meters of natural gas annually.

### **Energy Crops**

Certain types of trees and plants are cultivated specifically for solid biofuel production. These can be categorized into three main groups:

- Fast-growing trees;
- Perennial grasses (e.g., Miscanthus, switchgrass);
- Annual grasses (e.g., sorghum, triticale).

Additionally, energy crops include traditional agricultural crops grown for the production of biodiesel fuel (e.g., rapeseed, sunflower), bioethanol (e.g., corn, wheat), and biogas (e.g., corn). One application of biomass is its processing into liquid biofuels: biodiesel and bioethanol.

### **Biodiesel**

Biodiesel consists of methyl and/or ethyl esters of higher organic acids derived from vegetable oils or animal fats, used as biofuel or a bio-component in fuel blends.

### **Bioethanol**

Bioethanol is anhydrous ethyl alcohol produced from biomass or raw ethyl alcohol for use as biofuel. Ukraine possesses the necessary conditions for liquid biofuel production, including sufficient land resources, plant potential, and existing production facilities. The current biomass potential in Ukraine is sufficient for cost-effective liquid biofuel production (bioethanol and biodiesel), making this sector highly promising. The annual technically achievable energy potential of liquid biofuels in Ukraine is equivalent to 1 million tons of oil equivalent, and its utilization could save approximately 1.2 billion cubic meters of natural gas annually.

Economic analysis indicates a global trend of increasing energy prices. Consequently, expanding the cultivated areas for rapeseed and organizing biodiesel production using advanced global technologies and equipment are among the country's priority strategic objectives in the

energy sector. Bioethanol production is mainly carried out at reconstructed distilleries. In recent years, fuel bioethanol production has been established at four distilleries, with plans to involve an additional eight facilities within the next three years. The use of liquid biofuels will help reduce greenhouse gas emissions and positively impact the reduction of petroleum imports.

### **Biogas**

Biogas is a gas derived from biomass and used as fuel. Energy production from biogas is environmentally friendly, as it does not result in additional CO<sub>2</sub> emissions and helps reduce organic waste volumes. Unlike wind and solar energy, biogas production is independent of climatic and weather conditions. Furthermore, unlike fossil energy sources, biogas in Ukraine has significant renewable potential. The annual theoretical potential of biogas in Ukraine is estimated at 3.2 billion cubic meters.

A highly effective method for supplementing and replacing traditional fuel and energy resources is the production and use of biogas, generated through the methane fermentation of livestock biomass. Biogas typically consists of 60-70% methane. Another biogas source is landfill waste at solid waste disposal sites.

Additionally, biogas can be sourced from wastewater. The treatment of municipal and industrial wastewater sludge addresses critical environmental, energy, and social challenges, particularly in metropolitan areas. Municipal and industrial wastewater sludge contains substantial amounts of organic matter.

Biogas derived from anaerobic biomass fermentation can substitute the following fuel types:

- Natural gas and liquefied gases used for industrial and domestic energy needs;
- Gasoline, diesel fuel, and kerosene in internal combustion engines.

The use of biogas enables the production of both thermal and electrical energy, which is particularly attractive for agricultural enterprises.

Moreover, landfills and solid waste disposal sites significantly impact the environment. The closure of landfills and the establishment of modern waste collection and utilization systems are essential measures for environmental sustainability.

The construction of biogas collection and utilization systems at municipal solid waste landfills has become a standard practice in developed countries around the world. In particular, in the United States, over 150 large landfills are used to generate thermal and electrical energy for industrial and residential purposes. The number of biogas plants in the country amounts to about 244 units, producing 4.3 billion cubic meters per year. In Germany, there are approximately 4,000 biogas plants (half of the global total). Each year, 280 plants generate biogas amounting to 3.7 million tons. According to expert forecasts, by 2020, Germany will have 20,000 biogas plants in operation.

### **Bioenergy Potential in Ukraine**

According to the Bioenergy Association of Ukraine, as of 2018, the potential energy from biomass in the country amounts to 23 million tons of conventional fuel. The main components of this potential are by-products of crop production (a total of 10 million tons of tce, or 44% of the total biomass potential) and energy crops (a total of 7.5 million tons of tce, or 32% of the total potential). By-products of crop production include straw from cereals and rapeseed, stalks of corn, sunflower, etc. Energy crops include willow, poplar, and miscanthus for solid biofuels, and corn for biogas. The biomass available in Ukraine is sufficient to replace all imports of gas, coal, and gasoline (as of 2018). According to the Energy Balance of Ukraine, the share of biofuels in the total supply of primary energy (TSPU) in 2018 amounted to 3.2 million tons of conventional fuel, which constitutes 3.4% of the TSPU.

#### **Current Issues and Prospects for the Use of Bioenergy in Ukraine**

Bioenergy in Ukraine is one of the important sectors of the energy industry, which has significant potential due to the vast volumes of agricultural and forestry waste, as well as favorable natural conditions for biogas and biofuel production.

### **Current Issues in Bioenergy in Ukraine**

- Low Infrastructure Development

One of the main challenges is the insufficient development of infrastructure for the production and use of bioenergy resources. Most bioenergy stations in Ukraine are small or medium-sized enterprises, which prevents the efficient utilization of biomass potential. Ukraine lacks a unified biomass collection and processing system, which significantly hinders the development of this sector.

- Low Level of Investment

Bioenergy requires large financial investments; however, the level of investment in this sector in Ukraine is currently insufficient. Insufficient state funding and investor mistrust towards infrastructure projects amid economic instability and war significantly limit the opportunities for bioenergy development. To attract investment, favorable conditions for business need to be created, including tax incentives and other stimuli.

- Legislative Inadequacy

The legislative framework regulating the development of bioenergy in Ukraine remains incomplete. Existing regulatory acts often do not meet the current needs of the sector and fail to promote its development. In particular, the presence of numerous bureaucratic barriers and the instability of the legal environment for investors create additional challenges for the development of bioenergy projects.

- High Technological Costs

The development of bioenergy technologies requires significant expenditures on research, implementation, and modernization of production facilities. Ukrainian enterprises often face the problem of high costs for purchasing modern equipment, which limits their ability to effectively use available biomass and achieve high efficiency levels.

- Untapped Waste

Ukraine has enormous potential for the production of bioenergy resources; however, a significant portion of agricultural and forestry waste remains unused or is simply destroyed. The lack of efficient collection, processing, and transportation schemes for biomass leads to large potential losses and negative environmental impacts.

- Prospects for Bioenergy Development in Ukraine. Reducing Dependence on Imported Energy Sources. Bioenergy can significantly reduce Ukraine's dependence on imported energy sources such as natural gas and oil. Thanks to abundant natural resources, the bioenergy sector is capable of replacing part of the imported energy, which will enhance the country's energy security and reduce vulnerability to fluctuations in global energy markets.

- Improving Environmental Situation

The use of biomass and biofuels for energy production contributes to reducing greenhouse gas emissions, which is an important step in the fight against climate change. Bioenergy helps mitigate the negative environmental impact, as CO<sub>2</sub> emissions from biomass combustion are almost entirely offset by the photosynthesis process of the plants from which this biomass is derived.

- Creation of New Jobs

The development of the bioenergy sector contributes to the creation of new jobs in agriculture, forestry, and processing industries. Ukrainian farmers can gain additional income from biomass production and processing, which also helps develop rural areas and reduce unemployment in rural regions.

- Utilization of Agricultural Waste

Ukraine has immense potential for utilizing agricultural waste for biofuel production. The high levels of agricultural crop production, such as wheat, corn, and sunflower, allow for a significant increase in the biomass that can be processed into biofuels or biogas. Additionally, the processing of agricultural waste helps reduce environmental pollution.

- Support for International Initiatives

Ukraine has the opportunity to take advantage of international support for bioenergy development. The European Union actively supports renewable energy programs, and Ukraine, as a candidate for EU membership, can benefit from funding and technological assistance in this area.

- **Technological Innovations**

The development of new technologies for the production of bioenergy resources, such as biogas and biodiesel, opens up new possibilities for increasing biomass utilization efficiency. The implementation of modern technologies, such as anaerobic digestion and gasification, will significantly enhance energy efficiency and reduce production costs for biofuels.

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## МОДЕЛІ КОНТРОЮ ЯКОСТІ ОСВІТНЬОГО ПРОЦЕСУ У ВИЩОМУ НАВЧАЛЬНОМУ ЗАКЛАДІ

*Based on the results of the research, the features of implementing the individual models of quality control of the educational process in higher educational institutions were studied, and the main principles and characteristics that should be taken into account when developing such a model for each individual institution of higher education were clarified.*

**Keywords:** *performance quality, quality control, educational process, evaluation criteria of education, management of the quality*

Якість у вищій освіті розглядається не лише як результат діяльності, а й як процес, спрямований на досягнення запланованих результатів з урахуванням внутрішнього потенціалу та зовнішніх умов об'єкта. Крім того, визначені компоненти якості вищої освіти (результат, процес, умови) сприймаються не просто як набір властивостей, а як певна ієрархічна система.

Застосування моделей управління якістю вищих навчальних закладів значно спрощує вирішення комплексних завдань управління установами. Перевагою кількісного підходу є можливість робити порівняння, аналіз і прогнозування в менеджменті. Європейські моделі управління якістю освіти базуються на технологічному підході, провідна ідея якого полягає в тому, що якість є результатом конкретної діяльності. Тому так і є необхідно контролювати якість, впливаючи на елементи діяльності та технології, а не на кінцевий результат. Такими елементами є цілі освітнього закладу та процеси, цілепокладання, кваліфікація педагогів та їх підвищення кваліфікації, методи навчання і методичне забезпечення, зміст і методи навчання, мотивація студентів, організаційно-технічне забезпечення навчального процесу.

Змінюючи ці елементи діяльності стає можливим спрямування технологічних рішень для управління якістю освіти при встановленні стратегії розвитку освіти об'єкта, створення динамічної організаційної структури менеджменту, що визначає компоненти цієї структури та їхні взаємозв'язки, перехід від принципу лідерства до принципу горизонтальної координації, який передбачає рівноправні компоненти на основі самоорганізації та саморозвитку, оптимальне поєднання функціональної та лінійної структур управління якістю із ситуативним підходом до управління, що забезпечує цілісність управлінських функцій у рамках менеджменту: цикл, адресність управлінських впливів, визначення об'єктів і суб'єктів управління, чітке розмежування повноважень, прав, обов'язків і відповідальності суб'єктів управління, посилення моніторингу, аналізу та оцінка результатів навчального процесу, вибір обґрунтованих критеріїв і показників якості, поєднання різноманітних методів матеріальної та соціальної мотивації та організаційного впливу.

Провідна роль у забезпеченні якості вищої освіти належить вищим навчальним закладам, які є відповідальними за те, щоб розробити власну стратегію якісної освіти, реалізовувати та постійно вдосконалювати внутрішні механізми її забезпечення, реалізації освітньої місії, спрямованої на сприяння європейському рівню освітнього процесу, утвердження академічних ідеалів і цінностей, сприяння розвитку культури якості, залучаючи до співпраці всіх зацікавлених сторін. При цьому необхідно дотримуватися балансу інтересів і відповідальності за якість між основними аспектами педагогічної взаємодії, що робить її цілеспрямованою та конструктивною.

Впровадження системи якості у вищих навчальних закладах сприяє визнанню освіти споживачами, досягненню та стабільному підтриманню високої якості послуг з метою задоволення потреб і вимог споживачів, впевненості у тому, що очікувана якість освіти досягнута і буде стабільно підтримуватися, підкреслюючи мету діяльності та відповідаючи



очікуванню здобувачам вищої освіти, збільшуючи рівень результативності та ефективності діяльності установ, використанню нових можливостей на ринку освітніх послуг.

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УДК 811.111

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#### THE INFLUENCE OF CYTOKININS ON THE GROWTH AND DEVELOPMENT OF *PATIO* GROUP ROSES IN «*IN VITRO*» CONDITIONS (ВПЛИВ ЦИТОКІНІНІВ НА РІСТ І РОЗВИТОК ТРОЯНД ПАТІО ГРУПИ В УМОВАХ «*IN VITRO*»)

*У статті подана інформація про вплив різних концентрацій цитокінінів на утворення пагонів троянди групи Patio в умовах in vitro. Дослідження спрямоване на визначення оптимальних концентрацій цих фітогормонів для стимулювання ефективного мікроклонального розмноження та отримання якісного посадкового матеріалу.*

**Ключові слова:** мікроклональне розмноження, троянди групи Patio, in vitro, ауксини, цитокініни, ризогенез, експлант, поживне середовище, in vivo.

*The article presents information on the effect of different concentrations of cytokinins on the formation of shoots of Patio roses in vitro. The study is aimed at determining the optimal concentrations of these phytohormones to stimulate effective microclonal propagation and obtaining high-quality planting material.*

**Keywords:** microclonal propagation, Patio roses, in vitro, auxins, cytokinins, rhizogenesis, explant, culture medium, in vivo.

The use of in vitro microcloning methods can facilitate rapid the rapid multiplication of varieties, the dissemination of initial and elite breeding material, as well as and rapid multiplication of plants free from viral diseases [1, 2].

The research material was roses of the *Patio* group of 6 varieties. The buds used as explants for in vitro culture were 0.5-0.8 cm in size, typical in phenotype without damage by pests and viruses. Cultivation was carried out on modified nutrient medium (MS), modified 4 times, 6-benzylaminopurine (BAP) was added as a cytokinin. The medium (MS1) with a BAP content of 0.5 mg/l was used as standard.

To study the effect of cytokinin concentrations on shoot formation shoot formation in vitro, explants of 6 rose varieties of the *Patio* group (*Alegria*, *Cinderella*, *El Toro*, *Jana*, *Tamango*, *Trumpeter*) were planted on modified nutrient media with BAP.

Thus, the best environment for the *Alegria* and *Cinderella* genotypes was MS2 medium, which produced an average of 1.65 and 1.90 new shoots, respectively. pieces, respectively. While the worst environment for them was the MS4 modification. The largest number of newly formed shoots was observed in genotypes *Jana*, *Tamango*, *Trumpeter* on MS2 medium - 6.50 pieces, 6.23 and 5.30 pieces respectively. The most favorable medium for shoot growth for the genotype *Jana* genotype was the standard MS1 medium, and for the *Tamango* and *Trumpeter* genotypes, the MS2 medium was again not MS4 medium was again not favorable. For the *El Toro* genotype, the worst were modifications MS3 and MS4, while the classic MS1 medium for this genotype was the best for this genotype.

Increasing the concentration of BAP in the medium led to the formation of a large number of axillary buds, but they did not develop further due to the phenomenon of apical dominance. The best results of development and adaptation were characteristic of for all six rose varieties cultivated on MS2 medium (BAP 1.0 g/ml), which contributed to the viability of newly formed shoots at the level of 42.7-43.9% for the varieties *Alegria*, *Cinderella*, *El Toro* and not at the level of 63.8-69.7% for *Jana*, *Tamango*, *Trumpeter*.

It was found that the best nutrient medium for roses of the *Patio* roses was the MS2 nutrient medium we modified. It provided the largest number of newly formed shoots and their corresponding best viability -42,4-67,9%.

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УДК 796

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### ФІЗИЧНЕ ВИХОВАННЯ ТА СПОРТ ЯК ЖИТТЄВО НЕОБХІДНА ПОТРЕБА ДЛЯ ЗДОБУВАЧІВ ВИЩОЇ ОСВІТИ

*Фізичне виховання – це процес, який почав своє життя багато років тому, і зараз є результатом важкої та довгої праці. Усім нам відомо, що фізичне виховання – це не тільки фізичний розвиток, а ще й розвиток духовних та моральних якостей, розвиток лідерства та цілеспрямваності. Безсумнівно, спорт-це не тільки засіб розвитку особистості, а ще й незамінна допомога протягом навчання. Багатьом відомо, що фізичне виховання сприяє покращенню пам'яті, стійкості під час виникнення стресових ситуацій (під час іспиту, заліків або контрольних робіт), концентрації уваги, підвищенню рівню життєдіяльності, формуванню мотивації фізичного і духовного самовдосконалення. Але, на жаль, не дивлячись на все це, через певні причини інтерес студентів та молоді до фізичного виховання зник і продовжує зникати.*

**Ключові слова:** фізичне виховання, здоров'я, потреба, фізична культура, фізичні вправи, здобувач вищої освіти, заняття, вищий навчальний заклад, молодь.

Фізичне виховання є складовою частиною загальноосвітньої системи виховання молоді та залучає молодих людей до культури через рухову активність у всіх формах, відіграє вирішальну роль у формуванні індивідуальності молодих людей, що іноді більш важливо, ніж оздоровчий вплив фізичної культури [1].

Фізична культура - це специфічний вид соціальної діяльності молодої людини, у процесі якої відбувається задоволення фізичних і духовних потреб. Фізична культура за допомогою фізичних вправ готує молодих людей до життя і праці, використовуючи природні сили природи і весь комплекс факторів (режим праці, побут, відпочинок, гігієна і т.д.), що визначають стан здоров'я людини і рівень його загальної і спеціальної фізичної підготовки.

Перед вищими навчальними закладами стоїть задача корінного і всебічного поліпшення професійної підготовки і фізичного виховання майбутніх фахівців, через появу цілої низки професій, які пов'язані з обмеженням рухів. Рухова гіпокінезія є причиною порушень фізіологічних ритмів в організмі. Слід зазначити, що одночасно з тривалим обмеженням рухів, зросла схильність здобувачів вищої освіти до різноманітних стресових факторів. Учені в галузі фізіології вважають, що цьому можуть протистояти заняття фізичною культурою та спортом. Ніякі ліки не можуть замінити надлишкове нагромадження структурно-енергетичних потенціалів, що виникають під час рухової активності. Кожен здобувач вищої освіти повинен усвідомлювати першочергову необхідність руху.

На думку І. Брехмана, є всі підстави припускати, що здебільшого молодь не знає значення руху. Багато хто думає, що це важливо головним чином для гарної постави й красивої мускулатури; про здоров'я думають найменше та зовсім мало знають про роль визначеного обсягу рухової активності [2].

Фізичне здоров'я – найважливіший складник будь-якого нашого успіху. Статистика показує, що наше суспільство хворе, що в ньому практично не залишилося здорових людей. Особливу тривогу викликає погіршення здоров'я дітей і підлітків, половина з яких має хронічні захворювання, причому недолік рухової активності провокує в них хвороби серцево-судинної та кістково-м'язової систем. Поширеність гіподинамії серед здобувачів вищої освіти досягла 80 %. Уперше за 40 років лікарі зіштовхнулися з проблемою гіпотрофії юнаків допризовного віку, що відбивається на комплектуванні Збройних сил [3]. Здоров'я молодого покоління, що погіршується, диктує необхідність зайнятися цією проблемою невідкладно. Фізична культура та спорт у навчально-виховному процесі ВНЗ виступають засобом соціального становлення майбутніх фахівців, активного розвитку їхніх індивідуальних і професійно важливих якостей, виховання в дусі колективізму та взаємодопомоги, із почуттям відповідальності й гордості за свій колектив, країну, засобом досягнення фізичної досконалості.

Важливо включити дисципліну «Фізичне виховання» як обов'язковий компонент до освітніх програм закладів вищої освіти. Фізичне виховання повинне реалізовуватися через визначені форми занять; додаткові (факультативні) заняття, у тому числі з учнями, які мають відхилення в стані здоров'я; через фізкультурно-оздоровчі заходи в режимі дня, позаакадемічні форми занять (спортивні секції, групи спортивного вдосконалювання, самостійні заняття); спортивно-масові й фізкультурно-оздоровчі заходи. Усе це повинно забезпечити кожному здобувачу вищої освіти рухову активність не менше 8–10 годин на тиждень.

Фізичне виховання й спорт у закладах вищої освіти сприяють підготовці майбутніх фахівців до високопродуктивної праці, допомагають протидіяти негативним факторам, що впливають на здоров'я й навчання у закладах вищої освіти, умінню самостійно використовувати засоби фізичної культури в праці та відпочинку, формувати загальну й професійну культуру здорового способу життя тощо. Нашій країні необхідні високоосвічені

фахівці, виховані й свідомі, здатні до активної діяльності в різних галузях суспільного та державного життя, у науці, на виробництві.

Для того, щоб бути здоровим, треба не лікувати самого себе, а вжити заходи для попередження захворювання. Насамперед це фізична культура й спорт, активна праця та відпочинок, раціональне харчування, особиста й суспільна гігієна, відмова від шкідливих звичок. Фізичні вправи відсувають вікові межі старіння, продовжують життя людини (діють як акумулятор енергії). Немає потреби пояснювати, що краще не бігати за здоров'ям у 40–60 років підтюпцем, а постійно займатися фізичними вправами. Ці заняття повинні увійти у звичку як миття рук і тіла, як чищення зубів. Якщо вважати заняття фізичними вправами другорядною справою, то завдання оздоровлення людей не вирішити. Фізична культура та спорт допомагають людині розкрити свої внутрішні резерви, природний потенціал і можливості [4; 5].

Дані медичної науки та багаторічний досвід людства засвідчують, що фізичні вправи є могутнім засобом зміцнення здоров'я та підвищення стійкості й опірності організму людини стосовно багатьох інфекційних й особливо неінфекційних захворювань. Серед сотень тисяч ліків, які складають арсенал сучасної медицини, немає жодного, що могло б конкурувати з фізичними вправами за діапазоном свого впливу та відсутністю побічного негативного впливу на наш організм.

Отже, фізичне виховання і спорт у вищих навчальних закладах виступає як невід'ємна частина здорового способу життя здобувача вищої освіти.

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УДК 378.4:811

Пустовойченко Д.В.

#### **ДО ПИТАННЯ ОЦІНКИ ЕФЕКТИВНОСТІ КАНООТ ЯК КОМП'ЮТЕРНОГО ІНСТРУМЕНТУ У ВИВЧЕННІ АНГЛІЙСЬКОЇ МОВИ**

*В статті проаналізовано використання комп'ютерного інструменту Kahoot для вивчення англійської мови у вищих навчальних закладах у вищій школі. Визначено, що використання додатку Kahoot на заняттях з англійської мови покращує мотивацію*

студентів завдяки цікавому підходу. Ефективність Kahoot як інструменту у вищій освіті для вивчення іноземних мов є багатообіцяючою.

**Ключові слова:** оцінювання, комп'ютерні інструменти, дистанційне навчання, інституційна ефективність

*The aim of the article is to analyse the effectiveness of using the computer-based tool Kahoot for English language learning in higher education. The use of the Kahoot application in English classes improves students' motivation through its fun approach. The effectiveness of Kahoot as a tool in higher education for learning foreign languages is promising.*

**Keywords:** assessment, computer tools, distance learning, institutional efficiency

На сьогоднішній день все більш уваги приділяється вивченню іноземних мов, при цьому це стосується усіх сфер життя, де іноземна мова є ключем для розвитку міжнародних відносин, культурного обміну між представниками різних країн.

В системі професійної освіти в становленні навчальної мотивації найважливішу роль відіграють пізнавальні інтереси і мотиви професійної діяльності. Оскільки іншомовна компетентність трактується в контексті професіоналізму, то доцільно розглядати питання формування мотиваційної основи розвитку компетентності в області іноземних мов з точки зору ролі професійної мотивації у формуванні мотивації навчання.

Домінуючий вплив на ставлення до навчальних дисциплін надають професійні мотиви. Студенти, які мають яскраво виражені професійні мотиви навчальної діяльності, оцінюють важливість предметів і інтерес до них значно вище, ніж ті, хто не прагне стати хорошим фахівцем і придбати необхідні глибокі знання [1].

Процес вивчення дисципліни з іноземної мови направлений на формування елементів загальнокультурних і професійних компетенцій. Саме сукупність даних компетенцій в майбутньому визначатиме рівень професійної підготовки майбутніх фахівців, ступень їх готовності до професійної само визначеності та професійної діяльності. Вивчення іноземних мов та їх використання як засобу міжнародного спілкування сьогодні неможливо без глибокого і різнобічного знання культури носіїв цих мов, їхнього менталітету, національного характеру, способу життя, бачення світу, звичаїв, традицій тощо. Тільки поєднання цих двох видів знання – мови і культури – забезпечує ефективне та плідне спілкування» [2, с. 90].

Володіння іноземними мовами сприяє процесу розширення світогляду особистості студентів, активізації культурного освоєння світу, розуміння інших соціумів та народів, що сприяє комунікації культур і професійному зростанню та вдосконаленню знань студентів.

Ефективність Kahoot як інструменту у вищій освіті для вивчення іноземних мов є багатообіцяючою. Його цікавий та інтерактивний формат, миттєвий зворотній зв'язок та інтерактивний формат, миттєвий зворотній зв'язок та можливості для спільного навчання роблять його цінним інструментом для покращення вивчення мови.

Можливість варіювати навчальний інструмент під час занять з англійської мови, покращує мотивацію студентів у контексті вивчення англійської мови. З огляду на це, було висунуто гіпотезу, що використання додатку Kahoot на заняттях з іноземної мови покращить мотивацію студентів завдяки його цікавому підходу до вивчення іноземної мови.

Покоління студентів, які зараз навчаються у вищих навчальних закладах, визначають цифрові технології, як невід'ємну частину їхнього повсякденного життя. Однак, незважаючи на адаптацію системи освіти до цього інструменту, не всі навчальні заклади використовують його на повну потужність через фінансові обмеження, а іноді через брак досвіду у викладачів. Отже, ефективність Kahoot як комп'ютерного інструменту для вивчення іноземних мов у вищій школі та вирішення проблеми недостатньої мотивації студентів у вивченні англійської мови є актуальною. Можливість, яку надає додаток Kahoot, а саме варіативність навчального інструменту під час занять з англійської мови покращує мотивацію студентів. З цією метою було висунуто гіпотезу, що використання додатку Kahoot на заняттях з іноземної мови покращить мотивацію студентів завдяки його цікавому підходу.

Результати дослідження показали, що студенти, які використовували додаток Kahoot на заняттях з англійської мови, були значно більше вмотивовані до навчання. Додаток надавав можливість варіювати навчальний інструмент залежно від потреб студентів, що стимулювало їхню активну участь у навчальному процесі. Використання Kahoot додало інтересу та веселощів до занять з англійської мови, оскільки студенти мали змогу грати в різноманітні інтерактивні ігри, відповідати на запитання та отримувати миттєві результати.

Для більшості студентів використання мобільних телефонів та додатку Kahoot покращило їхню мотивацію на заняттях. Здається, вони цінують той факт, що цифрові навички, які вони демонструють у повсякденному використанні мобільних телефонів, стануть у пригоді. Усі студенти однозначно віддають перевагу використанню додатку Kahoot перед більш традиційним навчанням. Розважальний аспект цифрових вікторин Kahoot робить заняття менш нудним в їхніх очах, незважаючи на те, що студенти не сприймають предмет, який вивчають.

Таким чином, можливість, яку надає додаток Kahoot, урізноманітнює навчальний процес під час занять з англійської мови, покращує мотивацію студентів. Додаток не лише розважає студентів та забезпечує веселий підхід до навчання, але й стимулює бажання вивчати англійську мову та вдосконалювати навички.

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УДК 332.146

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### METHODS FOR ASSESSING BUSINESS PROFITABILITY AND WAYS TO INCREASE IT (МЕТОДИ ОЦІНКИ ПРИБУТКОВОСТІ ПІДПРИЄМСТВА ТА ШЛЯХИ ЇЇ ПІДВИЩЕННЯ)

У дослідженні розглядаються основні методи оцінки прибутковості підприємства та шляхи її підвищення. Проаналізовано коефіцієнти рентабельності, зокрема рентабельність продажів, активів і власного капіталу, а також метод аналізу грошових потоків. Визначено основні фактори, що впливають на прибутковість, та окреслено стратегії її підвищення.

**Ключові слова:** прибутковість підприємства, рентабельність, фінансовий аналіз, оптимізація витрат, інновації, ринкова стратегія.

*The article examines the main methods for assessing business profitability and ways to increase it. The profitability ratios, including return on sales, assets, and equity, as well as the cash flow analysis method, are analyzed. The key factors affecting profitability are identified, and strategies for improving it are outlined,*

**Keywords:** business profitability, profitability ratios, financial analysis, cost optimization, innovations, market strategy.

The profitability of a business is one of the key indicators of its financial stability and operational efficiency. In today's economy, this metric determines not only a company's ability to survive but also its competitiveness, investment attractiveness, and growth potential. Profitability serves as an indicator of a company's success, reflecting how efficiently resources are utilized to achieve maximum financial results. Thus, the proper assessment of profitability and its improvement are among the primary objectives of company management. This paper explores key methods for assessing business profitability and effective strategies for increasing it.

Various methods are used to evaluate a company's profitability, which are based on financial indicators and ratios [1]. Among them:

#### **Return on Sales (ROS) Ratio**

One of the most commonly used indicators for profitability assessment is the return on sales ratio. It shows what portion of a company's revenue is retained as net profit after covering all expenses, including taxes, administrative, and operational costs. ROS is calculated using the formula:

$$ROS = \left( \frac{\text{Net profit}}{\text{Revenue}} \right) * 100\%$$

This indicator helps analyze how efficiently a company controls its costs during sales. An increase in ROS indicates improved operational efficiency and the potential for higher net profits.

#### **Return on Assets (ROA) Ratio**

The return on assets ratio evaluates a company's ability to use its assets to generate profit. It is calculated as the ratio of net profit to the total asset value:

$$ROA = \frac{\text{Net profit}}{\text{Total assets}} * 100\%$$

A high ROA value indicates the efficient utilization of a company's assets. This is especially important for capital-intensive businesses, where effective asset management can significantly boost profitability.

#### **Return on Equity (ROE) Ratio**

The return on equity ratio determines how much profit is generated per unit of invested equity. The formula is as follows:

$$ROE = \frac{\text{Net profit}}{\text{Equity capital}} * 100\%$$

This indicator is crucial for shareholders and investors as it demonstrates the profitability of their investments in the company. A high ROE value indicates a company's ability to efficiently utilize its own funds to generate profit.

#### **Cash**

#### **Flow**

#### **Analysis**

Cash flow analysis is another essential method for assessing a company's financial stability and profitability. The main focus is on net cash flow from operating activities, as it reflects a company's ability to generate cash to cover its obligations and finance operations. A positive cash flow indicates a company's stability and its ability to maintain long-term profitability.

The profitability of a business depends on several internal and external factors, including [2, p.3]:

- **Economic conditions:** Changes in the macroeconomic environment (inflation, exchange rates, market conditions).
- **Competitive environment:** The level of market competition and competitor influence.
- **Pricing strategy:** Proper pricing can significantly affect sales and profitability.
- **Regulatory conditions:** Changes in legislation and tax policies can either increase or decrease profitability.

There are several key approaches to improving a company's profitability, including optimizing internal processes and effectively managing external factors.

Business profitability assessment methods are crucial tools for analyzing financial efficiency. Proper profitability management ensures sustainable growth and financial stability.

Strategies for increasing profitability include cost optimization, innovation implementation, effective personnel management, and tax planning. However, it is also essential to consider external factors that may impact business operations and adapt strategies accordingly.

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УДК 796

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### ФІЗИЧНЕ ВИХОВАННЯ ЯК СПОСІБ ПІДРИМКИ МЕНТАЛЬНОГО ЗДОРОВ'Я ПІД ЧАС ВОЄНОГО СТАНУ

*Розглянуто значення фізичного виховання як ефективної підтримки ментального здоров'я в умовах воєнного стану. Особлива увага приділена дистанційному формату проведення занять, яка акцентує увагу на самостійній фізичній активності. Проаналізовано основні цілі фізичного виховання, зокрема зміцнення здоров'я, підвищення працездатності, отримання більшої навички, удосконалення професійної підготовки та формування соціальної активності.*

**Ключові слова:** фізичне виховання, спорт, активність, ментальне здоров'я.

The importance of physical education as an effective support for psychological health in martial law conditions is considered. Special attention is paid to the distance learning format, which emphasizes independent physical activity. The main goals of physical education are analyzed, including health promotion, improving working capacity, gaining more skills, improving professional training and forming social activity.

**Keywords:** physical education, sports, activity, psychological health.

В умовах воєнного стану зростає рівень стресу, тривожності та емоційного виснаження як у військових, так і у цивільного населення. Особливо це стосується молоді, здобувачів вищої освіти та осіб, які зазнали впливу бойових дій. Фізичне виховання відіграє ключову роль у підтримці не лише фізичного, а й ментального здоров'я. Регулярна фізична активність сприяє зниженню рівня стресу, покращенню емоційного стану та адаптації до складних умов життя. Фізична активність впливає на мозкову діяльність та гормональний фон людини. Під час занять спортом виробляються ендорфіни – так звані «гормони щастя», які допомагають боротися зі стресом і депресією. Також фізичні вправи сприяють покращенню концентрації, знижують рівень тривожності та допомагають зменшити наслідки посттравматичного стресового розладу (ПТСР), який часто розвивається у людей, що пережили бойові дії.

В умовах воєнного стану люди часто позбавлені можливості відвідувати спортивні зали. Проте навіть мінімальна фізична активність, наприклад, ранкова гімнастика, йога або кардіотренування, можуть допомогти підтримати тонус організму та знизити рівень стресу. Спільні фізичні навантаження (біг, спортивні ігри, бойові мистецтва) допомагають не лише підтримувати фізичну форму, а й створювати соціальні зв'язки, що є важливим елементом підтримки ментального здоров'я. Йога, пілатес, дихальні практики допомагають стабілізувати нервову систему, зменшити рівень кортизолу (гормону стресу) та сприяють загальному розслабленню організму [2].



В умовах війни діти особливо вразливі до стресових факторів. Заняття спортом допомагають їм адаптуватися до нових умов, зберігати позитивний настрій і розвивати дисципліну.

Для здобувачів вищої освіти фізична активність є важливою частиною здорового способу життя. Регулярні тренування допомагають боротися з тривогою, покращують соціалізацію та підвищують рівень стресостійкості.

Організація різноманітних спортивних заходів, один із прикладів впровадження фізичного виховання під час воєнного стану. Проведення групових тренувальних занять, змагань, челенжів та спортивних марафонів сприяє підтримці морального духу. Також організація дистанційних практичних занять. Використання онлайн-платформ для проведення тренувань з видів спорту дозволяє здобувачам вищої освіти підтримувати фізичну активність навіть в умовах обмежень. В умовах військового стану заняття з фізичного виховання для здобувачів вищої освіти, як правило, здійснюються дистанційно, більшість часу виділяється на самостійну роботу. Вони можуть мати різноманітні форми, але спрямовані на зміцнення здоров'я, впровадження здорового способу життя, підвищення працездатності, оволодіння необхідними вміннями та навичками, удосконалення професійної підготовки, а також розвиток соціальної активності [1].

Отже, фізичне виховання є одним із ключових інструментів підтримки ментального здоров'я в умовах воєнного стану. Регулярне заняття фізичною культурою, фізичними вправами допомагає знизити рівень стресу, покращує адаптацію організму до сучасних умов. Впровадження спортивних заходів та розробка реабілітаційних програм є важливими складовими підтримки здоров'я студентської молоді у складний період воєнних дій.

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UDC 811.111

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#### SOFT AND HARD SKILLS FORMATION DURING FOREIGN LANGUAGE CLASSES IN UKRAINIAN HIGH SCHOOLS

*The article describes the importance, as well as analyzes the features and methods of forming “soft skills” and “hard skills” during foreign language classes in Ukrainian higher educational institutions.*

**Key words:** “soft skills”, “hard skills”, group tasks, teamwork, speaking, reading, writing, listening.

Nowadays with the development of artificial intelligence and automation of all human life spheres, such human qualities as the ability to empathize, think creatively and inspire others became the most valuable for employers. Analysts of global companies determine that these skills will be a key factor in the success of employees in the labor market in 2025. The world's largest businesses – from technology giants to innovative startups – are now looking for not just good specialists, but people who can communicate effectively, work in a team, and adapt quickly to change [1]. Thus, in the modern world, where technologies are developing at a rapid pace, the so-called “soft skills” are becoming a determining factor in the professional success of any future specialist, and therefore, we

consider their formation and development in higher education students to be very important during studies at higher education institutions, including foreign language classes.

“Soft skills” are defined as a set of general, non-profession-specific qualities and skills. A person who possesses them copes with their tasks more effectively, builds communication with the team, partners, and clients, and also successfully advances up the career ladder or develops their business. Some believe that the term “skills” is not entirely correct, since a “skill” is an ability that has been practiced to the point of automatism. They use the word “abilities,” because it includes experience, knowledge, and skills. It can also be called tools and technologies that allow you to be productive and successful in various fields. “Soft skills” are independent of cultural and linguistic contexts and play an important role in professional development and in everyday life for personal success. However, in our opinion, “soft skills” can still be attributed to skills, since they can be formed in a person who did not have them from the very beginning.

The term appeared in the English language as the opposite of “hard skills” – specialized practical skills that can be mastered. They are necessary to become a specialist, for example, a pilot or an economist with a diploma. Unlike “hard skills”, which use logical thinking, “soft skills” are guided by the emotional one. The requirements for “hard skills” remain the same regardless of the company and corporate culture where a person works. “Soft skills” are variable, they depend on the situation. When an employee is just starting out as a professional, he needs more “hard skills.” But as he grows and develops in his profession, he is forced to communicate with people, and “soft skills” become increasingly useful to him.

Let’s analyze examples of “soft skills” that can be successfully formed and developed during foreign language classes in higher educational institutions of our country. For example, completing group tasks that the teacher usually gives in foreign language classes contributes to the ability to work well with others in a group or team. Interacting with a team, a person constantly learns new things, learns to understand different people, and acquires new habits. Teamwork develops people both in the corporate world and in everyday life. People in friendly relations with colleagues work much more efficiently and productively than people who have only working relationships [2].

During a foreign language lesson, basic speech skills are developed through various exercises: speaking, reading, writing, and listening. For example, speaking skills are developed during monologue and dialogical speech of higher education students. Exercises for the development of monologue speech include telling a topic, making a report on a previously prepared topic, making presentations. During such exercises, active listening is developed, the ability to use facial expressions and gestures to confirm words, which makes communication more expressive; the ability to convince the interlocutor, the ability to present the project and speak publicly, the ability of storytelling. Writing exercises develop skills in report writing and business communication. Critical thinking skills, empathy, emotional intelligence, and leadership skills are developed during game activities and situational tasks. Properly allocating time for homework helps develop time management, streamlining and organizing activities (experience in organizing one’s work), etc.

Therefore, the labor market of 2025 will require future professionals to constantly develop soft skills. “Soft skills” are thus transformed from additional advantages into a key factor of competitiveness. Finding a good job requires more than a perfectly composed resume. Today, soft skills are as important as hard skills. “Soft skills” are something that needs to be developed continuously, regardless of employment [2]. The successful ones will be those specialists who can combine technical knowledge with developed social competencies and adaptability to changes [1]. That is why the “soft skills” formation of higher education students is extremely important during their studies in higher education institutions, as well as directly in foreign language classes.

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УДК 811.111

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## STEM CELLS IN MEDICINE: THE FUTURE TREATMENT OF INCURABLE DISEASES (СТОВБУРОВІ КЛІТИНИ В МЕДИЦИНІ: МАЙБУТНЄ ЛІКУВАННЯ НЕВИЛІКОВНИХ ХВОРОБ)

*У публікації розглянуто перспективи використання стовбурових клітин у медицині для лікування невиліковних захворювань. Проаналізовано основні типи стовбурових клітин, їх джерела та можливості застосування в регенеративній медицині. Окремі увагу приділено викликам та етичним аспектам, пов'язаним із використанням стовбурових клітин, а також перспективам їхнього впровадження в персоналізовану медицину.*

**Ключові слова:** стовбурові клітини, регенеративна медицина, ембріональні стовбурові клітини, індуковані плюрипотентні стовбурові клітини (iPSC), неврологічні захворювання, серцево-судинні патології, онкологія, етичні аспекти, персоналізована медицина.

*The publication discusses the prospects of using stem cells in medicine for the treatment of incurable diseases. The main types of stem cells, their sources and possibilities of application in regenerative medicine are analysed. Particular attention is paid to the challenges and ethical aspects associated with the use of stem cells, as well as the prospects for their implementation in personalised medicine. The publication emphasises the significant potential of stem cells in the treatment of diseases such as neurological disorders, cardiovascular pathologies, diabetes and cancer.*

**Keywords:** stem cells, regenerative medicine, embryonic stem cells, induced pluripotent stem cells (iPSCs), neurological diseases, cardiovascular diseases, oncology, ethical aspects, personalised medicine.

Modern medicine is on the verge of a revolution, and the key to this is stem cells - unique cells capable of self-renewal and transformation into any type of specialised cell in the body. This property opens up new perspectives for regenerative medicine, offering hope for the treatment of diseases that were previously considered incurable [1].

Stem cells are classified according to their origin and properties. The most promising are embryonic stem cells, which are derived from embryos and have the highest capacity for differentiation. However, their use is accompanied by ethical controversy. Adult (somatic) stem cells, which are found in body tissues (e.g. bone marrow or adipose tissue), have limited capabilities, but their use is less controversial. Induced pluripotent stem cells (iPSCs), which are obtained by reprogramming ordinary cells, are worth mentioning. This method avoids ethical issues and opens up great opportunities for personalised medicine [3].

Stem cells are already showing impressive results in the treatment of a number of diseases. For example, in neurology, they are used to repair damaged neurons in diseases such as Parkinson's disease, Alzheimer's disease or the effects of strokes. In cardiology, they are used to regenerate the heart muscle after a heart attack, which significantly improves the prognosis for patients [1].

One of the most promising areas is the treatment of diabetes. Researchers are working to create insulin-producing cells that could become an alternative to insulin injections for patients with type I diabetes. In oncology, stem cells have already been successfully used for bone marrow transplantation in leukaemia, and in orthopaedics to restore cartilage and joints.

Despite its enormous potential, the use of stem cells is accompanied by a number of challenges. One of the main problems is the risk of rejection of transplanted cells, which can lead to complications. In addition, there is a risk of tumour formation, especially when embryonic cells are used [2].

Ethical issues also remain a subject of debate. The use of embryonic cells is controversial because of the need to destroy embryos. This leads scientists to look for alternatives, such as iPSCs, that avoid these problems.

Stem cells are a real breakthrough in medicine that can dramatically change the approach to the treatment of many incurable diseases. They open up new opportunities for tissue and organ regeneration, giving hope to millions of patients [3].

However, a number of scientific and ethical challenges need to be overcome to fully implement this technology. In the future, stem cells may become the basis for personalised medicine, where treatment will be tailored to the needs of each patient.

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УДК 339.166:5

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#### MANAGEMENT OF INTANGIBLE ASSETS IN THE WORLD ECONOMY (УПРАВЛІННЯ НЕМАТЕРІАЛЬНИМИ АКТИВАМИ У СВІТОВІЙ ЕКОНОМІЦІ)

*Дослідження розглядає управління нематеріальними активами, які набувають дедалі більшої важливості у світовій економіці. А також аналізуються міжнародні підходи до управління інтелектуальною власністю та роль інновацій у створенні конкурентних переваг компаній.*

**Ключові слова:** нематеріальні активи, світова економіка, ESG-критерії, управління брендом, інтелектуальна власність, репутація.

*Study examines the management of intangible assets, which are becoming increasingly important in the global economy. International approaches to intellectual property management and the role of innovation in creating competitive advantages are also analyzed.*

**Keywords:** intangible assets, world economy, ESG criteria, brand management, intellectual property, reputation.

Intangible assets such as brands, copyrights, patents, data and reputation are important in the global economy. The strategic importance of such assets lies in the formation of the value of companies, as well as in determining their competitive advantages in the market. However, since

these assets have no physical expression, their management requires specialized approaches that are increasingly complex due to rapid changes in technology, social and environmental requirements.

The main areas of management of intangible assets [1, 2]:

1. Sustainable development and ESG criteria. The integration of environmental, social and governance (ESG) aspects into business strategy is becoming one of the key trends in the management of intangible assets. According to the report «Approaching the Future 2023», 60% of companies already pay significant attention to the integration of sustainable development in their strategies. This not only improves the reputation of brands, but also helps attract investment, especially from companies that are committed to being socially responsible.

2. Reputation and corporate communication. Reputation is a key intangible asset for companies, especially in times of global uncertainty. According to Corporate Excellence, about 80% of large company leaders are developing reputation management strategies, and 56% are focusing on improving corporate communication. This contributes to strengthening trust in the brand, increasing customer loyalty and creating new opportunities for development.

3. Technologies and digital transformation. Using the latest technologies, such as artificial intelligence (AI), big data and blockchain, helps companies effectively manage their intangible assets. For example, in the commercial services and media industries, technology adoption significantly increased the value of intangible assets by 68% and 309%, respectively. At the same time, companies must strengthen cybersecurity to protect data, a key element of today's intangible assets.

4. The role of the brand and leadership. Brand management is becoming more and more important in today's world, especially in the context of social responsibility and sustainable development. According to the report «Approaching the Future 2023», work on the corporate brand and its positioning is becoming a priority for companies. An important component here is responsible leadership, which aims to create sustainable business models and ensure social cohesion.

One of the main challenges of managing intangible assets is their valuation and monetization. Unlike tangible assets (such as equipment or real estate), the value of intangible assets is more difficult to measure because it is based on innovation, knowledge and creativity. However, their economic influence is growing more and more. According to the World Intellectual Property Organization (WIPO), in 2023, investments to intangible assets have shown resilience even during economic crises. This confirms the importance of intellectual property to support economic growth in difficult conditions such as war or global economic downturns [3].

World leaders, including the US, France and Sweden, are actively investing in intangible assets, which far exceeds their investment in tangible assets. The US invests twice as much in intangible assets as in tangible assets. This allows them to strengthen their positions on the global market, while increasing the competitiveness of companies due to innovation and management of intellectual capital [3, 4].

In addition, international approaches to the management of intangible assets include the development of special strategies to minimize risks and increase economic value. In particular, the Singapore Academy of Intellectual Property offers useful cases demonstrating how effective management of intellectual property stimulates the growth of national and international companies [5].

Management of intangible assets is not just a trend, but a critically important element of the strategy of modern companies. The introduction of ESG criteria, innovative technologies, effective brand and reputation management is the key to long-term success in the global market. Companies that are the first to implement such strategies gain significant competitive advantages while strengthening their position in the global economy.

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УДК 811.111

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## PECULIARITIES OF ACCOUNTING FOR CURRENCY TRANSACTIONS AT AGRICULTURAL ENTERPRISES DURING THE WAR

*During the war period, agricultural enterprises in Ukraine face unique challenges in accounting for currency transactions. Changes in the regulatory framework, particularly the reduction of settlement deadlines for export transactions, require enterprises to adapt financial processes to ensure timely repatriation of foreign currency earnings and maintain financial stability.*

**Keywords:** agricultural enterprises, currency transactions, war, accounting, export, foreign currency earnings, regulatory framework.

The military actions on the territory of Ukraine since 2022 have significantly impacted the economic activities of agricultural enterprises, especially in the context of currency transactions. Changes in legislation and economic conditions require enterprises to adapt their accounting practices to ensure financial stability and compliance with new regulatory requirements.

One of the key changes is the reduction of settlement deadlines for export transactions. Starting from November 11, 2023, the National Bank of Ukraine (NBU) has set a 90-day term for the repatriation of foreign currency earnings for the export of certain agricultural goods, such as wheat, rye, barley, corn, soybeans, rapeseed, and sunflower oil. Previously, this term was 180 days [1]. This decision by the NBU aims to strengthen financial discipline and ensure the timely inflow of foreign currency into the country's economy. For agricultural enterprises, this means the need to review contract terms with foreign partners, optimize logistics processes, and expedite customs procedures to meet the new settlement deadlines.

In 2024, Ukraine exported agricultural products worth \$24.5 billion, which accounted for 59% of the country's total goods exports. This figure is the second highest after the record year of 2021, when agricultural exports reached \$27.7 billion. In terms of volume, the export amounted to 78.3 million tons. The largest share in exports was occupied by sunflower oil — 21% (almost 6 million tons worth \$5.1 billion), corn — 21% (29.6 million tons worth \$5 billion), and wheat — 15% (20.6 million tons worth \$3.7 billion). Such export volumes underline the importance of timely repatriation of foreign currency earnings to maintain the stability of the national economy [2].

During the war, risks associated with fulfilling foreign economic contracts have significantly increased. Damage to infrastructure, blocked transportation routes, and supply instability create additional obstacles for timely fulfillment of obligations. In this context, agricultural enterprises must implement effective risk management systems, including insurance of export operations and the use of currency risk hedging.

Accounting for currency transactions requires special attention to exchange rate differences arising from fluctuations in exchange rates. Enterprises must regularly re-evaluate receivables and payables in foreign currency, reflecting the respective income or expenses in the financial statements. This ensures a realistic reflection of the enterprise's financial condition and performance.

Changes in tax legislation also impact the accounting of currency transactions. In particular, the taxation of exchange rate differences and the procedure for recording foreign currency inflows in tax accounting may change according to new regulatory acts. Agricultural enterprises must monitor these changes and timely adjust their accounting policies to avoid tax risks.

An important aspect is the automation of accounting processes. Using modern software solutions allows for timely tracking of currency transactions, automatic calculation of exchange rate differences, and generation of necessary reporting documents. This increases the accuracy of accounting and reduces the likelihood of errors, which is especially important under increased workload on financial departments during the war.

Additionally, cooperation with banking institutions is of particular importance. Banks can provide advice on optimal conditions for conducting currency transactions, offer tools for hedging currency risks, and ensure the swift execution of settlements. Close interaction with banks contributes to effective management of currency flows and minimization of financial risks [3].

**Conclusion.** The military actions in Ukraine since 2022 have profoundly impacted the economic activities of agricultural enterprises, necessitating significant adaptations in their accounting practices for currency transactions. The reduction of settlement deadlines for export transactions by the National Bank of Ukraine underscores the need for stronger financial discipline and timely inflow of foreign currency earnings. Agricultural enterprises must now navigate a more complex landscape, requiring the optimization of contract terms, logistics processes, and customs procedures to meet the new regulatory demands. Furthermore, the increased risks associated with fulfilling foreign economic contracts during wartime highlight the importance of implementing effective risk management strategies, including insurance and currency risk hedging.

Changes in tax legislation further complicate the accounting of currency transactions, necessitating continuous monitoring and adjustment of accounting policies to avoid potential tax risks. Automation of accounting processes and close cooperation with banking institutions are crucial for enhancing the accuracy and efficiency of currency transaction management. By adopting these measures, agricultural enterprises can better manage financial risks, maintain financial stability, and ensure compliance with new regulatory requirements, even amidst the challenges posed by ongoing military actions.

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## THE ROLE OF INNOVATION AND DIGITALISATION IN THE POST-WAR ECONOMIC RECOVERY OF UKRAINE

*Ця робота досліджує критичну роль інновацій та інвестицій у відбудові післявоєнної економіки України. Наголошується на міжнародній підтримці, зокрема з боку Європейської Комісії, яка виділила фінансові та організаційні ресурси для сприяння розвитку інноваційної екосистеми України. У дослідженні аналізується необхідність адаптації інноваційної політики до національних умов із залученням цінного міжнародного досвіду.*

**Ключові слова:** *повоєнне відновлення, інноваційна політика, інвестиції, економічний розвиток, Україна.*

*This paper examines the critical role of innovation and investment in the post-war economic recovery of Ukraine. It highlights international support, in particular from the European Commission, which has allocated financial and organizational resources to foster the development of Ukraine's innovation ecosystem. It analyses the need to adapt innovation policy to national conditions, drawing on valuable international experience.*

**Keywords:** *post-war recovery, innovation policy, investment, economic development, Ukraine.*

The deep socio-economic crisis caused by the ongoing hostilities in Ukraine requires the development of effective approaches and mechanisms to overcome it. The issue of developing innovation and investment processes has always been at the centre of scientific debate, as countries that actively invest in innovative projects demonstrate high economic stability. At the same time, the problem of post-war economic recovery based on innovative investments has become particularly relevant since the start of the full-scale invasion. The Russian military aggression has caused significant destruction in Ukraine, including damage to critical infrastructure and production facilities. The loss of human resources, mass migration and job losses have led to a sharp decline in the purchasing power of citizens, which has exacerbated the economic crisis.

In the context of large-scale economic transformations, innovation and investment can be a key factor in rebuilding the post-war economy. In particular, the European Commission has initiated support for Ukraine's innovation environment by funding start-ups. The planned budget for the development of innovative projects is €20 million.

In addition to financial support, the European Innovation Council will facilitate the organisational development of start-ups through consultancy and intermediation. As part of this initiative, participants will have the opportunity to acquire skills in project promotion and international market entry. The European Innovation Council will also facilitate the integration of Ukrainian startups into the pan-European innovation ecosystem [1].

To date, a significant number of plans and strategic initiatives have been developed to support Ukraine's economic recovery. As part of this perspective, the National Council for the Recovery of Ukraine from the Consequences of the War was established by a Presidential Decree of 21.04.2022. The main task of this body is to develop a comprehensive plan for the country's post-war recovery. Most of the consultations and proposals concerning the future economic development are focused on the implementation of an innovative model of state development.

At the same time, the analysis of this issue shows that innovation policy needs to be adapted to national conditions, not exclusively to the European experience. Although international experience plays a key role, it should be used based on its proven effectiveness. The examples of Germany and Japan, who achieved successful economic modernization through innovative strategies after World War II, merit close examination in this context. Research on the economic



recovery of East Asian countries indicates that successful post-war reconstruction depends on the synergy of five key factors:

- technological progress;
- critical thinking and innovation;
- economic awareness and expansion of production and trade relations;
- political will of the government to implement innovation and investment reforms;
- openness to borrowing international experience.

Thus, innovation development is a complex process that requires a simultaneous combination of quantitative and qualitative changes to achieve sustainable economic growth [2].

Developing innovations is a key factor in developing business potential, even for projects with low growth prospects. Innovative solutions help attract new partners and customers, expand markets, and increase competitiveness. The main characteristics of innovation are creativity, efficiency, profitability, strategic orientation, practical implementation, and economically justified cost [3].

The active phase of the war significantly limits the financial potential of Ukraine, in particular the ability of the state and business to invest in innovative development. In this regard, it is extremely important to create a favourable investment environment for attracting foreign capital. Ukrainian business and the startup ecosystem should focus on developing competitive innovative projects that will ensure long-term sustainability.

The IT sector, which has demonstrated high adaptability even in the face of a full-scale war, plays a special role in this process. Increasing investment in digital business processes is a promising area for post-war economic recovery. The main benefits of digital innovation include:

- Optimisation of business and production processes through automation, which contributes to productivity growth;
- Integration of Ukrainian digital experience into the global digital ecosystem;
- Introducing new formats of communication with customers and expanding existing channels of interaction;
- Expanding sales markets and adapting goods and services to meet consumer demands, including predicting their needs using artificial intelligence;
- Formation of efficient supply chains through the digitalisation of design, production, marketing and supply processes [4].

In today's digital realities, technology is a key tool for creating innovations that help attract investment. Digitalisation plays an important role not only in the current improvement of the economic situation, but also in ensuring its sustainable development in the future. According to research, the share of the digital economy in Ukraine's GDP is expected to grow rapidly until 2030. Due to its high technological activity and dynamic implementation of innovations, Ukraine is expected to become an attractive investment destination. Consequently, this will foster broader economic expansion and enhance the digital sector's contribution to the national GDP [5].

Thus, the process of post-war economic recovery in Ukraine directly depends on the effective implementation of innovations and investment attraction. Large-scale destruction of infrastructure, migration of the working population, and declining purchasing power pose significant challenges to economic growth, but innovative approaches can be the basis for overcoming these problems.

Thus, a strategic course towards innovative development combined with digital transformation is crucial for Ukraine's economic recovery. Creating a favourable business climate, attracting foreign capital, and adopting global best practices will create the preconditions for stable economic growth and strengthening the country's international competitiveness.

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УДК 811:111

Тішечкіна К.В.

## PSYCHOLOGICAL STATE OF HIGHER EDUCATION STUDENTS DURING THE PERIOD OF MARTIAL LAW

*У статті приділено увагу психологічному стану студентів вищих навчальних закладів під час воєнного стану, розглядено основні фактори стресу, механізми подолання та системи підтримки, доступні студентам у регіонах, уражених конфліктом.*

**Ключові слова:** психологічний стан, вища освіта, воєнний стан, тривога, посттравматичний стресовий розлад, психічне здоров'я, механізми подолання, академічні порушення.

*The article focuses on the psychological state of students of higher education institutions during martial law, examining the main stress factors, coping mechanisms, and support systems available to students in regions affected by the conflict.*

**Keywords:** psychological state, higher education, martial law, anxiety, PTSD, mental health, coping mechanisms, academic disruption.

Since 2022, Ukraine has been in difficult conditions that significantly affect both the psychological state of a person in general and the educational process in particular. Martial law imposes strict governmental control, often in response to political instability, war, or national emergencies. In such periods, higher education students face unique psychological challenges, including stress, anxiety, depression, and post-traumatic stress disorder (PTSD) [1-6]. This article explores the mental health struggles of students under martial law, highlighting the importance of psychological support systems.

One of the primary concerns for students during martial law is the disruption of their academic journey. Universities may shut down temporarily or transition to online learning, which may not be accessible to all students. The uncertainty surrounding examinations, graduation, and future career prospects exacerbates anxiety and stress.

Even in conditions of peaceful existence, stress is an indispensable component of human life. Stress is the body's reaction to a certain threat, challenge, or physical or psychological barrier. There are several concepts of stress, among which the most common are the biological and psychological concepts. According to the biological concept, stress is the body's reaction to any external or internal stimuli that disrupt its homeostasis (for example, physical danger). The psychological concept explains stress as a state that occurs when a person believes that he is unable to cope with a certain situation. Such a state may include feelings of disrespect, loss of control,

inability to solve the problem, and other factors) [3].

Moreover the presence of military forces, curfews, and restrictions contribute to heightened fear and anxiety. Students may worry about their safety and that of their families. Continuous exposure to distressing news reports and social media updates can also intensify psychological distress.

Many students rely on part-time jobs or financial aid to sustain their education. Under martial law, economic instability often leads to job losses and financial difficulties, making it harder for students to focus on their studies. Additionally, social isolation due to restrictions on movement affects students' ability to connect with peers and maintain emotional well-being.

Students who witness violence, destruction, or loss of loved ones are at high risk of developing PTSD. Symptoms include nightmares, flashbacks, emotional numbness, and heightened vigilance. Without proper psychological support, these symptoms can lead to long-term mental health issues.

What coping mechanisms are there?

Strong social networks, including family, friends, and university communities, play a crucial role in buffering stress. Engaging in conversations and sharing emotions with trusted individuals can help students cope with trauma.

Many universities and organizations provide counseling services for students facing psychological distress. Access to professional therapists, either online or in person, can significantly improve students' mental well-being.

Practicing mindfulness, meditation, and relaxation techniques helps students manage anxiety and stress. Exercise, proper nutrition, and sufficient sleep also contribute to overall mental stability.

Universities can support students by offering flexible deadlines, mental health leave, and alternative examination methods. Establishing helplines, peer counseling groups, and stress management workshops can also assist students in coping with their challenges.

Student life is a period of active intellectual and creative growth, during which new career and social opportunities open up for a young person. At this stage, the foundation is laid for further development and future creative and professional realization of the personality. Students were usually characterized by stress due to factors such as poor academic performance and insufficient understanding of the subject; the need to quickly assimilate a large amount of complex information; problems in relationships with classmates and teachers; lack of time; strong emotional experiences due to taking exams and tests; the search for professional self-identity; fear of the first professional steps after graduating from a higher education institution, etc. Implementing comprehensive mental health programs, academic support systems, and community engagement initiatives is essential for fostering resilience among students. Governments and educational institutions must prioritize students' mental well-being to ensure their academic success and future contributions to society.

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## GENETIC METHODS FOR IMPROVING THE PRODUCTIVITY OF FARM ANIMALS (ГЕНЕТИЧНІ МЕТОДИ ПОКРАЩЕННЯ ПРОДУКТИВНОСТІ СІЛЬСЬКОГОСПОДАРСЬКИХ ТВАРИН)

*У статті подана інформація про сучасні генетичні методів, спрямовані на покращення продуктивності сільськогосподарських тварин, зокрема маркер-асоційованої селекції (MAS), технології CRISPR/Cas9 та інших біотехнологічних підходів. Розглянуто їхні механізми дії, переваги, потенційні ризики, етичні аспекти та перспективи використання у практичній ветеринарії та зоотехнії.*

**Ключові слова:** генетика, селекція, CRISPR/Cas9, продуктивність тварин, молекулярні маркери, біотехнології.

*The article presents information on modern genetic methods aimed at improving the productivity of farm animals, particularly marker-assisted selection (MAS), CRISPR/Cas9 technology, and other biotechnological approaches. It examines their mechanisms of action, advantages, potential risks, ethical aspects, and prospects for application in practical veterinary medicine and animal husbandry.*

**Keywords:** genetics, selection, CRISPR/Cas9, animal productivity, molecular markers, biotechnology.

Genetic research is a driving force behind progress in animal husbandry, providing innovative solutions to enhance productivity, adaptive potential, and resilience to stress factors. The use of modern biotechnological methods significantly improves the efficiency of the selection process, minimizes losses associated with diseases, and reduces the environmental footprint of the industry [1].

### 1. Marker-Assisted Selection (MAS)

Marker-assisted selection (MAS) is a key method for the precise selection of high-performance individuals based on genetic markers. The main advantages of MAS include:

- Acceleration of the selection process through early genotype diagnosis.
- Increased selection accuracy compared to traditional phenotypic selection.
- Optimization of genetic resource utilization to preserve biodiversity.

MAS is widely used in animal husbandry, particularly to increase milk yields in cattle, improve disease resistance in pigs, and enhance feed conversion efficiency in poultry [2].

### 2. CRISPR/Cas9 Technology in Animal Husbandry

CRISPR/Cas9 is a unique technology that allows geneticists to edit parts of the genome by deleting, adding, or modifying DNA sequence fragments. As an advanced genome-editing tool, CRISPR/Cas9 enables precise genetic modifications. Its applications in animal husbandry include:

- Development of breeds with increased resistance to viral and bacterial infections.
- Optimization of nutritional value by modifying metabolic pathways.
- Reduction of antibiotic use through natural immune system enhancement.

An example of successful CRISPR implementation is the creation of pig lines resistant to porcine reproductive and respiratory syndrome (PRRS), significantly reducing economic losses in the industry [2,3,5].

### 3. Genetic Modification and Its Prospects

Genetic editing opens up opportunities for:

- Increasing resistance to parasitic invasions and infections.
- Improving the quality of dairy and meat products.
- Developing animals with greater adaptability to climate change.

Despite its significant potential, the widespread implementation of genetic modifications faces challenges, including ethical concerns and public perception of such changes [4].

#### 4. Ethical Aspects of Genetic Research

The application of genetic engineering methods in agriculture requires an in-depth analysis of their impact on animals and the environment. Key aspects requiring careful consideration include:

- Ensuring animal welfare and preventing potential pathological changes.
- Assessing the risks of unforeseen genetic mutations.
- Controlling biosafety and ecological impacts.

The need for international legal regulation of genetic modifications is a critical factor for their safe implementation in agricultural production [5].

The use of modern genetic methods, such as MAS and CRISPR/Cas9, is transforming animal husbandry by improving productivity, disease resistance, and resource efficiency. These technologies accelerate breeding processes, enhance genetic selection accuracy, and open new possibilities for targeted genome modifications.

However, their implementation requires careful consideration of ethical concerns, potential genetic risks, and environmental impacts. Public perception and regulatory frameworks play a crucial role in their adoption. A balanced approach—combining innovation with responsible oversight—will ensure that genetic advancements contribute to sustainable livestock production while maintaining safety and ethical standards.

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## RISKS AND ANTI-CRISIS MANAGEMENT IN THE AGRICULTURAL SECTOR

*The agricultural sector consistently faces diverse risks that can have significant negative impacts on productivity, sustainability, and profitability. This research explores the key categories of risks in Ukraine's agricultural sector, analyzes their economic implications, and examines effective anti-crisis management strategies that can help agricultural enterprises maintain resilience in an uncertain environment. Special attention is given to the integration of innovative technologies and risk diversification approaches in modern agricultural risk management systems*

**Keywords:** agricultural risks, anti-crisis management, risk mitigation, agricultural economics, sustainability, agricultural innovations.

*Аграрний сектор постійно стикається з різноманітними ризиками, які можуть мати значний негативний вплив на продуктивність, стійкість та прибутковість. Це дослідження розглядає основні категорії ризиків в аграрному секторі України, аналізує їх економічні наслідки та вивчає ефективні стратегії антикризового управління, які можуть допомогти аграрним підприємствам підтримувати стійкість у нестабільному середовищі. Особлива увага приділяється інтеграції інноваційних технологій та підходів до диверсифікації ризиків у сучасних системах управління аграрними ризиками.*

**Ключові слова:** аграрні ризики, антикризове управління, зниження ризиків, аграрна економіка, сталий розвиток, аграрні інновації.

The agricultural sector in Ukraine and globally faces a complex and diverse set of risks that significantly affect its sustainable development and economic stability. Agricultural production, by its very nature, remains one of the most risk-prone economic activities due to its dependence on natural, climatic, biological, and market factors [1]. The relevance of developing effective risk management and anti-crisis systems in agriculture has been further highlighted by recent global challenges, including climate change, geopolitical tensions, and market volatility.

Agricultural risks can be categorized into several major groups. Production risks are primarily associated with weather conditions, pests, diseases, and other natural factors that directly impact crop yields and livestock productivity. According to research by Prokopenko et al. [2], crop losses due to adverse weather conditions in Ukraine can reach 30-40% in particularly challenging years, representing billions of hryvnias in economic damage. Climate change has exacerbated these risks, with increasing frequency of extreme weather events such as droughts, floods, and unseasonable frosts.

Market risks constitute another significant category, manifesting through price volatility, changes in demand, and disruptions in supply chains. Khodakivska et al. [3] note that price fluctuations for agricultural products in Ukraine can reach 30-70% within a single marketing year, creating substantial challenges for financial planning and sustainability of agricultural enterprises. These fluctuations are often exacerbated by global market dynamics, changes in trade policies, and currency exchange rate volatility.

Financial risks in agriculture are related to access to capital, credit availability, interest rate changes, and liquidity issues. According to the National Bank of Ukraine data, the agricultural sector continues to face challenges in accessing affordable long-term financing, with only 7% of agricultural enterprises having sufficient access to banking credit resources [4]. This limitation significantly hinders technological modernization and implementation of innovative solutions necessary for risk mitigation.

Institutional and political risks, including changes in agricultural policies, regulatory frameworks, and international trade regulations, also play a crucial role in the sector's stability.

Research by Lupenko and Mesel-Veselyak [5] indicates that regulatory uncertainty and frequent changes in agricultural support mechanisms create additional challenges for strategic planning in Ukrainian agricultural enterprises.

Effective anti-crisis management in agriculture requires a comprehensive and integrated approach. Proactive risk identification and assessment serve as the foundation for developing appropriate mitigation strategies. Successful agricultural enterprises implement systematic risk monitoring using both traditional methods and modern digital technologies. Early warning systems based on data analytics help identify potential threats before they materialize into significant problems.

Diversification remains one of the most effective strategies for risk mitigation in agriculture. This includes diversification of crops, production technologies, markets, and income sources. Research by Khodakivska et al. [3] demonstrates that agricultural enterprises implementing diversification strategies show 15-20% higher economic resilience during crisis periods compared to highly specialized farms. Integration of crop and livestock production creates synergistic effects that enhance overall farm sustainability.

Technological innovation plays an increasingly important role in agricultural risk management. Precision farming technologies, which leverage GPS, remote sensing, and IoT sensors, allow for more efficient resource utilization and reduce production risks. Implementation of precision agriculture systems can reduce production costs by 10-15% while simultaneously decreasing vulnerability to adverse weather conditions through optimized irrigation and crop protection. Similarly, digital platforms for market analysis help farmers make more informed decisions regarding product sales timing and market selection.

Financial risk management instruments, including agricultural insurance, futures and options contracts, and forward agreements, represent another critical component of anti-crisis strategies. However, the agricultural insurance market in Ukraine remains underdeveloped, with less than 5% of agricultural land being insured. Development of innovative insurance products, index insurance schemes, and public-private partnerships in this area could significantly enhance the sector's resilience.

Creating reserves and buffer systems represents a traditional but still relevant approach to crisis management in agriculture. This includes not only financial reserves but also technological reserves (backup irrigation systems, alternative energy sources) and strategic inventory management. Agricultural enterprises with adequate reserve systems demonstrate 25-30% higher survival rates during prolonged crisis periods.

Knowledge management and continuous education of agricultural producers are equally important components of effective anti-crisis management. Farmers with higher levels of professional knowledge and access to advisory services implement more effective risk management practices and demonstrate greater adaptability to changing conditions.

Public policy measures also play a crucial role in supporting agricultural risk management systems. These include development of market infrastructure, information systems, insurance mechanisms, and targeted support during crisis periods. According to Lupenko and Mesel-Veselyak [5], countries with well-developed agricultural support systems that include risk management components show 30-40% higher sector resilience during economic downturns.

The integration of these diverse approaches into a coherent anti-crisis management system represents the most effective strategy for enhancing agricultural resilience. Modern agricultural risk management requires a balanced combination of traditional wisdom and innovative solutions, adapted to the specific conditions of each agricultural enterprise and region.

The effectiveness of anti-crisis management in agriculture is significantly enhanced when implemented at multiple levels: individual farm, cooperative or industry association, and national policy levels. Coordinated actions across these levels create synergistic effects and allow for more efficient resource utilization during crisis periods.

In conclusion, effective risk and anti-crisis management in the agricultural sector requires a systematic, proactive, and integrated approach. The combination of diversification strategies,

technological innovation, financial instruments, knowledge management, and supportive public policies creates a robust framework for agricultural resilience. As climate change, market volatility, and other challenges continue to intensify, the importance of developing and implementing such comprehensive risk management systems will only increase. Further research should focus on developing region-specific risk assessment methodologies and innovative financial instruments tailored to the unique needs of Ukrainian agriculture.

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УДК 811.111

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### HARNESSING THE POWER OF TIDES (ВИКОРИСТАННЯ ЕНЕРГІЇ ПРИПЛИВІВ ТА ВІДПЛИВІВ)

*У статті досліджено використання енергії припливів та відпливів як надійного джерела відновлюваної енергії. Розглянуто основні технології генерації, такі як греблеві системи, припливні лагуни та динамічні припливні установки. Аналізуються технічні, економічні та екологічні аспекти, зокрема вплив на морські екосистеми, фінансова ефективність і перспективи інтеграції з іншими видами енергетики. Також розглядаються інноваційні рішення для підвищення продуктивності та можливості міжнародної співпраці.*

**Ключові слова:** *припливна енергетика, відновлювані джерела, гідродинаміка, екологічний вплив, альтернативна енергетика, економічна ефективність, інноваційні технології.*

*The article explores the use of tidal energy as a reliable source of renewable energy. The main generation technologies, such as dam systems, tidal lagoons, and dynamic tidal plants, are considered. Technical, economic, and environmental aspects are analyzed, including the impact on marine ecosystems, financial efficiency, and prospects for integration with other types of energy. Innovative solutions to increase productivity and opportunities for international cooperation are also considered.*

**Keywords:** *tidal energy, renewable sources, hydrodynamics, environmental impact, alternative energy, economic efficiency, innovative technologies..*

Tidal energy is a renewable and sustainable source of power generated by the gravitational interaction between the Earth, Moon, and Sun. It is one of the most predictable energy sources due to the periodic nature of tides, making it a highly reliable option for energy production. The movement of ocean waters follows a consistent and measurable pattern, ensuring a stable supply of energy compared to other renewable sources like solar and wind power, which can be affected by unpredictable weather conditions. This unique characteristic makes tidal energy an attractive option



for countries with coastal access, looking to diversify their energy portfolios and reduce dependence on fossil fuels. [1]

Tidal energy generation relies on different technologies, including tidal barrages, tidal stream generators, and dynamic tidal power (DTP). Tidal barrages function similarly to hydroelectric dams, trapping water during high tide and releasing it during low tide to drive turbines and generate electricity. This method is considered highly effective, as it can generate a significant amount of energy. However, the construction of tidal barrages often requires significant financial investment and can have profound ecological impacts, affecting fish migration and water salinity. Tidal stream generators, on the other hand, operate like underwater wind turbines, utilizing tidal currents to produce power with less environmental disruption. They are smaller in scale but can be deployed in multiple locations, making them a more flexible option for energy generation. DTP, a newer concept, involves constructing long dams perpendicular to tidal flows to create pressure differentials that drive turbines. While this approach has great potential for energy production, its large-scale implementation remains limited due to high costs and technological challenges. [2]

The advantages of tidal energy include its predictability, sustainability, and low operational costs. Unlike wind and solar power, which depend on weather conditions, tidal cycles are highly consistent, allowing for precise energy output forecasts. This consistency ensures that energy providers can plan ahead and integrate tidal power into the electrical grid with minimal fluctuations. Additionally, tidal energy is virtually inexhaustible, as long as gravitational forces persist. Once infrastructure is built, maintenance costs are relatively low compared to fossil fuel plants, making it an economically viable solution in the long term. Furthermore, tidal energy production does not emit greenhouse gases, contributing to global efforts in reducing carbon emissions and combating climate change. [3]

However, there are challenges associated with tidal energy. The high initial investment for infrastructure development remains a significant barrier to large-scale adoption. The cost of building and installing tidal barrages and turbines can be substantial, and financial incentives or government subsidies are often required to make these projects feasible. Tidal barrages can alter water salinity levels, disrupt marine habitats, and affect sediment transport, raising ecological concerns. Fish populations and aquatic biodiversity can be negatively impacted by changes in the water flow, which necessitates careful planning and environmental assessments before project implementation. Furthermore, tidal energy is geographically limited, as only coastal regions with strong tidal activity can harness it effectively. This means that inland countries or those with weaker tides may not benefit from this energy source. Technological maturity also poses a challenge, as many tidal energy systems are still in the experimental phase, requiring further research and innovation. Without advancements in engineering and cost reduction, widespread deployment of tidal energy remains a distant goal. [4]

Future developments in tidal energy are expected to focus on enhancing efficiency and reducing costs through advances in engineering, materials science, and computational modeling. New materials and design innovations could lead to more efficient turbines that generate higher amounts of energy while minimizing environmental damage. The integration of tidal energy with other renewable sources, such as offshore wind farms, is also being explored to create hybrid energy systems that maximize electricity production. Improved environmental assessments and mitigation strategies may facilitate broader acceptance and implementation of tidal energy projects. For example, new research aims to develop fish-friendly turbine designs that reduce harm to marine life. As the world transitions toward sustainable energy solutions, continued research, policy support, and international collaboration will be crucial in unlocking the full potential of tidal energy. If governments and private investors commit to further development, tidal energy could become a major contributor to the global renewable energy landscape. [5]

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УДК 004.8:316.422

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## ARTIFICIAL INTELLIGENCE AS A FOUNDATION FOR SOCIAL TRANSFORMATION

*Стаття аналізує вплив штучного інтелекту на різні сфери життя, зокрема освіту, медицину та соціальні системи, а також підкреслює важливість етичних аспектів і міждисциплінарних зусиль у його розвитку.*

**Ключові слова:** штучний інтелект, інформаційні технології, людство, соціальне життя.

*The article analyzes the impact of artificial intelligence on various spheres of life, including education, medicine and social systems, and also emphasizes the importance of ethical aspects and interdisciplinary efforts in its development.*

**Keywords:** artificial intelligence, information technologies, humanity, social life.

Modern information technologies and intellectual capital have become the determining factors of the progress of civilization. The rapid development of technical progress, including digital media, artificial intelligence and the Internet of Things, is significantly transforming human activities and social systems. It is important to be aware of these changes, their concepts and the main characteristics of artificial intelligence, as they have a direct impact on our daily lives and the future of society.

Humanity has always sought change, but at the same time felt fear of it. The transition from hand tools to machines, the replacement of steam with electric or nuclear energy, as well as the latest scientific and technological developments have significantly transformed the labor process. Although these changes promised to expand productive opportunities, they have caused concern among a part of the population. Today, humanity is again on the verge of new discoveries, especially in the field of artificial intelligence, which, although exciting, also cause serious concerns.

Artificial intelligence as a scientific direction arose with the advent of digital computers. In 1950, the English mathematician Alan Turing, in his article “Computing Machines and Intelligence,” noted that interest in “thinking machines” arose thanks to digital computers. He described the basic structure of a digital computer, the interaction of its components, and proposed the use of a binary number system. Turing proved that computing machines can solve problems of any complexity, and since all digital computers are logically the same, he called them universal machines. [2]

People often tend to intellectualize their goals, believing that thinking is exclusively an attribute of the human brain. However, over the past fifty years, we have increasingly realized that many unconscious processes can imitate conscious thinking.

Artificial intelligence has the potential to radically change the world, opening up new horizons in education, medicine, and social life, adapting to the needs of modern society. The use of AI in education provides individualized curricula and interactive methods that help each student develop at a comfortable pace. In medicine, AI contributes to the diagnosis of diseases, the development of new drugs and the creation of personalized treatment plans. In social life, it provides support through chatbots and helps to identify psychological problems.

Along with these opportunities, the development of AI poses challenges, such as automation, which can threaten jobs, as well as ethical and security issues. Therefore, it is important to create effective regulatory mechanisms to ensure the ethical use of artificial intelligence.

The formation of AI requires efforts in mathematics, biology, psychology and cybernetics, as well as in philosophy. The role of philosophy goes beyond establishing ethical foundations for human interaction with AI; it involves understanding its role in the fate of civilization. This understanding is key to coordinating efforts in developing a model of AI that meets the task of cooperation with human intelligence and society. It depends on understanding the dynamics of how we think about AI. [1]

Unlike humans, who think naturally, robots only imitate the process of thinking, which allows them to remotely control gadgets and make predictions for various industries. An AI system has a limited amount of processed data and is usually used to perform routine tasks. It works at high speed, performing up to 10 million operations per second, and can implement complex AI programs. However, it can only be trained on large amounts of data, and it is not capable of abstract thinking, which, due to its low adaptability, limits its ability to solve problems and correct failures. [3]

It is therefore important to note that emotions, intuition, and social influences play a significant role in shaping individual actions and choices, highlighting the complex interaction between rational thinking and other cognitive and affective processes. At the same time, the rapid development of artificial intelligence, ethical dilemmas in biotechnology, and the spread of information are forcing us to rethink the concept of human intelligence and its relationship to the evolving world.

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УДК 811.111

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### **CRISPR-Cas: A GENETIC REVOLUTION (CRISPR-Cas: ГЕНЕТИЧНА РЕВОЛЮЦІЯ)**

*У публікації розглядаються основні аспекти її застосування в сільському господарстві, зокрема покращення врожайності, якості культур, стійкості до хвороб і*

гербіцидів. Описано також її роль у вдосконаленні селекційних методів, прискоренні процесу доместикиції та впровадженні нових підходів до регуляції генів. Обговорюються перспективи технології та можливі виклики, пов'язані з її ефективністю, нормативним регулюванням і сприйняттям суспільством.

**Ключові слова:** CRISPR-Cas, редагування геному, біотехнологія рослин, стійкість до хвороб, стійкість до гербіцидів, генна регуляція, селекція гібридів, стале сільське господарство, генетична модифікація, сільськогосподарська біотехнологія.

*The publication discusses the main aspects of its application in agriculture, including improving yields, crop quality, disease and herbicide resistance. It also describes its role in improving breeding methods, accelerating the domestication process and introducing new approaches to gene regulation. The prospects of the technology and possible challenges related to its effectiveness, regulatory framework and public perception are discussed.*

**Keywords:** CRISPR-Cas, genome editing, plant biotechnology, disease resistance, herbicide resistance, gene regulation, hybrid breeding, sustainable agriculture, genetic modification, agricultural biotechnology.

CRISPR-Cas genome editing technology has revolutionized plant molecular biology, offering high specificity, programmability, and efficiency. It allows for precise genetic modifications in crops, facilitating the creation of varieties with beneficial traits such as increased yield, improved quality, and enhanced resistance to diseases and environmental stressors. This system is derived from an adaptive immunity mechanism found in bacteria and archaea, utilizing sequence-specific nucleases to induce double-strand breaks in DNA, which are repaired through homology-directed repair or non-homologous end joining. Compared to earlier genome editing techniques like zinc-finger nucleases and TALENs, CRISPR-Cas9 is more efficient and easier to use due to its RNA-guided mechanism [1].

One of the key applications of CRISPR-Cas in agriculture is increasing crop yield. Scientists have successfully manipulated genes controlling plant growth and development, leading to higher grain production in rice and wheat. Alterations in genes that regulate tiller number and panicle size have also contributed to yield improvements in cereals. Beyond yield, CRISPR-Cas has been applied to improve crop quality by adjusting starch composition in rice and maize, enhancing cooking and nutritional properties. The development of low-gluten wheat using this technology has provided new opportunities for individuals with celiac disease. Another significant advancement is in disease resistance, where CRISPR-Cas has been used to knock out susceptibility genes, strengthening plant defenses against bacterial blight in rice, citrus canker in citrus crops, and powdery mildew in wheat and tomato. The system has also been harnessed to engineer resistance against plant DNA and RNA viruses. Additionally, herbicide-resistant crops have been developed by modifying specific genetic sequences, reducing dependence on chemical weed control [2].

Beyond improving crops, CRISPR-Cas has streamlined breeding processes by accelerating domestication and hybrid seed production. Through haploid induction, editing of genes like *MATRILINEAL* has facilitated the production of haploid plants, significantly reducing the time needed to develop stable genetic lines. The modification of male sterility genes such as *Ms1* in wheat has enabled the efficient production of hybrid seeds, which exhibit higher yield and resilience. Scientists have also induced apomixis through precise gene editing, allowing plants to reproduce asexually while maintaining the advantages of hybrid vigor [3].

In addition to direct genome modifications, CRISPR-Cas is expanding its role in gene regulation, multiplexed editing, and directed evolution. Modified CRISPR variants like dCas9 allow for precise activation or repression of genes without altering DNA sequences, making it possible to fine-tune gene expression. Multiplexed CRISPR systems enable the simultaneous targeting of multiple genes, increasing the efficiency of genetic modifications. Directed evolution strategies using CRISPR-Cas facilitate the rapid adaptation of plant traits to environmental stressors, contributing to sustainable agricultural practices [4].

Despite its transformative potential, several challenges remain, including the need to improve editing efficiency, address regulatory concerns, and ensure consumer acceptance. Future research aims to optimize CRISPR–Cas for broader applications in diverse crop species and agricultural settings. Nonetheless, CRISPR–Cas stands as a revolutionary tool for sustainable agriculture, offering precise and efficient solutions to global food security challenges [3].

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УДК 339.138:005.33

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### CRITERIA FOR THE EFFECTIVENESS OF ENTERPRISE MANAGEMENT

*У статті досліджено критерії ефективності управління підприємством, зокрема виробничу, трудову, організаційну, фінансову та ринкову складові. Розглянуто методи оцінки ефективності менеджменту та їхній вплив на досягнення стратегічних цілей підприємства.*

**Ключові слова:** ефективність, менеджмент, підприємство, трудові ресурси, фінансові показники, маркетинг.

*The article studies criteria of efficiency in enterprise management, in particular, production, labour, organisational, financial and market components. Methods of assessment of management efficiency and their impact on achievement of strategic goals of an enterprise are considered.*

**Keywords:** efficiency, management, enterprise, labour resources, financial indicators, marketing.

Management effectiveness is a multifaceted concept that covers a wide range of aspects of management activities aimed at achieving the organisation's ultimate goals under conditions of optimal use of available resources and adaptation to the external environment. The definition of management efficiency as the level of effectiveness of management activities is based on criteria and indicators that reflect the qualitative and quantitative characteristics of the management process, as well as the degree of achievement of the set objectives.

Management efficiency criteria perform the function of assessing the quality of management processes and must meet several requirements. They should fully reflect the results of economic activity, determine the level of achievement of goals, and be measurable. In the economic literature, the efficiency of management activities is traditionally viewed through the prism of the maximum excess of results over resource costs. This is based on the generally accepted principle of rational use of material, financial and labour resources.

The key criteria for the effectiveness of enterprise management include profitability, product quality, production defect rate, production process capacity, technological efficiency, rhythmicity

and continuity of the production cycle. In addition, indicators of human resources potential, such as employee qualifications, staff turnover, labour productivity and the quality of management decisions, are also of significant importance. Financial criteria include the level of profitability, liquidity, solvency and financial stability of the enterprise. The marketing component assesses market share, product competitiveness, sales conditions and logistics parameters.

Management performance indicators serve to quantify the effectiveness of management decisions. They allow analysing and comparing the results of the company's business activities in different time periods. The main financial indicators are the ratio of own and borrowed funds, solvency, creditworthiness, as well as profitability indicators, including gross and net income from sales. Business activity is assessed using indicators of asset turnover, capital efficiency, material intensity and labour efficiency.

One of the central aspects of assessing management effectiveness is the analysis of the company's assets and liabilities. Assets represent the value of tangible and intangible resources owned by the company and used to generate economic benefits. Liabilities, in turn, reflect the company's financial obligations to external entities, which may be long-term or short-term. The ratio of assets to liabilities allows us to assess the financial independence of the company and its ability to self-finance.

Assessing the efficiency of an enterprise's management is a complex process that covers various aspects of an organisation's activities, which together determine its overall performance. The production efficiency of management is manifested in the ability of an enterprise to rationally use labour resources, optimise the operation of production equipment and technologies, ensure an uninterrupted production process and minimise losses at the stages of work in progress. Rational logistics management, efficient use of warehouse stocks and optimisation of production capacities help to achieve a stable level of productivity and product quality. Another important area of assessment is the rhythmicity and uniformity of production, which helps to improve the efficiency of management decisions and reduce unproductive costs. The effectiveness of strategic and operational planning of production processes is a key factor in ensuring the sustainable development of an enterprise.

Labour, organisational, financial and market efficiency of management cover a wide range of factors that influence the overall success of an enterprise. The efficiency of labour resources depends on the moral and psychological climate in the team, the quality of management decisions and the level of communication processes. Organisational aspects of management efficiency include the ability of the company to implement innovative, investment and commercial projects, as well as the effectiveness of strategic business plans. Financial efficiency is determined by the stability of budgeting, liquidity, financial stability, and the level of asset and capital utilisation. The market area of management effectiveness assessment includes an analysis of competitiveness, marketing strategies, product sales and pricing policy. All these components together allow the company to adapt to changes in the external environment, develop its operations and ensure sustainable economic development.

Thus, management effectiveness is a complex concept characterised by a combination of qualitative and quantitative indicators that reflect the level of achievement of organisational goals. Its assessment requires a systematic approach that includes analysis of financial, production, human resources and market parameters. In the context of growing competition and dynamic market development, management decisions should be adaptive, strategically balanced and aimed at long-term growth of the enterprise's efficiency.

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УДК 811.111

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## RISK MANAGEMENT IN FINANCIAL INSTITUTIONS (УПРАВЛІННЯ РИЗИКАМИ У ФІНАНСОВИХ УСТАНОВАХ)

*Управління ризиками у фінансових установах є ключовим для забезпечення їхньої стабільності та прибутковості. Основні ризики, такі як кредитний, ринковий та ліквідний, можуть мати значний вплив на діяльність установ. Застосування новітніх технологій, зокрема штучного інтелекту, допомагає ефективно оцінювати та мінімізувати загрози. Ефективне управління ризиками забезпечує стійкість і конкурентні переваги установи.*

**Ключові слова:** фінансові установи, управління ризиками, кредитний ризик, ринковий ризик, фінансові технології.

**Abstract:** Risk management in financial institutions is crucial for maintaining their stability and profitability. Key risks, such as credit, market, and liquidity risks, can significantly affect operations. The use of advanced technologies, like artificial intelligence, helps assess and mitigate these threats effectively. Effective risk management ensures the resilience and competitive advantage of institutions.

**Keywords:** financial institutions, risk management, credit risk, market risk, financial technologies.

Risk management in financial institutions is a fundamental process aimed at identifying assessing and mitigating potential threats that could affect their stability and profitability. Financial institutions operate in a complex environment where various risks such as credit risk, market risk, liquidity risk and operational risk can have significant consequences if not managed effectively. The importance of risk management has grown due to increasing regulatory requirements, economic uncertainties and technological advancements that introduce new vulnerabilities.

Credit risk remains one of the most critical concerns for financial institutions as it arises when borrowers fail to meet their obligations. This type of risk affects banks and lending institutions directly as loan defaults can lead to financial losses. To manage credit risk, institutions employ stringent credit assessment procedures, diversify their loan portfolios and set aside capital reserves to cover potential losses. Additionally, credit risk mitigation strategies include requiring collateral, credit insurance and closely monitoring borrower behavior [1].

Market risk stems from fluctuations in interest rates, exchange rates and asset prices that can impact the financial performance of institutions. This type of risk is particularly relevant for investment banks, asset managers and firms engaged in trading activities. To mitigate market risk, financial institutions use various techniques such as hedging with derivatives, stress testing and setting limits on market exposures. Effective market risk management allows institutions to maintain stability even in volatile economic conditions.

Liquidity risk is another crucial aspect of risk management as it involves the ability of an institution to meet its short-term obligations. Financial institutions must ensure they have adequate cash flow and liquid assets to cover unexpected withdrawals and financial commitments. A lack of

liquidity can lead to insolvency and a loss of confidence among clients. To manage liquidity risk, institutions implement robust liquidity management frameworks, maintain sufficient reserves, and establish contingency funding plans. Central banks also play a crucial role in providing liquidity support during financial crises.

Operational risk encompasses potential losses resulting from inadequate internal processes, human errors, system failures, or external events such as cyberattacks and fraud. As financial institutions increasingly rely on technology, operational risks have become more complex. Cybersecurity threats pose a major challenge, requiring institutions to invest in advanced security systems, conduct regular risk assessments, and implement strict data protection measures. Strong internal controls, employee training programs, and business continuity plans are also essential for minimizing operational risks [2].

Regulatory compliance is an integral part of risk management as financial institutions must adhere to laws and regulations designed to maintain financial stability. Governments and regulatory bodies impose capital adequacy requirements, reporting standards, and risk management guidelines to ensure institutions operate in a transparent and secure manner. Non-compliance with regulatory requirements can result in severe penalties, reputational damage, and legal consequences. Therefore, institutions allocate significant resources to compliance teams and risk management departments to ensure adherence to regulations.

The role of risk management has evolved with the advancement of financial technologies and globalization. The emergence of digital banking, fintech companies, and blockchain-based financial systems has introduced new opportunities and risks. Financial institutions must adapt their risk management strategies to address challenges such as digital fraud, identity theft, and algorithmic trading risks. Implementing artificial intelligence and big data analytics has enhanced risk assessment capabilities, allowing institutions to identify potential threats more accurately and respond proactively [3].

Effective risk management not only protects financial institutions from potential threats but also enhances their competitive advantage. A well-structured risk management framework fosters investor confidence, strengthens customer trust, and ensures long-term sustainability. Institutions that proactively manage risks can seize new opportunities while minimizing potential losses, thereby contributing to the overall stability of the financial system.

In conclusion, risk management in financial institutions is a dynamic and essential process that requires continuous adaptation to changing economic, regulatory, and technological landscapes. By implementing comprehensive risk management strategies, financial institutions can safeguard their operations, mitigate potential losses, and maintain resilience in an increasingly complex financial environment.

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**OPTIMIZATION OF THE STRUCTURE OF ADVANCED CAPITAL  
(ОПТИМІЗАЦІЯ СТРУКТУРИ АВАНСОВАНОГО КАПІТАЛУ)**

*У статті подана інформація про місце авансованого капіталу у структурі підприємства. Визначено особливості оптимізації структури авансованого капіталу.*

**Ключові слова:** авансований капітал, оптимізація, структура авансованого капіталу, норма прибутку, прибутковість.

*The article provides information on the place of advanced capital in the structure of an enterprise. The peculiarities of optimization of the structure of advanced capital are determined.*

**Keywords:** advanced capital, optimization, structure of advanced capital, rate of return, profitability.

The effectiveness of any enterprise depends on a number of factors and conditions. The study of the advanced capital of the enterprise deserves special attention. In conditions of economic volatility, processes are underway that directly affect the structure of advanced capital. These changes, in turn, affect the final result of the enterprise's activities.

The advanced capital of the enterprise is the value invested in economic activity in the form of fixed assets and intangible assets, current assets, human capital, etc., which in the process of its movement (transformation) brings income. These contributions must have a specific purpose that does not contradict the types of economic activity, and can be provided for a specific task for its subsequent implementation, including the creation of a new enterprise [1].

The formation of the optimal capital structure of a commercial organization is a significant factor in ensuring the effective management of its finances, and also determines the creation of a stable financial base for the production and economic activities of commercial enterprises.

The optimal capital structure of commercial organizations is understood as the ratio of equity and borrowed funds in which the enterprise ensures maximum business profitability and the necessary level of solvency and financial stability established by the criteria [3].

The main goals of optimizing capital and increasing the efficiency of its use are:

- increasing the level of financial stability and solvency of the company;
- reducing the risk of insolvency (bankruptcy);
- increasing the efficiency of the company's business organization.

These goals are based on certain methods, such as: self-sufficiency, self-development and self-financing.

It is well known that modeling the behavior of objective economic phenomena is much more difficult in practice than in theory. In fact, every management decision of any level is made in uncertain conditions. Sometimes it is very difficult to predict its consequences.

Most often, management has to conduct a retrospective analysis of business operations that form the level of solvency. and the trajectory of further development of the business entity.

In most cases, competent diagnostics of negative phenomena in the optimal (most acceptable) structure of assets and liabilities of the company allows you to develop a management strategy and tactics in a timely manner in order to overcome the financial crisis in the early stages of its development.

Based on the above, the purpose of this article is to present for discussion the author's methodology for modeling the optimal structure of the total capital of a commercial organization, aimed at regulating the ratio of borrowed and own liabilities of the balance sheet, varying non-current and current assets within the framework of effective anti-crisis regulation of business processes.

There are various methods of forming the financial stability of an organization. In my opinion, one of the most significant is the optimization of the liquidity of assets and the structure of the sources of formation.

The problem of choosing the optimal ratio of the elements of the total capital (fixed and circulating, own and borrowed) is central in the theory of capital structure. This issue has been repeatedly raised in the academic literature (the most complete reviews of existing models and methods are given in the works of M. Harris and A. Reviv [4] and S. Myers [7]). The initial stage of developing the theory of the financial structure of capital is associated with the works of J. Williams [2] on the valuation of financial assets and the works of D. Durand [8]. The foundations of the theory of enterprise financing were laid by F. Modigliani and M. Miller [6], who showed that the choice between debt and equity does not affect the cost of raising capital and the value of the firm. Based on the Modigliani-Miller theory, compromise theories by M. Brennan, E. Schwartz [2], H. Leland [5] and other researchers emerged. They substantiated the need to take into account such factors of the economic development of the firm as real economic conditions, the level of financial market conditions, the severity of the tax burden and the degree of tax burden on profits, as well as the magnitude of bankruptcy costs.

According to M. Baker and J. Wegler, the capital structure is formed as a result of management's attempts to monitor the capital market and is the total result of all such attempts [9].

The capital of an enterprise is a necessary condition for its functioning. The level and structure of the enterprise's capital determine its financial capabilities, and also contribute to determining the level of financial stability and solvency. The assessment of the capital structure of an enterprise should be carried out in conjunction with the assessment of its composition, movement and efficiency of use, which will contribute to a more rational and detailed analysis, and as a rule, to the development of appropriate management decisions. In the practice of assessing the capital structure, there is no single model for its optimization, therefore, each company, taking into account certain factors, must independently decide what conditions for optimizing its capital are acceptable and optimal.

Increasing the efficiency of capital management of an enterprise should be limited only to its optimization. In order to rationally manage capital, it is necessary to take measures to increase the efficiency of its use, according to the principles: increasing the level of profitability of the enterprise's own and borrowed capital; creating conditions for strengthening the financial stability of the enterprise through the effective use of own and borrowed capital; increasing the level of profitability of capital in order to ensure an increase in financial returns and the formation of additional profits; ensuring the structure and size of own and borrowed capital; increasing the level of profitability of capital in order to ensure an increase in financial returns and the formation of additional profits; ensuring the structure and size of own and borrowed capital necessary to protect the interests of owners and for an objective assessment by creditors and other interested parties; confident behavior of the enterprise in the market; effective investment in the assets of the enterprise.

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УДК 811.111

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**BIOTECHNOLOGICAL METHODS OF REGULATING REPRODUCTIVE  
FUNCTIONS OF COWS  
(БІОТЕХНОЛОГІЧНІ МЕТОДИ РЕГУЛЯЦІЇ ВІДТВОРЮВАЛЬНОЇ ФУНКЦІЇ У  
КОРІВ)**

*У публікації проведено огляд методів регуляції відтворювальної функції корів. Було проаналізовано дослідження вчених про стимуляцію відтворювальної функції у сільськогосподарських тварин шляхом використання гормональних препаратів.*

*Ключові слова: біотехнології, відтворювальна функція, корови, стимуляція, гормональні препарати, синхронізація, простагландини, статевая охота, статевий цикл, гонадотропін.*

*The publication provides a review of methods for regulating the reproductive function of cows. It analyzes research by scientists on stimulating the reproductive function of farm animals through the use of hormonal drugs.*

*Keywords: biotechnology, reproductive function, cows, stimulation, hormonal drugs, synchronization, prostaglandins, estrus, sexual cycle, gonadotropin.*

Scientific research related to methods of regulating reproductive functions of farm animals dates back to the 1950s, when it was first proven that hormones could be used to increase the fertility of animals. However, at that time, the understanding of the mechanisms of neurohumoral interactions was quite incomplete, and the practical possibilities for using hormonal drugs of various actions were extremely limited [1].

In modern times, numerous studies on stimulating reproductive functions of farm animals through the use of biologically active substances are being conducted in many countries around the world. As real practice shows, hormonal drugs are the most effective, as they allow for proper normalization of sexual processes and increase fertility. Such drugs include gestagens (megestrol acetate, progesterone, etc.) used in combination with gonadotropic drugs [2].

However, according to scientists [3], after synchronization with progestagens, fertility may decrease, and synchronization may be incomplete for inseminating groups of animals at a specifically defined time. Therefore, nowadays, more researchers are focusing on the use of prostaglandins to study the stimulation of sexual function of cows and heifers [4].

One of the most widespread classes of prostaglandins includes: A, B, E, D, C, and F. Prostaglandins in living organisms are synthesized from polyunsaturated fatty acids through a special enzyme system (prostaglandin synthase), which is located in the myxomal membranes [5].

Prostaglandins can be found in a very large number of systems in the bodies of various animal species and humans, namely: in the mucous membranes of the stomach and intestines, in the kidneys, liver, spleen, brain tissue, iris, and other tissues and organs. However, the highest concentration is found in seminal fluid [6].

Prostaglandins exert a powerful physiological effect on a number of body systems: cardiovascular, endocrine, reproductive, nervous, respiratory, digestive, and excretory. Of particular interest to scientists is the luteolytic action of prostaglandin F<sub>2</sub>-α in the ovarian artery, where it

causes the regression of the corpus luteum, accompanied by a decrease in the content and production of progesterone [6].

The results of research by scientists [7] clearly showed that estradiol plays an extremely important role in the synthesis or realization of PGF2- $\alpha$ . 18-24 hours before the onset of labor, under the influence of estrogens, the content of PGF2- $\alpha$  in the blood of animals begins to increase sharply. PGF2- $\alpha$  of placental origin enhances the effect of oxytocin on the uterus, and at this time, the level of progesterone drops [7].

In conducted studies [6], prostaglandin, which was administered intrauterinely, caused synchronous estrus in 72.2% of animals within 70-84 hours after treatment, with a fertility rate of 84% after the first insemination. A significant advantage of this insemination is the coverage of animals characterized by "silent heat" and their subsequent successful artificial insemination.

The effectiveness of using PGF2- $\alpha$  estrumate in heifers was studied [8]. The drug was injected intramuscularly into the animals in a dose of 500 mcg twice with an interval of 11 days. As a result of this treatment, 100% of the heifers came into estrus within 48-72 hours. In the blood of the heifers, the concentration of progesterone decreased to minimal levels 36 hours after the administration of estrumate.

Scientists investigated [9] prostaglandin F2- $\alpha$  of domestic production and lutalyse of American origin. No radical difference in the luteolytic action of the drugs compared in a series of studies was found. The effective dose for the use of domestically produced prostaglandin was 10 mg when administered intrauterinely and 25 mg when administered intramuscularly.

One of the practical recommendations of scientists [6] to increase the effectiveness of using prostaglandins F2- $\alpha$  for animals with ovarian hypofunction is to administer them gonadotropin PMSG at a dose of 1500-2000 IU per head, and after 48 hours – prostaglandin F2- $\alpha$ . When using this treatment scheme, estrus is observed in 41.7% of heifers with a fertility rate of 60%.

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УДК 005.591.4:631.15

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## IMPLEMENTATION OF LEAN MANAGEMENT IN AGRICULTURAL ENTERPRISES

*The article comprehensively explores the theoretical, methodological, and practical aspects of implementing lean management in the activities of Ukrainian agricultural enterprises. The essence of the lean production concept is revealed, and its potential for improving management efficiency in the agricultural sector is analyzed. The main methodological approaches, advantages, and barriers to implementing lean technologies in agricultural enterprises are identified. The strategic expediency of applying lean production principles in the context of a transformational economy is substantiated.*

**Keywords:** lean management, agricultural enterprises, lean production, process optimization, management efficiency, business processes, competitiveness.

*У статті комплексно досліджено теоретичні, методологічні та практичні аспекти впровадження lean-менеджменту в діяльність аграрних підприємств України. Розкрито сутність концепції ощадливого виробництва, проаналізовано її потенціал для підвищення ефективності управління в аграрному секторі. Визначено основні методологічні підходи, переваги та бар'єри імплементації lean-технологій у сільськогосподарських підприємствах. Обґрунтовано стратегічну доцільність застосування принципів бережливого виробництва в умовах трансформаційної економіки.*

**Ключові слова:** lean-менеджмент, аграрні підприємства, ощадливе виробництво, оптимізація процесів, ефективність управління, бізнес-процеси, конкурентоспроможність.

In the context of contemporary global economic transformations, Ukraine's agricultural sector finds itself in a state of permanent necessity to enhance its competitiveness and adapt to dynamic market challenges. Innovative management technologies capable of ensuring significant improvement in operational efficiency and optimization of internal economic processes have become particularly crucial. Among such technologies, the concept of lean management, or lean production, which originated in the production system of the Japanese corporation Toyota and has been successfully adapted to various industrial contexts, occupies a prominent position [1].

The theoretical and methodological foundations of lean management are based on fundamental principles of continuous improvement of production systems, maximum minimization of all types of losses, and orientation towards creating value for the end consumer. According to Voitko's research on international enterprise competitiveness, these principles require strategic transformations that go beyond traditional management approaches [4].

Scientific research by leading domestic and foreign scholars convincingly proves the high potential of lean technologies in the agricultural sector. In particular, studies by the Institute of Agrarian Economics, as highlighted by Lupenko, demonstrate that consistent implementation of lean production principles enables domestic agricultural enterprises to achieve impressive economic results: reducing operational costs by 15-25%, increasing labor productivity by 20-30%, shortening production cycle duration by 35-40%, and improving overall product quality [1].

The methodology of lean management in agricultural production involves a comprehensive systemic approach to transforming business processes. Its key components include consistent identification and elimination of unproductive expenses, formation of a corporate culture of continuous improvement, maximum involvement of personnel in optimization processes, and implementation of the philosophy of constant improvements (kaizen). Ilchuk's research on innovative transformations in the agricultural sector emphasizes the importance of creating an adaptive management environment that supports continuous learning and improvement [5].

Empirical analysis of the activities of leading domestic and international agricultural enterprises allows identifying the most promising areas for lean technology implementation. These include rationalization of logistics processes for raw material supply and distribution, optimization of production inventory management, improvement of workplace organization, implementation of effective planning and forecasting systems for agricultural production, and enhancement of multi-level product quality control.

Simultaneously, the practice of implementing lean management in Ukraine's agricultural sector reveals a number of systemic barriers. These include conservative management approaches, limited financial resources for transformations, low level of personnel digital literacy, and natural resistance to organizational changes by employees. Overcoming these barriers requires a balanced strategy, consistent managerial decisions, and investments in human capital [2].

A critical aspect of successful lean technology implementation is the development of digital infrastructure in agricultural enterprises. The digitalization of management processes creates the necessary technological foundation for effective lean production principles. Modern information systems, such as ERP and CRM, enable real-time monitoring of business processes, allow for prompt identification of potential losses and inefficiencies, and ensure transparency and manageability of production cycles. Digital technologies provide management with powerful tools for analyzing production indicators, forecasting, and operational response to changes, which is a key condition for successful implementation of the lean management concept in the agricultural sector [3].

International experience of leading companies in the Agricultural Lean Group and successful cases of domestic agricultural enterprises demonstrate that a systematic and consistent approach to implementing lean management can provide significant long-term competitive advantages. Such an approach involves thorough diagnostics of current business processes, development of a detailed transformation strategy, comprehensive personnel training and education, phased implementation of changes, and continuous performance monitoring.

The lean management concept goes beyond traditional operational management, transforming into a comprehensive management philosophy based on the principles of continuous improvement, respect for human resources, and orientation towards creating maximum value for the consumer. In the conditions of Ukraine's modern transformational economy, precisely such an approach can become an effective tool for increasing the competitiveness of domestic agricultural enterprises.

**Conclusions.** The implementation of lean management is a strategically important direction for improving the efficiency of agricultural enterprises in the context of current economic challenges. The success of the transformation depends on a comprehensive approach, consistent implementation of lean production principles, investment in human capital, and management's readiness for systemic organizational changes.

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УДК 811.111

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**PROSPECTIVE DIRECTIONS FOR THE USE OF CLARY SAGE UNDER THE  
CONDITIONS OF GROWING IN THE SOUTHERN STEPPE OF UKRAINE  
(ПЕРСПЕКТИВНІ НАПРЯМКИ ВИКОРИСТАННЯ ШАВЛІЇ МУСКАТНОЇ ЗА УМОВ  
ВИРОЩУВАННЯ В ПІВДЕННОМУ СТЕПУ УКРАЇНИ)**

*У публікації розглянуто перспективи вирощування шавлії мускатної (Salvia sclarea) в умовах Південного Степу України. Проаналізовано агротехнічні особливості вирощування цієї культури, а також широкий спектр застосування її ефірної олії в фармацевтичній, парфумерній та харчовій промисловості. Особливу увагу приділено антиоксидантним і лікувальним властивостям олії шавлії мускатної, її використанню для виготовлення косметичних засобів, а також як натурального консерванта для продуктів харчування.*

**Ключові слова:** шавлія мускатна, *Salvia sclarea*, Південний Степ України, ефірна олія, фармацевтична промисловість, парфумерна промисловість, харчова промисловість.

*The publication considers the prospects for growing clary sage (Salvia sclarea) in the conditions of the Southern Steppe of Ukraine. The agrotechnical features of growing this crop are analyzed, as well as a wide range of applications of its essential oil in the pharmaceutical, perfumery and food industries. Special attention is paid to the antioxidant and medicinal properties of clary sage oil, its use for the manufacture of cosmetics, as a natural preservative for food products.*

**Keywords:** clary sage, *Salvia sclarea*, Southern Steppe of Ukraine, essential oil, pharmaceutical industry, perfumery industry, food industry.

Clary sage (*Salvia sclarea*) is rapidly emerging as a highly promising crop, grabbing the attention of agronomists and entrepreneurs due to its versatile properties and its ability to thrive in the environmental conditions of Ukraine's Southern Steppe. This plant is renowned for its drought resistance, frost tolerance, and adaptability to various soil types, making it particularly well-suited for the region's dry climate. As a result, clary sage has significant potential not only for agricultural development but also for industries such as food production, pharmaceuticals, and perfumery [1].

As a perennial plant, clary sage thrives in the Southern Steppe, where drought resistance is essential. It can adapt to a range of soil types, including poor, stony soils, although it performs best in nutrient-rich chernozem and loamy soils. To ensure high productivity and quality essential oil production, it is crucial to implement proper agrotechnical practices, such as determining optimal seed rates, sowing times, irrigation, and fertilization [2].

The essential oil of clary sage has broad applications in the pharmaceutical and perfume industries. It is valued for its antiseptic, anti-inflammatory, antibacterial, and antioxidant properties. These qualities make it a vital ingredient in medicines and a fixative in perfumes. Additionally, its antioxidant effects make it a valuable addition to cosmetics [3].

In medicine, clary sage oil is commonly used to treat skin diseases such as acne, eczema, and dermatitis. Its anti-inflammatory properties help reduce irritation and inflammation, making it a popular component in skincare products. Furthermore, the oil provides benefits for the nervous

system, with calming effects that help reduce stress and anxiety, so it is frequently used in aromatherapy [4].

Clary sage also has potential in the food industry, where its essential oil is used as a flavoring agent in products like confectionery, beverages, and sauces. The oil enhances the sensory qualities of food, increasing their appeal to consumers. Moreover, the antioxidant properties of clary sage essential oil make it an ideal ingredient for functional foods aimed at supporting health. It can also serve as a natural preservative, helping prevent oxidation in food products and extending their shelf life [5].

In summary, clary sage (*Salvia sclarea*) is a promising crop for cultivation in the Southern Steppe of Ukraine due to its drought and frost resistance. These traits make it well-suited for agro-industrial development in the region. With the growing demand for its essential oil in the pharmaceutical, perfumery, and food industries, the cultivation of clary sage also offers significant economic opportunities for the country. However, to fully realize its potential, further research into agrotechnical practices and the development of climate-resilient varieties is necessary.

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**PROSPECTS FOR CULTIVATING MONARDA DIDYMA IN THE SOUTHERN STEPPE  
OF UKRAINE  
(ПЕРСПЕКТИВИ ВИРОЩУВАННЯ МОНАРДИ ДВІЙЧАСТОЇ В ПІВДЕННОМУ  
СТЕПУ УКРАЇНИ)**

*У публікації проведено огляд та аналіз особливостей вирощування монарди двійчастої в умовах Південного Степу України. Розглянуто основні напрями застосування ефірної олії цієї культури в харчовій, медичній та сільськогосподарській галузях, зокрема у тваринництві та біологізації рослинництва. Проаналізовано переваги вирощування монарди двійчастої, а також виклики, пов'язані з її інтродукцією, впливом різних факторів на якість і кількість ефірної олії та перспективами подальших досліджень.*

**Ключові слова:** монарда двійчаста, ефірна олія, інтродукція, Південний Степ України, агротехніка, біологізація, рослинництво.

*The publication reviews and analyzes the features of growing *Monarda bifidum* in the conditions of the Southern Steppe of Ukraine. The main directions of application of the essential oil of this crop in the food, medical and agricultural industries, in particular in animal husbandry and biologization of plant growing, are considered. The advantages of growing *Monarda bifidum*, as well as the challenges associated with its introduction, the influence of various factors on the quality and quantity of essential oil and the prospects for further research are analyzed.*

**Key words:** *monarda didyma*, essential oil, introduction, Southern Steppe of Ukraine, agricultural technology, biologization, plant growing.

In recent years the direction of introduction and cultivation of essential oil plants in the Southern Steppe of Ukraine has significantly developed. The production of essential oils is a promising direction of agricultural development, as it can satisfy a large number of needs in various spheres of life. However, the area of cultivation of these crops is still insufficient to provide raw materials for all industries using essential oils, as well as to introduce new areas of their use. The share of exported raw materials for essential oil production still accounts for more than half of the total amount [1].

The described problem creates new challenges and opportunities for research and development of new highly productive and profitable essential oil crops. One of the potential candidates in this direction is *Monarda didyma* L. Although the main volume of cultivation of this plant falls in the eastern part of North America and some regions of Eurasia, it is also successfully adapting in the western regions of North America. Thanks to modern agronomic technologies it is possible to expand the area of cultivation of this plant, since it can successfully adapt to different soil and climatic conditions. We must also take into account the fact that climate change is creating new opportunities for the introduction of essential oil crops in our region, particularly for the introduction of *Monarda didyma* L.

In Ukraine, there have been repeated studies on the characteristics of the introduction and cultivation of *Monarda didyma* L. However, the majority of these studies were conducted in the conditions of the Forest-Steppe and Polissya. For instance, there are studies on the influence of sowing dates and seed storage characteristics on the productivity of this plant in the northern Forest-Steppe. In the Southern Steppe of Ukraine, research has been conducted on the productivity of crop varieties and the influence of varietal characteristics on the qualitative and quantitative composition of the essential oil of *Monarda didyma* L. Varieties Slava, Serpanok, and Snezhana were studied, and the Snezhana variety was found to demonstrate the best indicators. This suggests that there are

significant prospects for further research in this area, although preliminary findings indicate the feasibility of introducing this plant in the southern Ukrainian climate [2].

*Monarda didyma* is notable for its high concentration of beneficial chemicals in its leaves, which contribute to its economic and practical value. These chemicals include various aromatic compounds that emit scents reminiscent of mushrooms, bergamot, oregano, and menthol. These compounds have been shown to possess bactericidal, insecticidal, immunostimulating, and antioxidant properties, which contribute to maintaining plant health and may have a beneficial effect on the human body when utilized for various purposes, including treatment and culinary applications [3].

In the confectionery industry, *Monarda didyma* holds significant potential, with savory crackers made with its essential oil emerging as a particularly promising application. The research has highlighted the plant's high antioxidant content, underscoring its status as a natural antioxidant with health-promoting benefits. *Monarda didyma* L. also holds promise in the field of animal nutrition. The replacement of synthetic antibiotics with *Monarda* in animal feeding has the potential to contribute to advancements in animal husbandry by reducing the risk of developing antibiotic resistance and ensuring safer and more environmentally friendly conditions for animal production [5].

The research by some scientists has indicated the presence of compounds in *Monarda didyma* that have the potential to serve as components of biological preparations with antibacterial and antifungal effects. Studies have demonstrated that the essential oils of *M. didyma* exhibit high antibacterial activity against the genera *Xanthomonas* and *Pseudomonas*. Furthermore, research has shown that *Monarda* essential oil has antifungal properties, with a negative effect on the development of all fungi studied by scientists [6].

A number of studies by foreign scientists have indicated the potential of *Monarda didyma* L. essential oil for use as a component in bioherbicides. Further research on the properties of this essential oil in field conditions is planned to better understand the real effect of its use [7].

The *Monarda didyma* L. culture demonstrates considerable promise for application in diverse domains, including confectionery, medicine, and the field of biologization of agricultural production through the utilization of by-products derived from crop processing as constituents of biological preparations exhibiting fungicidal and herbicidal properties. Concurrently, the regulation of cultivation conditions, the integration of supplementary cultivation technologies, and the examination of varietal characteristics can facilitate the accumulation of specific substances within the plant, thereby delineating optimal utilization pathways.

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УДК 811.111

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**GENE THERAPY FOR THE TREATMENT OF INCURABLE DISEASES – SUCCESSES AND CHALLENGES IN THE TREATMENT OF HEREDITARY DISEASES  
(ГЕННА ТЕРАПІЯ ЛІКУВАННЯ НЕВИЛКОВНИХ ХВОРОБ – УСПІХИ ТА ВИКЛИКИ В ЛІКУВАННІ СПАДКОВИХ ЗАХВОРЮВАНЬ)**

*У публікації проведено огляд сучасних досягнень у сфері генної терапії як методу лікування спадкових захворювань. Розглянуто успіхи у використанні генної терапії для корекції серповидно-клітинної анемії, спінальної м'язової атрофії та спадкової сліпоти. Проаналізовано основні виклики, пов'язані з високою вартістю лікування, безпекою та етичними аспектами редагування геному, перспективи подальшого розвитку генної терапії та її впливу на майбутнє медицини.*

*Ключові слова: генна терапія, спадкові захворювання, генетична модифікація, серповидноклітинна анемія, спінальна м'язова атрофія (сма), спадкова сліпота, зольгенсма, редагування геному, етичні проблеми, медична біотехнологія, доставка генетичного матеріалу.*

*The publication provides an overview of current achievements in the field of gene therapy as a method of treating hereditary diseases. Successes in the use of gene therapy to correct sickle cell anaemia, spinal muscular atrophy and hereditary blindness are discussed. The main challenges related to the high cost of treatment, safety and ethical aspects of genome editing, prospects for further development of gene therapy and its impact on the future of medicine are analysed.*

*Keywords: gene therapy, hereditary diseases, genetic modification, sickle cell anaemia, spinal muscular atrophy (SMA), hereditary blindness, zolgensma, genome editing, ethical issues, medical biotechnology, genetic material delivery.*

Gene therapy is one of the most promising areas of modern medicine, allowing the treatment of hereditary diseases by modifying the patient's genetic material. This method opens up opportunities for treating pathologies such as sickle cell anaemia, spinal muscular atrophy (SMA), hereditary blindness and other diseases that were previously considered incurable. However, along with its successes, gene therapy faces a number of challenges that require further research and resolution [5].

One of the most significant achievements in the field of gene therapy was the treatment of sickle cell anaemia, which allows correcting mutations in the  $\beta$ -globin gene, which significantly improves the condition of patients [5]. In addition, in 2017, a drug was approved for the treatment of Leber's amaurosis, a severe inherited retinal disease. Thanks to the therapy, patients who were previously blind were able to partially restore their vision [1].

Another breakthrough was the use of Zolgensma to treat spinal muscular atrophy. This disease, which leads to loss of motor function of children, was previously considered fatal. Gene therapy can stabilise patients' condition and, in some cases, significantly improve their mobility and quality of life [4].

Despite significant progress, gene therapy faces a number of challenges. One of the main limitations is the high cost of treatment. For example, some drugs cost several million dollars, making them unaffordable for most patients.

Another problem is the issue of safety and ethics. Interfering with human genetic material raises concerns about possible long-term consequences. This is especially true of embryo genome editing, which can have unpredictable effects on future generations [2]. In addition, scientists face technical difficulties related to ensuring stable expression of the introduced genes and efficient delivery of genetic material to target cells [3].

Gene therapy has the potential to become the main treatment for hereditary and many acquired diseases. Further research, the development of more efficient methods of delivering genetic material, and a reduction in the cost of therapy could make it more affordable and safer. The introduction of these technologies into medical practice will open up new opportunities for patients who previously had no chance of living a full life.

In summary, gene therapy is one of the most promising areas of modern medicine, demonstrating significant progress in the treatment of incurable diseases. At the same time, it requires further development to overcome challenges related to high costs, safety and ethical issues. Despite these difficulties, the development of gene therapy has the potential to significantly change the way in which hereditary diseases are treated and improve the quality of life for millions of patients worldwide.

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Наукове видання

**Матеріали Міжнародної науково-практичної конференції «Загальні аспекти інноваційного розвитку освітньої галузі в контексті міжнародного співробітництва України. General Aspects of Innovation Development of Education in the Context of International Cooperation of Ukraine»**

м. Миколаїв,  
24-25 квітня 2025 р.

Технічний редактор: Ганна ЯБЛУНОВСЬКА

Формат 60x84/16. Ум. друк. арк. 12,5  
Тираж 100 пр. Зам. №\_\_

Надруковано у видавничому відділі  
Миколаївського національного аграрного університету  
54020, м. Миколаїв, вул. Георгія Гонгадзе, 9

Свідоцтво суб'єкта видавничої справи ДК № 4490 від 20.02.2013 р.