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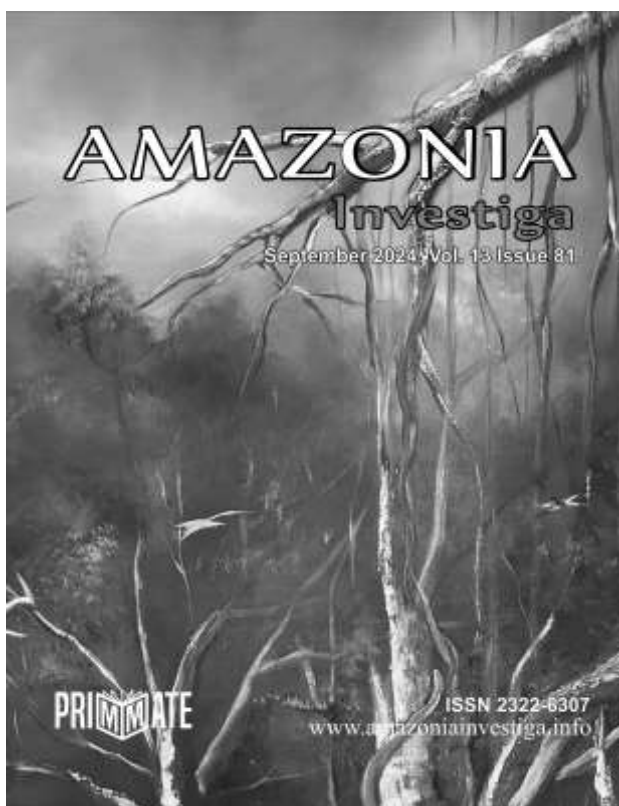
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INDEXATIONS



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TABLE OF CONTENTS

Industrial research and development capacity building	9
Private international law and parental responsibility: the experience of applying parental responsibility measures to Ukrainians in EU countries	24
Impact of digital marketing and E-Payments on Saudi online startup consumers	39
Caracterización de la movilidad en CDMX durante la pandemia de Covid-19 con ecuaciones de tendencia	59
Economic security of Ukraine in wartime: challenges and prospects	78
The impact of digital transformation on the development of post-war regions of Ukraine.....	86
History as a weapon: narratives and propaganda in the Russo-Ukrainian war	98
The influence of historical memory on the formation of national identity: a response to the challenges of the Russian-Ukrainian war	108
Morphology of evaluation: the peculiarities of modeling evaluative meanings through morphological means in the Ukrainian language.....	117
Adaptation of Ukrainians to forced migration: a study of psychosocial models and factors	130
Effect of storage time on antioxidant content in seeds of agricultural plants.....	142
Legal foundations as pillars of the anti-corruption fight: an analysis of the activities of judicial and law enforcement agencies.....	157
Assessment of public trust in the media under martial law	168
Cultivating values in early childhood: case study in rural and urban contexts.....	179
Social media and public opinion formation in times of war: A case study from Ukraine.....	187
Innovative technologies for the development of critical thinking in students	197
Innovative technologies for healthy education: a practical guide for educational institutions.....	214
The mask as a new means of communication: a multimodal analysis of its communicative value during the COVID-19 pandemic	234
Current socio-economic issues of migration regulation: Ukrainian realities and global trends	249
The impact of video on military engineering learning in wartime	260

"Science advances not only by expanding our knowledge but also by revealing the beauty and complexity of the universe we inhabit. Today we celebrate the tireless commitment of researchers who seek answers and solutions to improve our world."

"La ciencia avanza no solo expandiendo nuestro conocimiento, sino también revelando la belleza y la complejidad del universo que habitamos. Hoy celebramos el compromiso incansable de los investigadores que buscan respuestas y soluciones para mejorar nuestro mundo."

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Industrial research and development capacity building

การเสริมสร้างขีดความสามารถด้านการวิจัยและพัฒนาในภาคอุตสาหกรรม

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
Abstract


Thailand faces significant challenges in aligning academic research with industrial needs and fostering robust R&D capabilities within businesses. The Industrial Research and Development Capacity Building (IRDCap) initiative was implemented to address these issues and enhance Thailand's innovation ecosystem. The program employs a dual approach: Train-the-Trainer (TTT) to develop academic expertise, and IRDCap Consulting to provide tailored support to businesses. It utilizes a comprehensive framework for developing R&D blueprints and roadmaps, supported by a central digital platform for monitoring and communication. Over five years, IRDCap trained 489 trainers and engaged 201 companies across various sectors, predominantly in agriculture and food. The program generated a valuation of 241.2 million US dollars, stimulated 28.1 million US dollars in investment, and created over 750 high-value jobs. Case studies demonstrate successful implementation of R&D roadmaps leading to product innovations and market expansion. IRDCap effectively bridges the gap between academic knowledge and industrial application, contributing significantly to Thailand's R&D capacity. The program's success highlights the importance of structured, collaborative approaches in fostering innovation, the effectiveness of the Triple-Helix model in driving economic development, and the need for continued adaptation to dynamic business environments.


Keywords: Research and development (R&D), Triple-Helix model, R&D roadmap, R&D blueprint, Thailand.

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เชิงนามธรรม

ประเทศไทยกำลังเผชิญกับความท้าทายสำคัญในการปรับทิศทางการวิจัยทางวิชาการให้สอดคล้องกับความต้องการของภาคอุตสาหกรรม และการส่งเสริมขีดความสามารถด้านการวิจัยและพัฒนาที่แข็งแกร่งภายในธุรกิจ โครงการเสริมสร้างขีดความสามารถด้านการวิจัยและพัฒนาในอุตสาหกรรม (IRDCap) ถูกนำมาใช้เป็นเครื่องมือในการแก้ไขปัญหาดังกล่าว และเสริมสร้างระบบนิเวศนวัตกรรมของประเทศไทย โดยโครงการนี้ใช้แนวทางแบบคู่ขนาน ได้แก่ การฝึกอบรมผู้ฝึกสอน (Train-the-Trainer หรือ TTT) เพื่อพัฒนาผู้เชี่ยวชาญทางวิชาการ และการให้คำปรึกษา IRDCap เพื่อให้การสนับสนุนที่เหมาะสมกับธุรกิจ ซึ่งโครงการนี้ใช้กรอบการทำงานที่ครอบคลุมสำหรับการพัฒนาพิมพ์เขียวและแผนที่นำทางการวิจัยและพัฒนา โดยมีแพลตฟอร์มดิจิทัลกลางสนับสนุนการติดตามและการสื่อสาร โดยในช่วงเวลา 5 ปี IRDCap ได้ฝึกอบรมผู้เชี่ยวชาญไปทั้งสิ้น 489 คน และมีส่วนร่วมกับบริษัท 201 แห่งในหลากหลายภาคส่วน โดยเฉพาะอย่างยิ่งในภาคการเกษตรและอาหาร โครงการนี้สร้างมูลค่าประเมิน 241.2 ล้านดอลลาร์สหรัฐ กระตุ้นการลงทุน 28.1 ล้านดอลลาร์สหรัฐ และสร้างงานมูลค่าสูงกว่า 750 ตำแหน่ง โดยกรณีศึกษาแสดงให้เห็นถึงความสำคัญในการนำแผนที่นำทางการวิจัยและพัฒนาไปใช้ ซึ่งนำไปสู่นวัตกรรมผลิตภัณฑ์และการขยายตลาด ซึ่ง IRDCap สามารถปิดช่องว่างระหว่างความรู้ทางวิชาการและการประยุกต์ใช้ในอุตสาหกรรมได้อย่างมีประสิทธิภาพ ส่งผลอย่างมีนัยสำคัญต่อขีดความสามารถด้านการวิจัยและพัฒนาของประเทศไทย ความสำเร็จของโครงการนี้ชี้ให้เห็นถึงความสำคัญของแนวทางที่มีโครงสร้างและความร่วมมือในการส่งเสริมนวัตกรรม ประสิทธิภาพของโมเดลไตรภาคี (Triple-Helix) ในการขับเคลื่อนการพัฒนาเศรษฐกิจ และความจำเป็นในการปรับตัวอย่างต่อเนื่องเพื่อรับมือกับสภาพแวดล้อมทางธุรกิจที่เปลี่ยนแปลงตลอดเวลา.

คำสำคัญ: วิจัยและพัฒนา, โมเดลไตรภาคี, แผนที่นำทางการวิจัยและพัฒนา, พิมพ์เขียวการวิจัยและพัฒนา, ประเทศไทย.

Introduction

Research and Development (R&D) plays a crucial role in driving innovation and enhancing productivity across various sectors of the economy. Studies have consistently demonstrated that the social rate of return on R&D investments is substantial, under-scoring the significant positive externalities generated by these activities (Evenson et al., 1979; Alston, 2010). Similarly, research has shown that creative human capital plays an increasingly vital role in economic development as industrial economies transition to knowledge-based creative economies (Kuznetsova et al., 2022). This high social return justifies continued emphasis on R&D as a key driver of economic growth and technological advancement.

Global trends indicate a projected increase in R&D investments, with Asian countries expected to experience particularly robust growth in both economic output and R&D expenditure. This growth trajectory in Asia is anticipated to outpace that of other regions worldwide. Within this global landscape, the United States and China are poised to maintain their positions as leaders in economic growth and R&D investment increases (Mehlman, 2024).

In the United States, R&D investment has reached substantial levels, with annual expenditures approximating 495 billion US dollars. The private sector plays a dominant role in this investment, contributing about 67% of the total R&D spending. Complementing this private investment, the Federal government allocates approximately 150 billion US dollars annually to R&D activities. These funds are distributed across Federal laboratories, universities, and other research organizations (Armstrong et al., 2019). This public-private partnership in R&D funding exemplifies a balanced approach to fostering innovation, combining market-driven research with government-supported scientific inquiry.

The synergistic relationship between industry and academia has been widely recognized as a pivotal factor in enhancing research and development (R&D) outcomes. Recent research has highlighted how national culture significantly influences digital transformation success through its effects on digital competencies and information system management practices (Alshammari & Alshammari, 2023). University-industry linkages facilitate multifaceted benefits, including knowledge transfer, talent acquisition, and resource sharing, which collectively contribute to accelerated innovation and improved problem-solving capabilities (Phongthiya et al., 2022; Murga Pinillos, 2024). These collaborations enable firms to access cutting-edge research and specialized expertise, while simultaneously providing universities with practical insights and funding opportunities.

The symbiosis often results in expedited commercialization of research findings and a more robust innovation ecosystem. Moreover, such partnerships can mitigate R&D risks and costs for both parties, making ambitious projects more feasible and potentially leading to breakthrough technologies. The long-term research focus of universities complements the more immediate, application-oriented approach of industry, creating a balanced R&D portfolio that addresses both fundamental questions and market needs. Consequently, industries with strong university linkages tend to exhibit enhanced R&D success, manifesting in increased patent applications, product innovations, and overall competitive advantage in their respective markets (Opassuwan & Wannamakok, 2024).

Methodology

This research employs a mixed-methods approach combining quantitative program evaluation with qualitative case study analysis to assess the implementation and impact of the Industrial Research and Development Capacity Building (IRDCap) initiative in Thailand. The study spans a five-year period (2019-2024), utilizing both primary and secondary data sources to provide a comprehensive understanding of the program's effectiveness in enhancing R&D capabilities within Thai industries.

The quantitative component involves systematic collection and analysis of program performance metrics, including: number of trained consultants, participating companies, established R&D units, economic value generation, investment stimulation, and job creation. Data collection was facilitated through the IRDCap Central Platform, which served as a centralized repository for all program-related information and metrics. The platform's structured data collection protocols ensured consistency and reliability in performance measurement across different regions and industry sectors. This was supplemented by regular progress reports, financial documentation, and participant surveys that provided quantitative insights into program outcomes.

The qualitative dimension employs multiple case study methodology, analyzing specific instances of program implementation across various industry sectors. Primary data was gathered through semi-structured interviews with key stakeholders, including program managers, trainers, and participating company representatives. Documentation review included analysis of R&D blueprints, implementation reports, and feedback from knowledge exchange sessions. The research framework was guided by the Triple-Helix model of innovation, examining the interactions between government initiatives, academic institutions, and industry partners. This methodological triangulation, combining multiple data sources and analytical approaches, enhances the validity and reliability of the findings while providing rich contextual understanding of the program's impact on Thailand's R&D landscape.

Research and Development (R&D) Capacity Building in Thailand

Research and development (R&D) capacity building in Thai industry is a focal point of study, given its critical role in driving innovation and economic growth. An examination of Thailand's R&D expenditure reveals a modest investment of 13.4 billion US dollars, which accounts for only 1.1% of the country's GDP. This level of investment positions Thailand at the 36th rank globally in terms of R&D spending (Dutta et al., 2022). Such figures underscore the need for increased investment in R&D to enhance Thailand's competitiveness in the global innovation landscape.

In the Global Innovation Index 2022, published by the World Intellectual Property Organization (WIPO), Thailand ranks 43rd overall, indicating a moderate performance in innovation on the global stage (Dutta et al., 2022). This ranking suggests that while Thailand has made progress in fostering innovation, there is still considerable room for improvement to join the ranks of leading innovative nations. A closer examination of specific indicators reveals both strengths and areas for development in Thailand's R&D landscape. Business expenditure on R&D stands at 0.8% of GDP, placing Thailand at the 30th position world-wide. This relatively higher ranking in business R&D suggests a growing recognition among Thai companies of the importance of innovation in maintaining competitiveness. However, the percentage of knowledge-intensive employment in Thailand is only 15.1%, resulting in a lower global ranking of 90th. This disparity highlights a potential mismatch between R&D investments and the creation of high-skilled jobs in knowledge-intensive sectors.

Research and development (R&D) in Thailand faces significant challenges in aligning academic research with industrial needs. Most Thai R&D institutes primarily focus on basic research, resulting in a disconnect

between developed technology and industrial demand (Karaveg et al., 2014). This misalignment has prompted the government to take proactive measures to bridge the gap between academia and industry. In response, several projects have been initiated to support industrial R&D, with the dual objectives of enhancing the country's research activities and fostering stronger university-industry linkages (Siripitakchai & Miyazaki, 2015; Wannakul et al., 2019).

The Thai government plays a pivotal role in nurturing R&D, particularly among small and medium-sized enterprises (SMEs). Through a comprehensive evaluation process that considers factors such as entrepreneur capabilities, researcher expertise, and project details, the government selects and supports industrial R&D projects for SMEs (Karaveg et al., 2014). This targeted approach aims to stimulate innovation and technological advancement within the SME sector, which forms a crucial component of Thailand's economy.

Despite these efforts, researchers and developers in Thailand face several key challenges. A notable concern is the negative relationship between R&D intensity and firm performance in Thai SMEs (Suttipun & Insee, 2024). This inverse correlation suggests that SMEs struggle to translate their R&D investments into tangible improvements in business performance, highlighting the need for more effective R&D strategies and support mechanisms. Thailand's economic development has been hampered by what is commonly referred to as the middle-income trap. This stagnation is largely attributed to the relatively low technological learning capacity of firms, a situation exacerbated by decades of ineffective science, technology, and innovation policies (Intarakumnerd, 2019).

Innovation-driven enterprises (IDEs) in Thailand encounter specific impediments that hinder their growth and effectiveness. These challenges encompass the quality of entrepreneurs, product-market fit issues, and inadequate support systems (Thawesaengskulthai et al., 2024). These factors collectively impact the depth of knowledge within IDEs, the efficacy of business incubation programs, and the overall effectiveness of laws, measures, and policies designed to support innovation capability development. Addressing these impediments is crucial for fostering a more robust and dynamic R&D ecosystem in Thailand.

Industrial Research and Development Capacity Building (IRDCap) Initiative

The Ministry of Higher Education, Science, Research and Innovation (MHESI) in Thailand serves as the primary government agency responsible for overseeing higher education and fostering the research and development ecosystem. This ministry plays a crucial role in shaping the country's innovation landscape and aligning educational institutions with national development goals. MHESI has established a comprehensive strategic framework to guide its activities and initiatives. The key strategic objectives of the ministry include: (1) enhancing economic competitiveness and sustainable self-reliance through higher education, science, research, and innovation; (2) elevating social and environmental standards through the application of higher education, science, research, and innovation; (3) advancing cutting-edge science, technology, research, and innovation; and (4) developing human capital within higher education institutions and research organizations. These strategic pillars demonstrate a holistic approach to leveraging education and innovation for national development.

One of the notable initiatives launched by MHESI is the Industrial Research and Development Capacity Building (IRDCap) initiative. This program aims to strengthen the research and development capabilities of businesses in Thailand. The specific objectives of IRDCap include enabling businesses to develop comprehensive R&D blueprints, cultivating expertise in innovation and technology management within companies, and facilitating the establishment of dedicated R&D units within business entities. A distinguishing feature of this initiative is its adoption of the Triple-Helix model, which promotes collaboration between government, private sector, and educational institutions. This collaborative approach is designed to create synergies and enhance the overall effectiveness of R&D efforts in the country.

The IRDCap represents a significant initiative in Thailand's national innovation ecosystem, implemented through a decentralized network of Regional Science Parks (RSPs) (Poonjan et al., 2022; Wongwanich, 2022; Pairsuwan, 2023). This structure ensures comprehensive geographical coverage across the country, with four key RSPs strategically positioned: RSP North, RSP North-East 1, RSP North-East 2, and RSP South. The utilization of RSPs as the primary operational units for IRDCap leverages their established infrastructure and regional expertise, facilitating more effective engagement with local industries and academic institutions (Cooke et al., 1997; Asheim & Isaksen, 2002).

The decentralized approach of IRDCap through RSPs aligns with contemporary theories of regional innovation systems, which emphasize the importance of localized knowledge networks and context-specific innovation strategies (Tödtling & Trippel, 2021). By operating through regionally embedded institutions, IRDCap can more effectively tailor its interventions to the specific needs, challenges, and opportunities of different geographical areas within Thailand. This structure also facilitates the diffusion of innovation practices and knowledge across regions, potentially leading to more balanced economic development throughout the country (Lundvall & Borrás, 1997).

Furthermore, the involvement of RSPs in IRDCap exemplifies a Triple-Helix model of innovation, where government initiatives (represented by the national IRDCap program) intersect with academic institutions (embodied in the RSPs' university affiliations) and industry (the target beneficiaries of the program) (Etzkowitz & Leydesdorff, 2000). This tripartite collaboration is crucial for fostering an environment conducive to sustained innovation and technological advancement, particularly in emerging economies striving to enhance their global competitiveness through research and development capabilities (Intarakumnerd et al., 2002).

The success and sustainability of IRDCap projects are further bolstered by the RSPs' cumulative experience in managing complex, multi-stakeholder initiatives. Their proficiency in navigating the intricate dynamics between academic research, industrial application, and policy implementation positions the RSPs as ideal facilitators for the program (Perkmann et al., 2013). This expertise is particularly valuable in addressing the oft-cited challenges of bridging the gap between academic research and industrial application, a critical factor in the success of innovation-driven economic development strategies (Bruneel et al., 2010; Bozeman et al., 2013).

The IRDCap program represents a comprehensive approach to fostering innovation and enhancing R&D capabilities within Thailand's industrial sector. This initiative is structured around two interconnected yet distinct projects: Train the Trainer (TTT) and IRDCap Consulting, as illustrated in Figure 1. This dual-project framework is designed to create a sustainable R&D ecosystem by effectively bridging the gap between academic expertise and practical business applications.

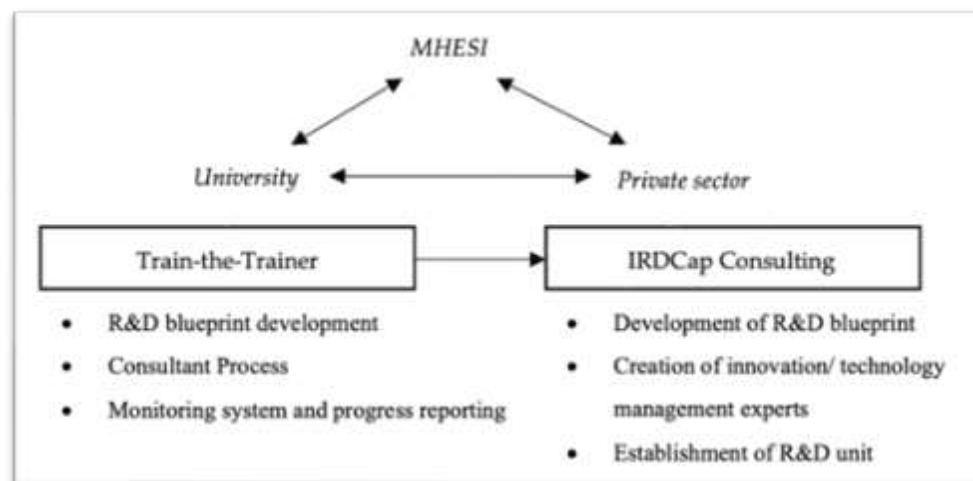


Figure 1. Conceptual Framework of IRDCap – a Triple-Helix approach.

At the core of this framework is MHESI, which serves as the central coordinating body. MHESI facilitates bidirectional relationships with both universities and the private sector, ensuring alignment between national innovation policies and the practical needs of industry. This tripartite interaction exemplifies the Triple-Helix model of innovation, where government, academia, and industry collaborate to drive economic and social development.

The TTT component focuses on developing a cadre of skilled consultants from academic institutions. This project encompasses three critical elements: R&D blueprint development, consultant process training, and the implementation of monitoring systems for progress reporting. By equipping academic professionals with these skills, the program aims to create a sustainable source of expertise that can be continually tapped to support industrial R&D efforts.

Complementing the TTT project, IRDCap Consulting represents the practical application of the developed expertise within the private sector. This component involves the development of tailored R&D blueprints for participating companies, the creation of innovation and technology management experts within these organizations, and the establishment of dedicated R&D units. This hands-on approach ensures that the knowledge and skills developed through the TTT project are effectively transferred and implemented within industrial settings.

Train-the-Trainer (TTT)

The Train-the-Trainer (TTT) project, a key component of the IRDCap initiative, focuses on building capacity for university academia to serve as trainers in developing research and development (R&D) capabilities within companies. TTT equips trainers with essential innovation and R&D management tools through an intensive 15-hour training program that emphasizes both hard and soft skills development.

The development of the course content follows a rigorous and comprehensive approach, integrating multiple sources of input and expertise. This includes stakeholder suggestions, extensive literature review, and expert knowledge. The program is structured into three primary modules covering hard skills, complemented by special lectures and integrated soft skills training.

The analysis module, allocated 4 hours, covers business trend analysis, business foresight, and gap analysis. It provides trainers with tools to assess current market conditions and future trends, such as SWOT, TOWS matrix, Business Model Canvas, Five Forces Model, and PESTEL (Martinez-Contreras et al., 2022; Pasaribu et al., 2023; Rizki & Wijaya, 2024). This module aims to develop understanding of the interplay between science, technology, and innovation while emphasizing the importance of key performance indicators (KPIs) in strategic planning.

The development plan module, also 4 hours, focuses on industrial research, technology blueprint development (Carvalho et al., 2013; Rennings et al., 2003), and capacity development. It addresses the identification and resolution of technology and innovation gaps within organizations, the development of technology blueprints and roadmaps, and the emphasis on sustainable capacity building.

The implement strategies module, another 4 hours, addresses strategies development and implementation. It ensures trainers can guide companies in executing their R&D plans effectively, focusing on translating plans into actionable strategies, developing R&D roadmaps and blueprints tailored to specific organizational needs, and considering relevant technologies and associated costs.

Complementing these core modules, the program includes 3 hours of special lectures on pertinent topics. These include overcoming challenges through open innovation (Elmquist et al., 2009), fostering innovative thinking in science and technology, and gaining insights into the future of industry from experts.

Soft skills are integrated throughout the program, particularly during workshop sessions. These sessions simulate real consulting scenarios, allowing trainers to practice and refine their communication, problem-solving, and advisory skills in the context of IRDCap consultations.

The structure of the TTT program can be summarized in Table 1.

Table 1.
Train-the-Trainer (TTT) program.

Module	Hrs.	Key Objective	Content Area	Workshop Activities
Analysis	4	Understand business trends, foresight, and gap analysis	Business trend analysis, foresight techniques, KPI setting	Conduct business trend analysis, environmental scanning
Development Plan	4	Address technology gaps, develop blueprints	Industrial research, technology blueprint development	Identify technology trends and gaps
Implement Strategies	4	Translate plans into actionable strategies	Strategies development and implementation	Develop R&D roadmap and plan
Special Lectures	3	Gain insights on innovation and industry future	Open innovation, innovation thinking in science and technology	

This comprehensive structure ensures that trainers are equipped with a holistic skillset to effectively support companies in developing their R&D capabilities, aligning with the broader objectives of the IRDCap initiative.

IRDCap Consulting

The IRDCap Consulting program represents a structured approach to enhancing research and development (R&D) capabilities within Thai businesses. The program begins with a rigorous selection process, wherein companies submit applications for participation. This selection phase employs multiple criteria, including organizational readiness, company size, and comprehension of the program's objectives. This multi-faceted evaluation ensures that participating companies are well-positioned to benefit from the program and contribute to its overall success.

Upon successful selection, companies are strategically paired with consultants drawn from a database of TTT graduates. This matching process is predicated on an initial assessment of compatibility between the company's specific needs and the consultant's areas of expertise. Such a tailored approach aims to establish a strong foundation for productive collaboration within the IRDCap framework, potentially enhancing the effectiveness of the consulting process.

The core of the IRDCap Consulting program is a comprehensive 20-man-day consultative process. The primary objective of this process is the development of detailed R&D blueprints for participating businesses. These blueprints are not generic templates but are instead tailored to address specific gaps in each company's R&D capabilities. Crucially, the development process ensures alignment between these R&D plans and the broader vision and strategic targets of the participating companies.

This hands-on, customized approach facilitates the practical application of R&D concepts and methodologies in real business contexts. By grounding theoretical knowledge in the specific challenges and opportunities faced by each company, the IRDCap Consulting program aims to produce more effective and relevant R&D outcomes. This methodology aligns with best practices in management consulting and organizational development, which emphasize the importance of context-specific interventions for maximum impact.

The consulting process follows a structured "expert journey," as illustrated in Figure 2. This journey serves as a consultation guideline, providing a standardized yet flexible framework for consultants to follow. While the specific details of this journey are not elaborated in the given text, the use of such a structured approach suggests a systematic method for guiding companies through the R&D blueprint development process.

By combining careful company selection, strategic consultant matching, and a structured yet tailored consulting process, the IRDCap Consulting program represents a comprehensive approach to building R&D capacity in Thai businesses. This methodology has the potential to contribute significantly to the broader goals of enhancing innovation and competitiveness in the Thai industrial sector.

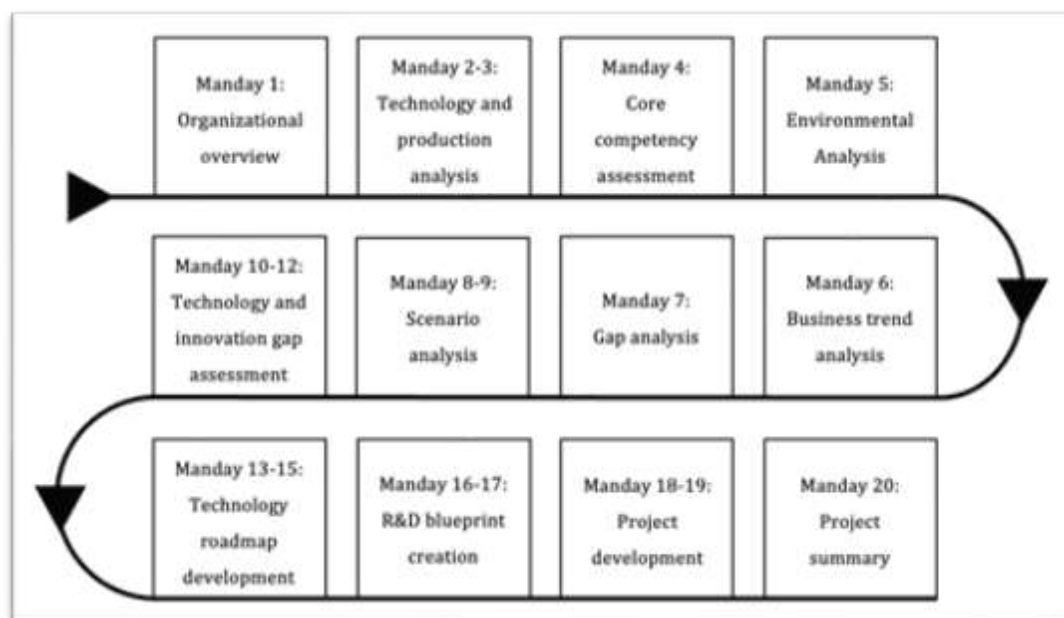


Figure 2. IRDCap Consulting - Expert Journey.

R&D Roadmap and Blueprint Development

The IRDCap program employs a comprehensive framework that delineates a strategic approach to transforming organizations into Research, Development & Innovation-Driven Enterprises (RDIDE) (Siripitakchai & Miyazaki, 2015; Dolińska, 2022). This framework, illustrated in Figure 3, outlines a systematic process of business analysis and planning aimed at enhancing innovation capabilities and competitiveness.

The model begins with a multifaceted business analysis that incorporates three key elements: business/market trends, technology trends, and foresight and scenario planning. These analyses serve as the foundation for developing or refining the organization's business model, which acts as the strategic core of the enterprise. This business model, in turn, guides the formulation of R&D activities, which are specifically designed to bridge gaps between current capabilities and future needs.

The framework recognizes that R&D activities do not exist in isolation but are influenced by various organizational factors. These include production and technology capabilities, capacity building efforts, and related business functions. This holistic approach ensures that R&D initiatives are aligned with the broader organizational context and capabilities.

The ultimate goal of this process is the transformation of the organization into an RDIDE with a clear vision and defined targets. This transformation is realized through the development of a comprehensive R&D Blueprint (Barbosa et al., 2020; Mehand et al., 2018). The blueprint comprises eight key components: organizational overview and goals, current business operations analysis, business trend analysis, environmental analysis, scenario development, technology assessment, R&D and technology roadmap development, and a detailed R&D plan.

This approach emphasizes a holistic view of business and innovation, recognizing the interdependence of R&D with all aspects of the business and its environment. By linking business analysis, model development, and R&D activities, the framework ensures that innovation efforts are strategically aligned with overall business objectives and market realities.

The IRDCap framework provides a structured yet flexible approach for businesses to systematically develop their innovation capabilities. Its iterative and dynamic nature allows organizations to adapt to changing market conditions while maintaining a focused approach to R&D and innovation. This methodology is particularly valuable in dynamic market environments, where the ability to innovate and adapt quickly can be a key determinant of competitiveness and long-term success.

By providing a comprehensive roadmap for R&D and innovation, this framework addresses a critical need in Thailand's industrial sector, potentially contributing to the country's efforts to enhance its technological capabilities and economic competitiveness.

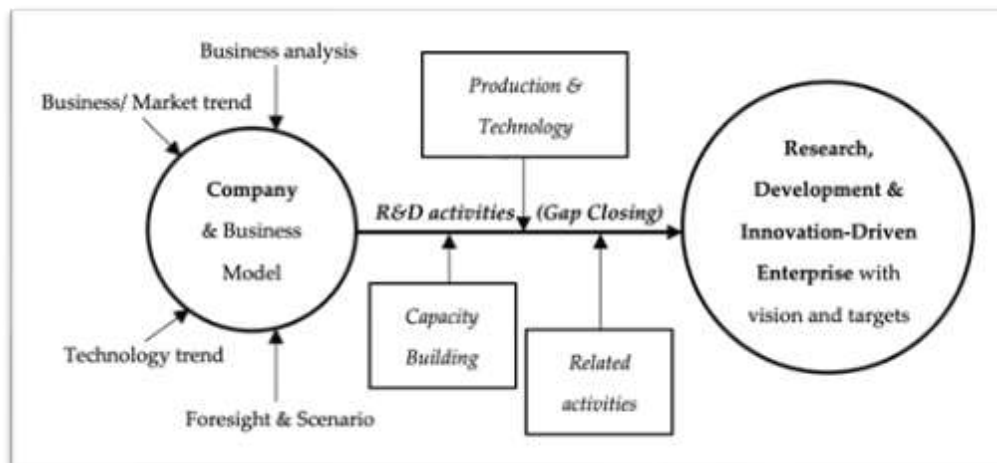


Figure 3. Conceptual Idea of IRDCap R&D Blueprint.

The R&D blueprint serves as a critical component of the IRDCap program, providing businesses with a strategic tool for systematic planning and execution of innovation and technology development initiatives. Figure 4. illustrates a simplified example of an R&D roadmap from a case study company, demonstrating a comprehensive temporal framework that integrates various organizational domains including R&D, production technology, human resources, and marketing. This multifaceted approach aligns with contemporary theories of innovation management, which emphasize the importance of cross-functional integration in driving organizational innovation. Additional key aspects that can be incorporated into such roadmaps include strategic alignment, technology roadmapping, resource allocation, collaboration strategies, market analysis, and Intellectual Property strategies.

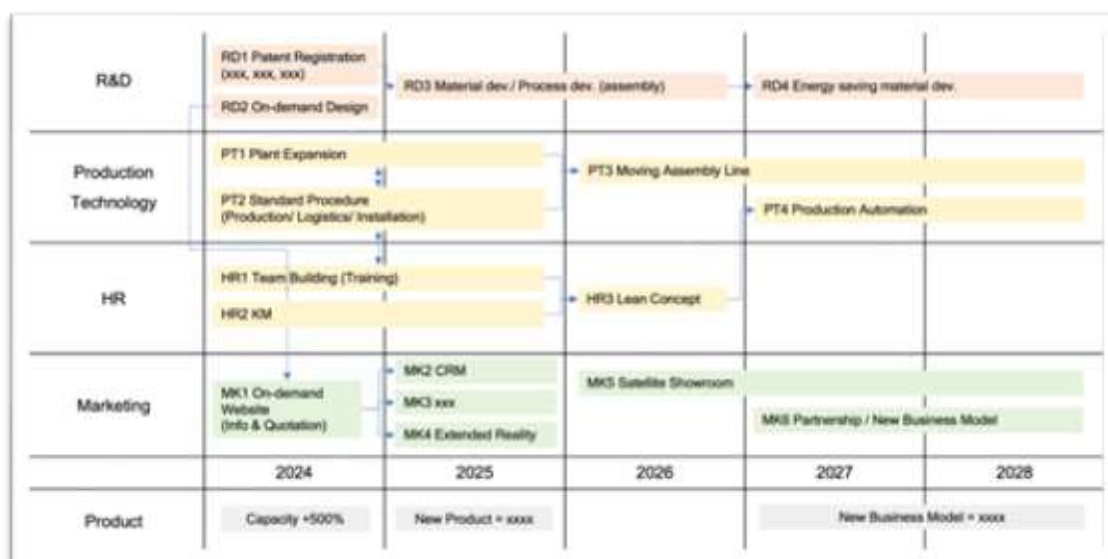


Figure 4. Simplified Example of R&D Roadmap.

Typically spanning a five-year horizon, the roadmap encompasses a range of activities designed to address specific organizational gaps, meet evolving needs, and propel the entity towards its strategic vision and objectives. Key elements often include patent registration, on-demand design capabilities, material and process development, energy-saving innovations, and production automation. These activities reflect the organization's commitment to technological advancement and operational efficiency, consistent with the resource-based view of competitive advantage.

A notable feature of the roadmap is its integration of human resource development initiatives, such as team building and knowledge management, alongside technological innovations. This holistic approach underscores the critical role of human capital in fostering innovation. The inclusion of a marketing track, featuring elements like CRM implementation and extended reality applications, demonstrates a customer-centric approach to innovation.

It is important to note that Figure 4. represents a simplified and partially redacted version of an actual organizational R&D roadmap, with certain details omitted due to confidentiality constraints and non-disclosure agreements. This practice of selective disclosure in academic research reflects the delicate balance between sharing knowledge and protecting proprietary information in industry-academia collaborations.

The roadmap's structure, with its clear delineation of activities, timelines, and cross-functional dependencies, exemplifies best practices in R&D management. It provides a visual representation of the organization's innovation strategy, facilitating alignment between various organizational units and supporting effective resource allocation, including budgeting. This strategic planning approach is crucial for enhancing an organization's innovative capabilities and maintaining competitive advantage in dynamic market environments.

Central Platform for IRDCap Consulting

The IRDCap Central Platform represents a sophisticated information system designed to facilitate monitoring and progress reporting in collaborative efforts between consultants and businesses. This multifaceted platform is built upon a robust architecture comprising three key components, each serving a specific function within the system's overall framework (see Figure 5).

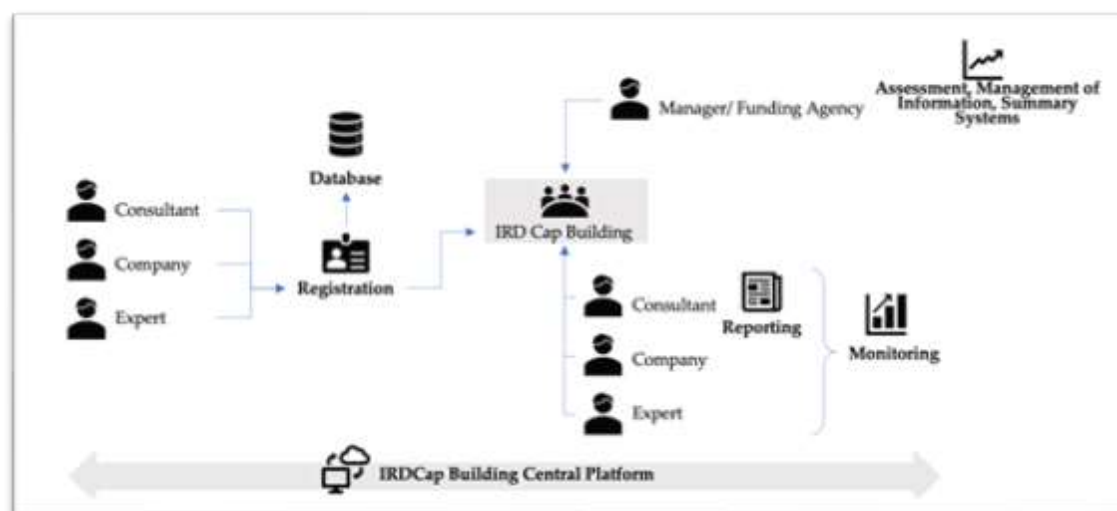


Figure 5. IRDCap Central Platform Ecosystem.

The first component utilizes JSON to create Rich Menus for Line@, a widely used communication application in Thailand (see Figure 6.). This implementation, accessible through an API, enables dynamic menu management based on user types within the system, enhancing user experience and functionality. The second component employs React as the framework for irdcap.com website development. Selected for its widespread acceptance in the developer community, React offers high flexibility in usage, reduces development time, and is supported by comprehensive documentation, facilitating efficient and effective web interface creation. The third component leverages MS SQL as the database management system, storing processed results in a format readily accessible for connection to Self Service BI systems or user-facing dashboards, ensuring data integrity and accessibility.

This integrated platform serves various critical functions within the consultancy framework. It acts as a central communication hub, enabling efficient information exchange among stakeholders, thereby fostering collaboration and knowledge sharing. The system provides self-monitoring capabilities for consultants, client companies, and project managers, allowing real-time performance tracking and progress assessment

(see Figure 7.). This feature enhances transparency and accountability within the project ecosystem, facilitating timely interventions and adjustments as needed.

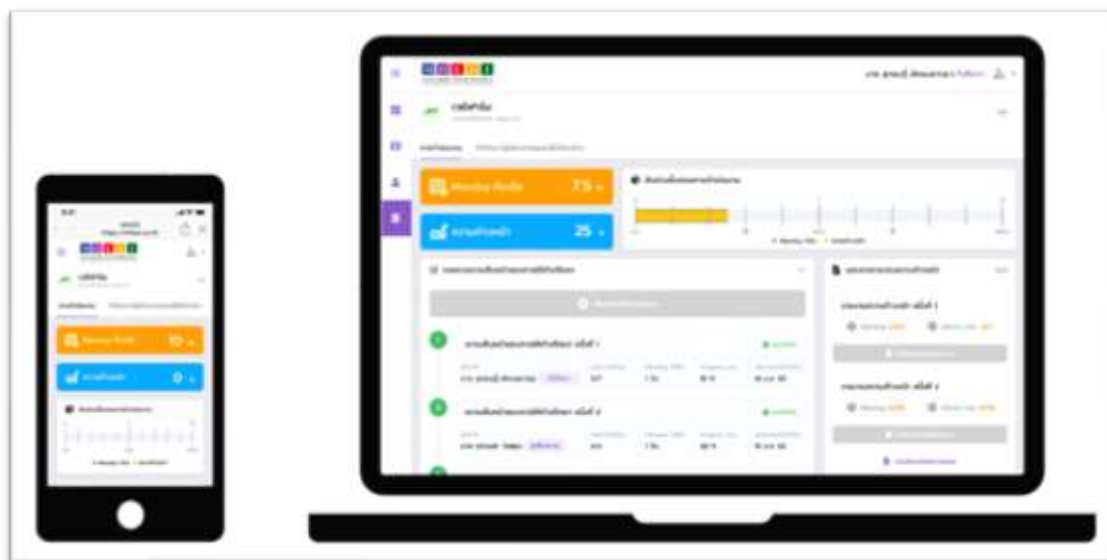


Figure 6. IRDCap Central Platform on Line@ and irdcap.com

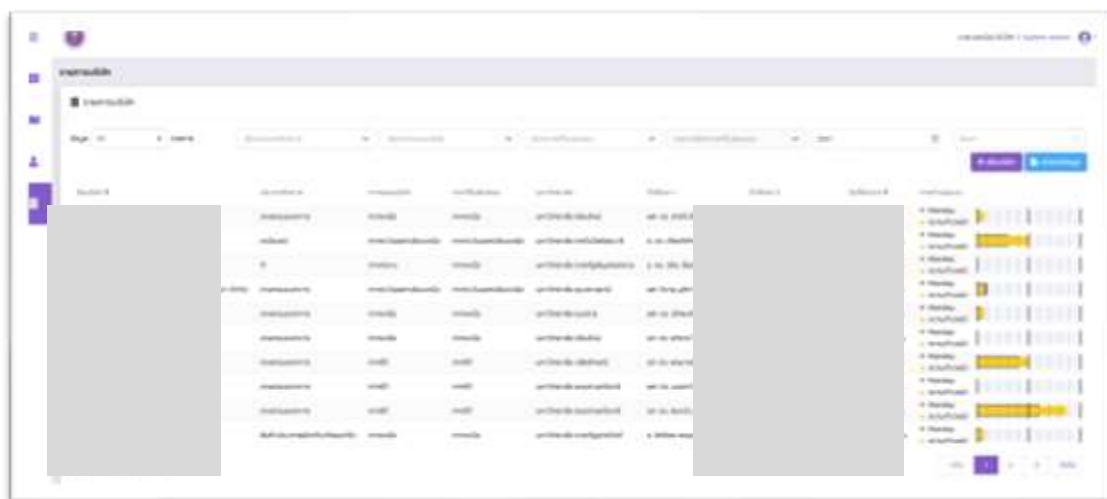


Figure 7. Company Database and Monitoring Status Bar

Furthermore, the platform offers comprehensive document management capabilities, supporting both upload and download of all pertinent reports. This functionality streamlines information flow and ensures that all stakeholders have access to up-to-date project documentation. A key feature of the platform is its hierarchical access control mechanism, which implements stringent information security measures through a tiered authorization structure. This structure aligns information visibility with individual roles and responsibilities within the project ecosystem, ensuring data confidentiality and integrity while promoting appropriate information sharing.

By integrating these diverse functionalities into a single, cohesive platform, the IRDCap Central Platform significantly enhances the efficiency and effectiveness of the consulting process, providing a robust technological foundation for the IRDCap initiative.

IRDCap Knowledge Exchange

Throughout the five-year duration of the IRDCap initiative, a series of knowledge exchange activities were systematically implemented to enhance the program's effectiveness and relevance. These activities were

designed to facilitate continuous improvement across all aspects of the program, adhering to the PDCA (Plan-Do-Check-Act) cycle principle.

A key component of this improvement process was the regular organization of learning exchange sessions among trainers who had completed the TTT program and subsequently gained experience in IRDCap Consulting. These sessions provided a valuable platform for sharing insights, challenges, and best practices derived from hands-on consulting experiences. Complementing these trainer-focused exchanges, feedback was also actively solicited from businesses that had received IRDCap Consulting services. This dual-perspective approach ensured a comprehensive understanding of the program's impact and areas for potential enhancement.

The feedback gathered through these channels informed iterative improvements to various aspects of the program. These included refinements to the TTT curriculum content, adjustments to the training duration and structure, and modifications to the training activities to ensure optimal effectiveness. Additionally, the IRDCap Consulting process and the IRDCap Central Platform underwent continuous evaluation and enhancement based on user experiences and identified needs.

Results and discussion

The IRDCap program has demonstrated significant success in bridging the gap between academic knowledge and practical business needs, while simultaneously revealing important insights about the challenges and dynamics of building R&D capacity in Thailand's industrial sector. Over its five-year implementation period, the program has established a substantial nationwide presence, conducting 12 TTT training sessions and producing 489 trainers, indicating successful scaling of the initiative's capacity-building component.

The program's engagement with 201 companies across diverse industries reveals interesting patterns in sectoral adoption of R&D initiatives. The strong concentration in the agriculture and food sector, accounting for approximately 70% of participants, reflects both Thailand's industrial strengths and the sector's readiness to embrace innovation. The cosmetics sector's emergence as the second-largest participant group (13%) suggests growing recognition of R&D's importance in high-value consumer products. The distribution across other sectors including construction, textiles, and IT indicates the program's broad applicability while highlighting potential areas for expanded outreach.

A critical success factor has been the establishment of dedicated R&D units across all 201 participating companies, complete with designated personnel who received comprehensive capacity building. However, this achievement revealed an important challenge: the misalignment between some businesses' expectations of quick wins and the program's emphasis on long-term strategic development. This tension highlights the need for clearer communication of program objectives and better expectation management during the initial engagement phase.

The program's economic impact has been substantial, generating a valuation of 241.2 million US dollars through value addition, cost savings, and market expansion. The catalyzation of 28.1 million US dollars in investment and creation of over 750 high-value employment positions demonstrates the program's role in driving economic development. These outcomes compare favorably with similar initiatives in other emerging economies, though direct comparisons are complicated by varying economic contexts and program scales.

The R&D Roadmap's effectiveness as a communication tool has emerged as a particularly valuable outcome, evidenced by several success stories. One notable case demonstrated its utility in facilitating long-term planning, market research, and open innovation initiatives, resulting in doubled sales within two years and multiple innovation awards. Another case highlighted its role in attracting Stock Exchange investors, showcasing the roadmap's versatility in different business contexts. However, the implementation process revealed the crucial importance of sustained executive engagement, as successful roadmap execution consistently correlated with strong leadership buy-in.

The program's sustainability aspects present both opportunities and challenges. Many participating companies have successfully leveraged their IRDCap experience to access additional funding and expand their involvement in the open innovation ecosystem. This suggests the program serves as an effective

catalyst for ongoing innovation and collaboration. However, the dynamic nature of the business and technological environment necessitates regular roadmap revisions, with annual updates recommended to maintain alignment with evolving market conditions and technological advances.

Several limitations and areas for future development have been identified through the implementation process. First, the program's heavy reliance on government funding raises questions about long-term sustainability and the need for alternative funding models. Second, while the program has been successful in establishing R&D units, measuring their long-term effectiveness and sustainability requires continued monitoring beyond the initial implementation phase. Finally, the varying levels of digital readiness among participating companies affected their ability to fully utilize the IRDCap Central Platform, suggesting the need for additional support in digital transformation.

These findings collectively emphasize the complex, multifaceted nature of building R&D capacity in industrial settings. They highlight the need for flexible, adaptive approaches that can balance immediate business needs with long-term strategic objectives while fostering a culture of continuous innovation and collaboration within the broader innovation ecosystem. Future research could focus on longitudinal studies of participating companies to better understand the long-term impacts of the program and identify factors contributing to sustained R&D success in Thailand's industrial context.

Conclusion

The Industrial Research and Development Capacity Building (IRDCap) initiative represents a significant and innovative approach to enhancing Thailand's research and development capabilities. Through its comprehensive framework encompassing both training and consulting components, IRDCap has demonstrated a successful model for bridging the gap between academic knowledge and industrial application.

The program's multi-faceted approach, incorporating the Train-the-Trainer (TTT) project and IRDCap Consulting, has proven effective in developing a robust ecosystem of R&D expertise. The TTT project has successfully cultivated a cadre of skilled trainers, while the consulting component has provided tailored support to a diverse range of businesses. This dual approach has enabled the program to address both the supply and demand sides of R&D capacity building, contributing to a more holistic enhancement of Thailand's innovation landscape.

The quantifiable impacts of the IRDCap program, including substantial economic value generation, investment stimulation, and job creation, underscore its effectiveness in translating enhanced R&D capabilities into tangible economic outcomes. Moreover, the program's strong focus on the agriculture and food sector aligns well with Thailand's economic strengths and priorities, potentially contributing to increased competitiveness in these critical industries.

The R&D Roadmap developed through IRDCap has emerged as a particularly valuable tool, serving not only as a strategic planning instrument but also as an effective communication medium for organizations. Its demonstrated utility in facilitating long-term planning, attracting investment, and driving innovation provides strong evidence of the program's practical relevance and impact.

Acknowledgments

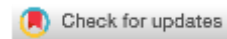
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Bibliographic References

- Alshammari, K. H., & Alshammari, A. F. (2023). Managing digital transformation in a global environment: The role of national culture. *Amazonia Investiga*, 12(68), 112-125. <https://doi.org/10.34069/AI/2023.68.08.11>
- Alston, J. M. (2010). *The benefits from agricultural research and development, innovation, and productivity growth*. *OECD Food, Agriculture and Fisheries Papers*, 31. Paris: OECD Publishing.

- Armstrong, C., Shieh, J., & Zielinski, P. (2019). Increasing the return on investment from federally-funded research and development. *Theoretical Issues in Ergonomics Science*, 20(1), 4-7.
- Asheim, B. T., & Isaksen, A. (2002). Regional innovation systems: the integration of local 'sticky' and global 'ubiquitous' knowledge. *The Journal of Technology Transfer*, 27(1), 77-86.
- Barbosa, G. F., Shiki, S. B., & da Silva, I. B. (2020). R&D roadmap for process robotization driven to the digital transformation of the industry 4.0. *Concurrent Engineering*, 28(4), 290-304.
- Bozeman, B., Fay, D., & Slade, C. P. (2013). Research collaboration in universities and academic entrepreneurship: the-state-of-the-art. *The Journal of Technology Transfer*, 38(1), 1-67.
- Bruneel, J., d'Este, P., & Salter, A. (2010). Investigating the factors that diminish the barriers to university–industry collaboration. *Research Policy*, 39(7), 858-868.
- Carvalho, M. M., Fleury, A., & Lopes, A. P. (2013). An overview of the literature on technology roadmapping (TRM): Contributions and trends. *Technological Forecasting and Social Change*, 80(7), 1418-1437.
- Cooke, P., Uranga, M. G., & Etzebarria, G. (1997). Regional innovation systems: Institutional and organisational dimensions. *Research Policy*, 26(4-5), 475-491.
- Dolińska, M. (2022). *Open Innovation-Driven Business Processes of Crowdsourcing in Internet Markets*. In Science, Business and Universities (pp. 31-45). Routledge.
- Dutta, S., Lanvin, B., Wunsch-Vincent, S., & León, L. R. (2022). *Global Innovation Index 2022: What is the Future of Innovation-driven Growth?*. Geneva, Switzerland: WIPO.
- Elmquist, M., Fredberg, T., & Ollila, S. (2009). Exploring the field of open innovation. *European Journal of Innovation Management*, 12(3), 326-345.
- Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: from National Systems and "Mode 2" to a Triple Helix of university–industry–government relations. *Research Policy*, 29(2), 109-123.
- Evenson, R. E., Waggoner, P. E., & Ruttan, V. W. (1979). Economic benefits from research: An example from agriculture. *Science*, 205(4411), 1101-1107.
- Intarakumnerd, P. (2019). Thailand's middle-income trap: Firms' technological upgrading and innovation and government policies. *Seoul Journal of Economics*, 32(1).
- Intarakumnerd, P., Chairatana, P. A., & Tangchitpiboon, T. (2002). National innovation system in less successful developing countries: the case of Thailand. *Research Policy*, 31(8-9), 1445-1457.
- Karaveg, C., Thawesaengskulthai, N., & Chandrachai, A. (2014). Evaluation model for research and development commercialization capability. *Production and Manufacturing Research*, 2(1), 586-602.
- Kuznetsova, N., Tkachuk, V., Obikhod, S., Vlasenko, T., Samborska, O., & Chorna, L. (2022). Human capital development in a creative economy. *Amazonia Investiga*, 11(54), 349-356. <https://doi.org/10.34069/AI/2022.54.06.33>
- Lundvall, B. Å., & Borrás, S. (1997). *The globalising learning economy: Implications for innovation policy*. European Union, Luxembourg.
- Martinez-Contreras, R. M., Hernandez-Mora, N. C., Vargas-Leguizamon, Y. R., & Borja-Barrera, S. M. (2022). Pestel Analysis and the Porter's Five Forces: An Integrated Model of Strategic Sectors. In *Handbook of Research on Organizational Sustainability in Turbulent Economies* (pp. 292-314). IGI Global.
- Mehand, M. S., Al-Shorbaji, F., Millett, P., & Murgue, B. (2018). The WHO R&D Blueprint: 2018 review of emerging infectious diseases requiring urgent research and development efforts. *Antiviral Research*, 159, 63-67.
- Mehlman, S. (2024). 2024 R&D Trends Forecast: Results from the Innovation Research Interchange's Annual Survey. *Research-Technology Management*, 67(1), 22-33.
- Murga Pinillos, A. Y. (2024). University-industry open innovation: main enablers and practices based on a scoping review. *International Journal of Innovation Science*, 67(1), 22-33.
- Opassuwan, T., & Wannamakok, W. (2024). Deciphering the determinants of firm's engagement with universities: An insight into the Thai industrial landscape. *Journal of Open Innovation: Technology, Market, and Complexity*, 10(1), 100248.
- Pairsuwan, R. (2023). *The roles of science and technology park in the entrepreneurial ecosystem: A case study of the Northern Science Park, Thailand* (Doctoral dissertation), University of Southampton.
- Pasaribu, R. D., Shalsabila, D., & Djatmiko, T. (2023). Revamping business strategy using Business Model Canvas (BMC), SWOT analysis, and TOWS matrix. *Heritage and Sustainable Development*, 5(1), 1-18.

- Perkmann, M., Tartari, V., McKelvey, M., Autio, E., Broström, A., D'este, P., Fini, R., Geuna, A., Grimaldi, R., Hughes, A., & Krabel, S. (2013). Academic engagement and commercialisation: A review of the literature on university–industry relations. *Research Policy*, 42(2), 423-442.
- Phongthiya, T., Malik, K., Niesten, E., & Anantana, T. (2022). Innovation intermediaries for university-industry R&D collaboration: Evidence from science parks in Thailand. *The Journal of Technology Transfer*, 47(6), 1885-1920.
- Poonjan, A., Tanner, A. N., & Andersen, P. D. (2022). How regional factors influence the performance of science and technology parks: A comparative analysis of regional science parks in Thailand. *Asian Journal of Technology Innovation*, 30(2), 364-386.
- Rennings, K., Kemp, R., Bartolomeo, M., Hemmelskamp, J., & Hitchens, D. (2003). *Blueprints for an integration of science, technology and environmental policy (BLUEPRINT)*. Mannheim, Germany: Center for European Economic Management GmbH (ZEW).
- Rizki, S., & Wijaya, F. (2024). Business development strategy using canvas business model and SWOT analysis on Bedroomstore. id. *Journal of Management Science*, 7(1), 371-378.
- Siripitakchai, N., & Miyazaki, K. (2015). Thailand's national research universities (NRUs) and their University-Industry Linkages (UILs) based on university-industry co-publications (UICs). *Portland International Conference on Management of Engineering and Technology (PICMET)* (pp. 287-294). IEEE.
- Suttipun, M., & Insee, K. (2024). R&D intensity and firm performance of SME firms in Thailand: the moderating role of firm size. *Cogent Business and Management*, 11(1).
- Thawesaengskulthai, N., Chatmarathong, A., & Koiwanit, J. (2024). Impact and policy supporting Thailand innovation driven enterprise: orchestrating university innovation and entrepreneurship ecosystem with public and private stakeholders. *Journal of Innovation and Entrepreneurship*, 13(1).
- Tödtling, F., & Trippel, M. (2021). Regional innovation policies for new path development—beyond neo-liberal and traditional systemic views. *European Planning Studies*, 26(9), 1779-1795.
- Wannakul, R., Pathumnakul, S., & Arunyanart, S. (2019). Factors Affecting Decision to Select Government R&D Support Projects for SMEs. IOP Conference Series: *Materials Science and Engineering*, 639.
- Wongwanich, M. (2022). *Firm, innovation, competitiveness and science park development in Thailand* (Doctoral dissertation), University of Birmingham.

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Private international law and parental responsibility: the experience of applying parental responsibility measures to Ukrainians in EU countries

Міжнародне приватне право та батьківська відповідальність: досвід застосування заходів батьківської відповідальності до українців у країнах ЄС

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Abstract

The article examines the relationship between parental responsibility as a measure of protection of children's rights and Private International Law on the example of the application of parental responsibility measures to Ukrainians in EU countries. The purpose of the article is to provide a legal analysis of the problem of removal of children from Ukrainian families by social services in the EU countries as a measure of parental responsibility. In the example of the analysis of the national legislation of Spain, Poland, Sweden, Germany and Finland, the differences in the legal regulation of parental responsibility are considered. The most pressing issues that arise when initiating a case on parental responsibility of persons enjoying temporary protection in the EU countries have been identified. The methodological basis of the research is: dialectical method, comparative legal method, method of legal analysis. It has been established that in most cases the removal of children from families as a measure of parental responsibility was applied based on improper performance of parental duties, but there are cases when such measures were of a preventive nature. The need to improve the legal regulation of parental responsibility in the legislation of Ukraine has been identified.

Keywords: rights of the child, law, Ukraine, parent-child relationship, parent attitudes, childhood, displaced person, child abuse, social service.

Анотація

Стаття досліджує взаємозв'язок між батьківською відповідальністю як заходом захисту прав дитини та міжнародним приватним правом на прикладі застосування заходів батьківської відповідальності до українців у країнах ЄС. Метою статті є правовий аналіз проблеми вилучення дітей із українських сімей соціальними службами в країнах ЄС як міри батьківської відповідальності. На прикладі національного законодавства Іспанії, Польщі, Швеції, Німеччини та Фінляндії розглядаються відмінності у правовому регулюванні батьківської відповідальності. Визначено найбільш актуальні питання, що виникають при порушенні справ про батьківську відповідальність щодо осіб, які користуються тимчасовим захистом у країнах ЄС. Методологічну основу дослідження становлять: діалектичний метод, порівняльно-правовий метод, метод правового аналізу. Встановлено, що в більшості випадків вилучення дітей із сімей як міра батьківської відповідальності застосовувалося через неналежне виконання батьківських обов'язків, але існують випадки, коли такі заходи мали превентивний характер. Виявлено потребу вдосконалення правового регулювання батьківської відповідальності у законодавстві України.

Ключові слова: права дитини, закон, Україна, відносини між батьками і дітьми, ставлення батьків, дитинство, жорстке поводження з дітьми, переселенець, соціальні служби.

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Introduction

The growing quantity of transborder private relations increases the need to resort to Private International Law (PIL), as conflict of laws issues arise in the regulation of such relations. The national legislation of foreign countries has differences and peculiarities, which causes unequal application of the law to the same private relations. Cross-border family relations are no exception. Particularly many questions arise regarding parental responsibility and protection of children's rights.

At the international level, international legal instruments on the rights of the child and their proper implementation are being developed and adopted, and Ukraine is a party to several such treaties. However, it is indisputable that the child is the most vulnerable party in any conflicting family legal relations, and it is he/she who suffers the most suffering and losses (Supreme Court of Ukraine, 2008).

Today, the problem of foreign social services applying urgent measures to Ukrainian families abroad who are under temporary protection, in EU countries in the form of removing children from the family and initiating proceedings for deprivation/restriction of parental rights, is quite acute. According to official UNHCR data², as of March 14, 2024, more than 6 million Ukrainian citizens have left for EU countries since the beginning of the war in Ukraine (Operational data portal UNHCR, 2024). In most of the known cases, the removal of children from Ukrainian families by the social services of the host country was based on suspicion of improper parental responsibilities or suspicion of harm to the child. Such circumstances simultaneously violate the rights of children and parents to communicate, in particular, the principle of "balancing the interests of the child and parents" (Volkova et al., 2023), and also violate the principle of the "best interests of the child". Children are placed in reception centers until the case is heard by the court, and only after the court decision, the child can be returned to the parents. Besides, parents are often deprived of the opportunity to communicate with their own child before the court hearing. Such situations often drag along for months.

This issue is multidimensional, as it touches upon Family law and PIL, in particular, parental responsibility and protection of children's rights. In addition, the problem has a cross-border nature, as children are removed from Ukrainian families in a foreign country by foreign social services. Ukrainians enjoying temporary protection in EU countries are at subject to two national laws - that of their country of citizenship and that of the country of residence. In such circumstances, they need to know the scope of rights and obligations they acquire in the host country depending on their legal status, as well as the procedure for protecting their rights and legitimate interests.

D. Lubinets noted «that the largest number of cases of taking children away from families was recorded in Italy and Germany» (Lubinets, 2023), and that those recorded cases constitute only the tip of the iceberg, since many cases are unknown. The problem is gaining momentum, notably, it also exists outside the EU. Unfortunately, there is currently a practice of removal of children in Spain, Italy, Poland, Germany, France and Finland. «240 cases were recorded when social services of European countries took children from families of Ukrainian citizens with temporary protection status as of June 2023. Fifty-five children were taken in Poland, 50 – in Germany, 30 – in Spain and 17 – in Italy as of June 2023» (Kobzar, 2023). As of March 2024, 340 such cases were recorded (Gorban, 2024). In some cases, after trial on the merits, children are returned to their parents, in others – parents are withdrawal of their parental rights, in others – children and their parents are placed in special centers, where they live together. Only in February 2024, the Ministry of Foreign Affairs of Ukraine published information on the official websites of Ukrainian embassies in different countries on the grounds for removal of children and the procedure for returning them to their families (Embassy of Ukraine in the Republic of Poland, 2024; Embassy of Ukraine in the Republic of Finland and Iceland, 2024; Embassy of Ukraine in the Kingdom of Spain, 2024; Embassy of Ukraine in the Federal Republic of Germany, 2024).

When initiating a case on parental responsibility and deprivation of parental rights of persons enjoying temporary protection in the EU countries, there are the following conflicting issues:

- What is the personal law of a child enjoying temporary protection?
- The court of which country will hear the case of parental responsibility?

² The number of Refugees from Ukraine recorded in Europe is 5,982,900. Refugees from Ukraine recorded globally 6,486,000

What are the reasons for deprivation of parental rights?
 What kind of substantive law will be applied during the trial?
 Which country's legislation is in the best interests of the child?

The reasons for bringing to parental responsibility and removal of children by social services are completely different, but the common thing is that the answers to these questions cannot be resolved without reference to the PIL rules.

In view of the above, the article aims to provide a legal analysis of the problem of removal of children from Ukrainian families by social services in the EU countries as a measure of parental responsibility.

The section "Theoretical Framework" represents the legislative basis for the study. The section "Methodology" identifies the key methods by which the research was conducted. In the first section of "Results and Discussion" the author analyzes the reasons for removal of children who are citizens of Ukraine from families enjoying temporary protection in EU countries. In the second section, describes the peculiarities of legal regulation of parental responsibility in the national legislation of some EU Countries and Ukraine. The third section discloses the peculiarities of determining jurisdiction in cases of parental responsibility. The results of the study are summarized in the conclusions and the need to improve the legislation of Ukraine in the issues of legal regulation of parental responsibility are identified.

Theoretical Framework

The analysis of existing scientific sources gives grounds to assert that the topic of the problems of legal regulation of parental responsibility is fragmentary. Ukrainian scholars have partially studied the questions of parental responsibility within the family law framework. Moreover, today there are no scientific studies in PIL on the legal analysis of the problems of removal of children from Ukrainian families abroad and parental responsibility. This indicates the relevance of the study and the need to find ways to overcome this problem.

In addition, today there are no scientific publications in the area of PIL, which would carry out a scientific analysis of the problems and grounds for the removal of children from Ukrainian families in the EU countries.

The legislative basis for the study are: the Hague Convention of 19 October 1996 on Jurisdiction, Applicable Law, Recognition, Enforcement and Co-operation in Respect of Parental Responsibility and Measures for the Protection of Children (hereinafter referred to as the 1996 HCCH Child Protection Convention) (HCCH, 1996) and Council Regulation (EU) No. 2019/1111 of 25 June 2019 on jurisdiction, recognition and enforcement of decisions in matrimonial matters and matters of parental responsibility and on international child abduction (Regulation No. 2019/1111, entered into force on First of August 2022)³ (European Union, 2019). Ukraine is not a party to this Regulation, but the Regulation No. 2019/1111 contains an addendum to the HCCA Child Protection Convention ((2) Preamble, Regulation No. 2019/1111)). In addition, the author examines the problems of removing children from Ukrainian families outside Ukraine, namely from families enjoying temporary protection in EU countries in accordance with Council Directive 2001/55/EC of 20 July 2001 on minimum standards for the provision of temporary protection in the event of a mass influx of displaced persons and on measures to help balance efforts between Member States to receive such persons and to bear the consequences thereof (Council of Europe, 2001), therefore, it is also important to study the provisions of Regulation No. 2019/1111 (European Union, 2019).

Methodology

The methodological basis of the article is general scientific and special methods of scientific knowledge. The legal nature of the relations under study has a cross-border nature and is included in the subject of private international law, therefore, the achievement of the purpose of the article is possible through the use

³ This regulation replaces and recasts Council Regulation (EC) 2201/2003 of 27 November 2003 concerning jurisdiction and the recognition and enforcement of judgments in matrimonial matters and the matters of parental responsibility (Regulation Brussels II bis), repealing Regulation (EC) 1347/2000 (Regulation Brussels II) (Council of Europe, 2003). It is now known as Brussels II ter (European Union, 2019; International Union of Judicial Officers, 2022).

of such methods as the dialectical method, the comparative legal method, the method of analysis. The result of the application of these methods is a comprehensive characterization of the problem of taking children away from families enjoying temporary protection in the EU countries, which reflects the grounds for parental responsibility, the peculiarities of legal regulation of parental responsibility in the national legislation of some EU Countries and Ukraine, the peculiarities of determining jurisdiction in cases of parental responsibility.

The dialectical method of scientific cognition has made it possible to identify and characterize the reasons for removal children who are citizens of Ukraine from families enjoying temporary protection in EU countries. The source of up-to-date information on the state of the problem of removal of children from families enjoying temporary protection in the EU was the information declared by the Ombudsman of Ukraine and published in the media.

The comparative legal method made it possible to: study the peculiarities of legal regulation of parental responsibility in the national legislation of some EU countries, in particular, Spain, Poland, Sweden, Germany, Finland, and determine the grounds for removing children from Ukrainian families in these countries. The focus of the application of the comparative legal method is focused on the study of: the grounds for removing children from families enjoying temporary protection in the countries given in the examples; comparison of the state of legal regulation of parental responsibility; determination of the consequences of the application of parental responsibility measures to Ukrainian families on the territory of the EU countries. In general, the comparative legal method provided an opportunity to reflect the experience of applying the national legislation of individual EU countries in the application of parental responsibility measures in relations with a foreign element.

Using the method of legal analysis, the author identifies the shortcomings of legal regulation of parental responsibility in the legislation of Ukraine. In addition, the application of the method of analysis made it possible to determine the jurisdiction over cases of parental responsibility, which is of key importance for research in the field of PIL.

A comprehensive literature review makes it possible to ascertain the state of research on this issue in PIL and family law. The scientific basis of the study is based on scientific publications in the field of PIL, which investigated the regulation of parental responsibility, jurisdiction in cases of parental responsibility and compliance with the principle of the best interests of children. The search for scientific publications was carried out in the scientific metric databases WoS, Science Direct, Google Scholar, ResearchGate. The legal basis of the study is: the Convention on the Protection of Children and Council Regulation 1996 No. 2019/1111 of June 25, 2019 on jurisdiction, recognition and enforcement of judgments in matrimonial matters and parental responsibility, as well as on international child abduction and national legislation of some EU countries. Legislative sources are selected in the legislative databases of the Hague Conference on Private International Law, the European Union, and on the official websites of the legislative databases of Spain, Poland, Sweden, Germany and Finland. In addition, up-to-date information related to the study was collected from the official websites of the Embassy of Ukraine in the Republic of Poland, the Embassy of Ukraine in the Republic of Finland and Iceland, the Embassy of Ukraine in the Kingdom of Spain, the Embassy of Ukraine in the Federal Republic of Germany. In the study of the legislation of Ukraine, legislative sources from the official Open Data Portal of the Verkhovna Rada of Ukraine <https://data.rada.gov.ua/open/data/zak> were used.

Results and Discussion

I. Analysis of the reasons for removal children who are citizens of Ukraine from families enjoying temporary protection in EU countries

Removal of children from families is one of the types of parental responsibility based on improper performance of parental duties. The Convention on the Rights of the Child of 1989 (United Nations, 1989) declares that “States Parties shall ensure that a child shall not be separated from the parents against their will, except cases when cognizant authorities due to the court decision determine that such separation is necessary in the best interests of the child in accordance with the applicable law and proceedings” (Article 6). Thus, the rules of the Convention on the Rights of the Child (United Nations, 1989) provide separation from parents, but according to the court decision and in the best interests of the child, but the category of

“the best interests of the child” is evaluative one and may vary according to the internal legislation of different countries.

The “best interests of the child” is a fundamental principle in the protection of children's rights under international law and national legislation. Social services of the countries that granted temporary protection believed in most cases that children were in real danger and carried out emergency measures for preventive purposes, which they are authorized to take - they took the children from their parents without a trial. Suspicion of harm or anonymous reports about non-standard communication with a child was enough for such situations. There were published in mass media about most of the cases in different countries.

It is considered necessary to analyse known cases of taking children who are citizens of Ukraine enjoying temporary protection away from their parents that took place abroad. The parents raised questions in all the mentioned cases about the powers of the cognizant authorities to apply the appropriate measures. It is particularly should noting in this aspect that the HCCH Child Protection Convention (HCCH, 1996) establishes jurisdiction for refugee children and children displaced to foreign countries as a result of social endurance. Articles 5 and 6 contain an indication that “for refugee children and children who, due to disturbances occurring in their own country, are internationally displaced, the authorities of the Contracting State on the territory of which these children are present as a result of their displacement have the jurisdiction to take measures directed to the protection of the child's person or property” (HCCH, 1996). That is, in cases of parental responsibility, the jurisdiction of the country that granted temporary protection to Ukrainian families will apply.

We can currently distinguish and characterize the following grounds.

Suspicion of creating dangerous circumstances for a child. For example, the Children's Service took away the daughter of one Ukrainian citizen who was under temporary protection in Germany. The reason for taking away the child was her mother's desire to go to Ukraine with the child for one week. The Children's Service believed that there was a real threat to the child, since there was a war going on in Ukraine, and took away the child from her mother for preventive purposes. Ukrainian citizens who are in Germany under the temporary protection status are subject to German legislation on the territory of this country following § 24 of the Act of Germany on the Residence (Law of Germany, 2008). The same is stated in the response of the Land Ministry for Refugees, Family, Children and Youth Affairs. Therefore, the “Jugendamt” (specialized state agency for youth affairs) has the right to act in cases when the child's well-being, life and health are in danger from a legal point of view. All that remains to be determined is whether the social service has reasonable grounds to suspect that the child is in actual danger. It is often the most controversial aspect that is the subject of consideration during the court session (Pozdnyakova, 2023). It is quite difficult to find the answer to this question, because, on the one hand, of the Convention on the Rights of the Child (United Nations, 1989) stipulates that “in all actions concerning children, whether undertaken by public or private social welfare institutions, courts of law, administrative authorities or legislative bodies, the best interests of the child shall be a primary consideration” (Article 3). And accordingly, living with a family is in the best interests of the child. However, there is another side to the situation, the norms of the Council Directive 2001/55/EC of 20 July 2001 on minimum standards for giving temporary protection in the event of a mass influx of displaced persons and on measures promoting a balance of efforts between Member States in receiving such persons and bearing the consequences thereof (Directive 2001/55/EC) (Council of Europe, 2001) are applied to the child who is the citizen of Ukraine, since the child is in Germany based on temporary protection. Temporary protection is granted to persons who are unable to return in safe to their country of origin because of the situation prevailing in that country (Article 2 (a), (c) of the Directive 2001/55/EC) (Council of Europe, 2001). Therefore, the intention of a woman with a child to go to Ukraine during the period of temporary protection constitutes a real danger to the life and health of the child, and the social services of the country that granted temporary protection have the right to apply measures of a preventive nature.

Religious grounds. There was a case in Germany when the “Jugendamt” (the name of the children's services) intended to take away the children from a Ukrainian family with 13 children that received temporary protection and to deprive them of their parental rights. The reason for removal children was indicated in the letter of accusation received by the family. “Since you are Baptists, and it is written in the Bible 'whom I love I punish', thus, there is a danger according to these arguments that the father will use force against his own children in the future”. That is, the children's services began to persecute the family not for specific actions, but for their religious beliefs, which, according to the children's services, could

pose a threat to the children (Vsirazom, 2023). The existence of a threat to children can be questioned in this situation, since the national legislation of Ukraine and international acts have declared the principle of freedom of religion, which is reflected in the following sources.

In Ukrainian legislation, the principle of freedom of religion is enshrined in the Law of Ukraine "On Freedom of Conscience and Religious Organizations" (Law of Ukraine No. 987-XII, 1991). According to the Article 3, «parents or persons who replace them, by mutual consent, have the right to raise their children in accordance with their own beliefs and attitude to religion. The freedom to exercise religion or belief is subject only to those restrictions that are necessary for protecting public safety and order, life, health and morals, as well as the rights and freedoms of other citizens established by law and are in line with Ukraine's international obligations» (Law of Ukraine No. 987-XII, 1991).

At the international level, the principle of freedom of religion is reflected in the following three international instruments:

Article 18 of the Universal Declaration of Human Rights (United Nations, 1948) provides that "everyone has the right to freedom of thought, conscience and religion; this right includes freedom to change his religion or belief, and freedom, either alone or community with others and in public or private, to manifest his religion or belief in teaching, practice, worship and observance" (United Nations, 1948).

Article 2 (1) of the Convention on the Rights of the Child (United Nations, 1989) declares «that States Parties shall respect and ensure the rights set forth in the present Convention to each child within their jurisdiction without discrimination of any kind, irrespective of the child's or his or her parent's or legal guardian's race, colour, sex, language, religion, political or other opinions, national, ethnic or social origin, property, disability, birth or other status».

Article 10 of the Charter of Fundamental Rights of the European Union (Council of Europe, 2000) establishes at the level of European legislation that «everyone has the right to freedom of thought, conscience and religion. This right includes freedom to change religion or belief and freedom, either alone or in community with others and in public or private, to manifest religion or belief, in worship, teaching, practice and observance».

Analysis of the norms of the Law of Ukraine "On Freedom of Conscience and Religious Organizations" (Law of Ukraine No. 987-XII, 1991), as well as the Universal Declaration of Human Rights (United Nations, 1948) and the Convention on the Rights of the Child (United Nations, 1989), and the Charter of Fundamental Rights of the European Union (Council of Europe, 2000) gives reason to conclude that the application of measures to children who are citizens of Ukraine enjoying temporary protection in the form of removal from the family and consideration of the case for depriving parental rights are discriminatory on a religious basis and violate the norms of national legislation and international acts. There are no real grounds to believe that children are in danger. «The court hearing was held two weeks after all the children were taken away. The parents were not deprived of their parental rights by the court, and two days after the trial, the children were returned to their parents» (Vsirazom, 2023).

Anonymous complaint against parents about child abuse. A Ukrainian woman came to Germany with her two sons in order to get temporary protection. After arriving, the mother and her children lived with a German family for 51 days, and then they moved to a refugee camp. A few days later, representatives of the juvenile services arrived and said that the family, where they lived before had complained about the mother: they wrote a statement that the mother does not allegedly take care of her children, does not feed children properly, reacts too emotionally to everyday difficulties, and stated that the children will be temporarily taken away from her based on this statement until all the circumstances are clarified.

The children were taken directly from the playpit where they were playing. The woman addressed the consulate of Ukraine, but she was told that they could not help, since she is under temporary protection based on clause 24 and is subject to German law (Athens News, 2023). Article 6 of the Basic Law for the Federal Republic of Germany (Law of Germany, 1949) states that "(1) Marriage and the family shall enjoy the special protection of the state. (2) The care and upbringing of children is the natural right of parents and a duty primarily incumbent upon them. The state shall watch over them in the performance of this duty. (3) Children may be separated from their families against the will of their parents or guardians only according to a law and only if the parents or guardians fail in their duties or the children are otherwise in

danger of serious neglect. (4) Every mother shall be entitled to the protection and care of the community” (Law of Germany, 1949).

We believe that the measures taken in this case by the social services to take away the child until the circumstances of the case are clarified were carried out in accordance with Part 3 of the Article 6 of the German Constitution (Law of Germany, 1949), but there were no real grounds of a threat to the child. In such a case, the child was separated from the family that is not in the best interests of the child contrary to the Convention on the Rights of the Child (United Nations, 1989).

Leaving children alone at home. A Ukrainian family (mother, two children and grandfather) has been granted temporary protection status in Finland since the beginning of the war in Ukraine. The mother took the bus to the grocery store, grandfather went with her to help carrying heavy bags. Children of elementary school age stayed at home alone. When the mother returned home, the children were not at home. She found a note on the floor with a phone number and a signature in Finnish: sosiali- ja crisiipäivystys (on-call social crisis service). While social services investigated the circumstances why the children were left alone at home, the children lived in the shelter for 30 days without their mother. The Ukrainian woman currently lives with her children in a family shelter. The task of this institution is to support parents who are unable to take care of their children) (Yle, 2023)

Finnish child protection legislation is based on the norms of the Convention on the Rights of the Child (United Nations, 1989). The Finnish Child Welfare Act (Law of Finland No. 13.4.2007/417, 2007) does not specify the age when a child can be left alone at home. Social services, according to the Child Welfare Act, can intervene when there is neglect of a child's treatment and when there is a threat to the child's development, life and health. The Finnish Child Welfare Act (Law of Finland No. 13.4.2007/417, 2007) defines responsibility for the welfare of the child in the Section 2, according to which the primary responsibility for a child's wellbeing rests with the child's parents and other custodians. The Finnish Child Welfare Act (Law of Finland No. 13.4.2007/417, 2007) applies to all children living and staying in Finland, regardless of their nationality, religion or culture (Embassy of Ukraine in the Republic of Finland and Iceland, 2024).

The child's parents and custodians must safeguard the child's balanced development and well-being in the manner laid down in the Child Custody and Right of Access Act (Law of Finland No. 361/1983). The Act on Child Custody and Right of Access (Law of Finland No. 361/1983) states that «the child must be guaranteed good care and upbringing, as well as supervision and care necessary for the child's age and level of development. The aim must be to provide the child with a safe and stimulating growth environment and an education that corresponds to the child's inclinations and wishes. The child must be protected from all forms of physical and psychological violence, ill-treatment and exploitation» (Section 1).

Analysis of the situation and legislation in Finland gives reason to conclude that the social service acted in accordance with the legislation in order to comply with the best interests of children, since the parents are entrusted with the duty to provide proper care and education, which are necessary for the age and level of development of a child. Leaving children of elementary school age alone without adults is improper performance of parental responsibilities.

Suspicion of sexual abuse of children. All 6 children were taken away from a Ukrainian family in 2022 in Sweden. The cause for that was the oldest daughter's complaints about sexual harassment by her stepfather. Those suspicions were not confirmed after the investigation, but the children have not been returned to the family by the moment of writing this article. The oldest girl was placed into a special institution, because she was diagnosed with mental problems; other children were distributed to different temporary families and did not communicate with each other (except for two children who were placed in the same family), the mother was not allowed to see the children for several months and she was not told about places where the children were, although she was not personally accused, and she could be the sole guardian of the children. The problem was aggravated by the fact that the adults and part of the children in the family are deaf and mute, who use Ukrainian sign language for communication. Only one temporary family had Ukrainian-speaking people, other involved persons – temporary guardians, employees of the special institution where the oldest girl was placed – spoke neither Ukrainian nor Russian, and no one spoke sign language at all (Adcmemorial, 2023). A defence attorney lawyer hired by the human rights organization found that the youngest baby had been placed in a foster home without a family background check. The defence attorney tried to contact the Ukrainian child protection services in order to get a clearer

understanding about the family and for the purpose that this family does not disappear from the field of view of social services in case of return to Ukraine, since the vulnerability of the children from this family is obvious, but communication is very complicated. At the time of this report, the family was in Sweden, with the adults living together but separately from the children, whom they were allowed to see. Social services did not return the children to them because they were considered incapable of caring for children; one of the reasons for refusal was that the mother was pregnant again (Adcmemorial, 2023).

The author believes that sexual abuse against children is unacceptable and should be punished by law. In cases of suspicious or real facts of sexual abuse, to take away the child from the family, where the abuse has been reported, is in the child's best interests. The Charter of Fundamental Rights of the European Union (Council of Europe, 2000) establishes that "the child's best interest must be the primary consideration when a decision is made by a public or private body on behalf of a child" (Article 24). Besides, the Convention on the Rights of the Child (United Nations, 1989) stipulates that "States Parties shall take all necessary legislative, administrative, social and educational measures to protect the child from all forms of physical or mental violence, injury or abuse, neglect or negligent treatment, maltreatment or exploitation, including sexual abuse, while in the care of parent(s), legal guardian(s) or any other person who has the care of the child" (Article 19(1)).

Unknown reasons. Social services in Italy (Naples), took away a child with a disability from a Ukrainian woman. After the son was taken away, no one gave the mother information about his location. Cognizant authorities were determined to deprive her of parental rights and take away the child. The woman managed to get a response from the Italian Department of the Ministry of Foreign Affairs of Ukraine, where it was stated that a court case on the deprivation of parental rights is being heard (Stralkivska, 2023).

Non-attendance of educational institutions. According to the Article 14 of the Directive 2001/55/EC (Council of Europe, 2001), "Member States shall grant access to the education system to persons under the age of 18 who benefit from temporary protection under the same conditions as nationals of the hosting Member State. Member States may provide that such access shall be restricted by the public education system".

Education is compulsory in most EU countries. For example, every child between the age of 7 and 18 living in Poland is subject to compulsory schooling or compulsory education. It means that any child is obliged to go to school under the threat of sanctions against the parents. This obligation is also applied to children who do not have Polish citizenship, regardless of the legal status of their parents in Poland (Migrant Info, 2024).

Every situation is extremely difficult. Parents in some cases are indeed deprived of their parental rights, but it is very important to identify the real reasons for a danger to the life and health of children, or a violation of their rights.

International institutions are also worried about the situation of Ukrainian children being taken from their families. The United Nations Committee on the Rights of the Child while considering the State party's report of Ukraine in cooperation with the States Parties, noted that "the Committee strongly recommends to the States Parties: (a) intensify its efforts to provide the necessary support and resources to strengthen the family, in particular by avoiding punitive measures for the neglect of parental responsibilities, but strengthening support systems and social benefits for families with children in order to improve their ability to fulfil their responsibilities for raising children; (b) place children in alternative care only when needed and in their best interests; (c) create the system of effective monitoring and evaluation of public services and support for families in need, including single parents" (Commissioner for Human Rights, 2023).

In cases of non-attendance of an educational institution by a child who is under the temporary protection, parents can deal with social services. Non-attendance of educational institutions in individual cases is the fault of the parents, more often it is the result of an imperfect legal regulation procedure of temporary protection. For example, a school-age child and his mother received temporary protection status in Spain. They were accommodated in the hotel on a permanent basis, but the hotel does not grant permission to register the place of residence. The child does not attend a school, because the address where the child is registered must be specified for processing documents. In fact, social services may have reason to take away a child because school attendance is mandatory.

II. Peculiarities of Legal Regulation of Parental Responsibility in the National Legislation of Some EU Countries and Ukraine

According to the HCCH Child Protection Convention (HCCH, 1996), "parental responsibility" includes parental authority, or any analogous relationship of authority determining the rights, powers and responsibilities of parents, guardians or other legal representatives in relation to the person or the property of the child (Article 1 (2)). A similar definition is contained in Council Regulation (EU) 2019/1111, "parental responsibility" means all rights and duties relating to the person or the property of a child which are given to a natural or legal person by a decision, by operation of law or by an agreement having legal effect, including rights of custody and rights of access" (Articles 2 (2)).

Josep Ferrer i Riba (2012) believes that, in strict terms, the concept of parental responsibility refers to the set of powers and duties that the law attributes to parents with regard to their children. These rights and duties are aimed at promoting and safeguarding the child's welfare and essentially encompass the providing of personal care, protection and education, assuming administration of the child's property, and exercising legal representation. Resort to the expression 'parental responsibility' as a legal concept is rather uncommon in national legal systems». For example, in Ukrainian legislation there is no term "parental responsibility".

As a result of living on the territory of the country that granted temporary protection, the regulation of the rights and responsibilities of parents in raising children is covered by two national laws – legislation of Ukraine and the host country, as well as international acts (Sushch, 2023). It is worth noting that the internal legislation of a foreign country that has provided temporary protection may have different specific features than the legislation of Ukraine, it may provide other grounds for the application of emergency measures in case of minimal suspicion of disorders of children's rights and the initiation of a case on the deprivation of parental rights as a result of the violation of children's rights. For example, the actions and deeds of parents, which are permitted and lawful under the legislation of Ukraine, may be inadmissible in a foreign country and entail legal consequences of a negative nature for parents in the form of deprivation of parental rights. Therefore, it is very important to understand the field of applying the legislation in issues of parental responsibility.

The scope of the study does not allow us to examine the specifics of national legislation on parental responsibility in all EU countries, so the author examines examples of legal grounds for the removal of children in those countries where such situations are most common.

The Regional Health and Social Protection Authorities (Services) of Spain are empowered to temporarily remove children from their parents or legal representatives in case of non-fulfilment, impossibility, or improper fulfilment of statutory obligations to care for minors, or when they are deprived of the required moral or material assistance, in particular: abandonment of the child; threats to the life or health of the child and his/her physical integrity; serious negligence in the fulfilment of obligations for the maintenance and nutrition of the child; risk to the mental health of the minor, his/her moral integrity and personal development; severe and prolonged parental attention to the child's emotional or educational needs; serious deterioration of the family environment or the child's living conditions (Embassy of Ukraine in the Kingdom of Spain, 2024). The main legislative act of the Kingdom of Spain in the field of protection of the rights of the child is the Spanish Civil Code (Law of Spanish No. 3158/1889, 1889), as amended by the Law "On the Legal Protection of Minors» (Law of Spanish No. 1/1996, 1996). At the same time, each Autonomous Community has regional legislation that regulates legal relations in this area. In general, any actions of his/her parents that are dangerous to the life and health of the child, or circumstances that result in improper performance of parental duties, may be grounds for temporary deprivation of parental care. Information about the decision taken by the relevant child protection service to remove the child shall be immediately communicated to the Regional Public Prosecutor's Office and, in certain cases, to the judicial institution, as well as to the parents or legal representatives of the child no later than 48 hours. The decision on temporary deprivation of parental care and removal of a child may be appealed administratively within two years from the date of receipt of the notification, or in court (Embassy of Ukraine in the Kingdom of Spain, 2024)

In Poland is concerned, the competent authorities responsible for the protection of the rights and legitimate interests of children on the territory of Poland are the Juvenile Courts. In the event that information is received through law enforcement agencies about violations of the rights and legitimate interests of a child,

including citizens of a foreign state, the above-mentioned judicial institutions assess all aspects of the child's residence and upbringing, and, if necessary, involve social and medical services, and appoint temporary guardians (*Rodzina zastępcza*). The reasons for initiating a case may be domestic/sexual violence; mental disorders of legal representatives; the child was unsupervised in a public place; the child told the school that he was insulted/scolded at home; During a visit to the doctor, bruises were noticed on the child, etc (Embassy of Ukraine in the Republic of Poland, 2024).

The legal basis for parental responsibility is the Polish Family and Guardianship Code (Law of Poland, 1964a), Civil Procedure Code (Law of Poland, 1964b). Parental responsibility in specifically encompasses parents' obligations and rights to care for a child's person and assets and to bring up a child, with respect for the child's dignity and rights (Article 95(1) of the Law of Poland, 1964a). This Code provides that parental responsibility may take the form of: the restriction of parental authority (Article 109 of the Law of Poland, 1964a); the suspension of parental authority (Article 110 of the Law of Poland, 1964a) and the deprivation of parental authority (Article 111 of the Law of Poland, 1964a; Prucnal-Wójcik, 2023, p.86).

In Sweden, the authorized bodies that make decisions on the temporary removal of children are the Municipal Social Services. The legal act that regulates the removal of children at the national level is the Act of the Kingdom of Sweden On The Care of Young Persons (Law of the Kingdom of Sweden, 1990). Issues of removal of a child, deprivation of parental rights, the appointment of guardianship and custody may also be the subject of court proceedings. Family cases are reviewed by a special commission at the municipal authority on a case-by-case basis, taking into account the opinions of psychologists and social secretaries appointed by the commission to review such cases.

According to the provisions of the said legal act, the decision to apply compulsory measures in the field of child protection, including the removal of a child from the parents or one of them, is made by the social service according to the opinion of a special authorized commission functioning under the municipal social service. In accordance with the social legislation of the Kingdom of Sweden, a child may be removed from his or her parents if harm to his or her life or health is identified. In this case, the social service makes a decision to immediately remove the child from the parents and place him or her in a foster family (Socialstyrelsen, 2023).

For the court to decide that the child needs to be taken into care, three requirements must be met: the problems are related to the child's home environment or behaviour; the problems pose obvious risks to the child's health or development; and the child's needs cannot be met under voluntary circumstances (National Board of Health and Welfare of the Kingdom of Sweden, 2023).

In Germany, after the removal of a child by local juvenile services, depending on the situation, a court may initiate a decision on custody or termination of parental rights. In some cases, the removal of a child may also be accompanied by a temporary ban on visits by the mother in the new place of residence, which causes stress and can cause mental trauma to both the child and the mother. The main reasons that may lead to consideration and decision-making on the removal of the child and custody include: improper performance of parental duties; negligent and careless attitude of parents towards their child; suspicions of abuse of the child by the parents; unwillingness or inability of the parents to properly meet the needs of the child, including special needs in case of illness; the health status of the parents. An important point in the framework of "counteracting the removal of children by their legal representatives" is to maintain communication, as well as a certain level of trust and understanding between the parents of children and the relevant German Department of Juvenile Services (Embassy of Ukraine in the Federal Republic of Germany, 2024).

In Finland, according to Section 1 of the Child Custody and Access Act, it is the responsibility of parents to ensure the balanced development and well-being of the child in accordance with their individual needs and wishes. Thus, the purpose of parental responsibility is to secure close and affectionate relationships, especially between children and their parents. Children must be assured of good care and upbringing, as well as the supervision and protection that correspond to their age and stage of development. Children should be brought up in a secure and stimulating environment and receive an education that corresponds to their inclinations and wishes. Children must be brought up with understanding, security and affection. They must not be subject to corporal punishment or otherwise treated in an abusive manner. Children should be supported and encouraged to reach independence, responsibility and adulthood (Law of Finland No. 361/1983, 1983).

A significant drawback of Ukraine's national legislation is the absence of a legislative definition of "parental responsibility."

The Family Code of Ukraine (Law of Ukraine No. 2947-III, 2002) enshrines the grounds for deprivation of parental rights, which is worded as follows: "A mother or a father may be deprived of parental rights by the court if she / he: 1) did not take the child from the maternity hospital or from another health care facility without a good reason and did not show parental care within six months; 2) evade from fulfilling their responsibilities for upbringing the child and/or ensuring that the child obtains full general secondary education; 3) mistreat the child; 4) are chronic alcoholics or drug addicts; 5) resort to any kind of exploitation of the child, force the child to beg and wander; 6) convicted of committing an intentional criminal offense against the child" (Article 164 (1)).

Deprivation of parental rights is, on the one hand, a means of protecting the rights of the child, and on the other hand, a measure of influence on parents who do not properly fulfil their parental responsibilities towards the child. The consequence of parents' failure to fulfil their obligations is not only deprivation of parental rights, but also removal of the child from the parents without deprivation of their parental rights (Menjul, 2021).

Special regulations on the protection of children's rights at the national level are enshrined, in particular, in the Law of Ukraine "On the Protection of Childhood" (Law of Ukraine No. 2402-III, 2001). This Law defines the protection of childhood in Ukraine as a strategic national priority, which is important for ensuring the national security of Ukraine, the effectiveness of the internal policy of the state, and aimed at ensuring the realization of the children's rights to life, health care, education, social protection, comprehensive development and upbringing in a family environment, establishes the basic principles of the state policy in this area, which are based on ensuring the best interests of the child (Law of Ukraine No. 2402-III, 2001).

III. Peculiarities of Determining Jurisdiction in Cases of Parental Responsibility

A key issue in the regulation of private relations that are the subject of PIL is the determination of jurisdiction. PIL contains two effective tools for determining jurisdiction in cases of parental responsibility. The system of conflicts norms, as well as the rules for determining jurisdiction in cases of parental responsibility and protection of children's rights, is enshrined at the level of international acts in the HCCH Child Protection Convention (HCCH, 1996) and Regulation No 2019/1111 (European Union, 2019).

The HCCH Child Protection Convention (HCCH, 1996) establishes jurisdiction for refugee children and children displaced to foreign countries as a result of social endurance. The Articles 5 and 6 contain an indication that «for refugee children and children who, due to disturbances occurring in their own country, are internationally displaced, the authorities of the Contracting State on the territory of which these children are present as a result of their displacement have the jurisdiction to take measures directed to the protection of the child's person or property» (HCCH, 1996). Thus, the law of the country of residence – the country that granted temporary protection – will be applied to cases arising abroad regarding parental responsibility or deprivation of parental rights of citizens of Ukraine who have received temporary protection, and the protection of children enjoying temporary protection (Sushch, 2024).

In determining jurisdiction, Regulation No. 2019/1111 (European Union, 2019) assumes that "the grounds of jurisdiction in matters of parental responsibility are shaped in the light of the best interests of the child and should be applied in accordance with them. Any reference to the best interests of the child should be interpreted in light of Article 24 of the Charter of Fundamental Rights of the European Union ('the Charter') and the United Nations Convention on the Rights of the Child ('United Nations, 1989) as implemented by national law and procedure (clause 19 of the Preamble, European Union, 2019). To safeguard the best interests of the child, jurisdiction should in the first place be determined according to the criterion of proximity. Consequently, jurisdiction should lie with the Member State of the habitual residence of the child, except for certain situations set out in this Regulation, for instance, where there is a change in the child's residence or pursuant to an agreement between the holders of parental responsibility" (clause 20, European Union, 2019).

Since the article focuses on the issue of parental responsibility of Ukrainian citizens in a foreign country, it is also necessary to analyze the application of conflict-of-laws rules enshrined in the Law of Ukraine "On

Private International Law" (Law of Ukraine № 2709-IV, 2005). According to the Article 66 of the Law of Ukraine "On Private International Law", the rights and responsibilities of parents and children, except for the cases provided in the Articles 67, 67-1, 67-4 of this Law, applied to maintenance obligations, are determined by personal law of the child or the law, which is closely related to the relevant relationship and if it is more favourable to the child (Law of Ukraine № 2709-IV, 2005).

Based on the analysis of the Article 66 of the Law of Ukraine "On Private International Law" (Law of Ukraine № 2709-IV, 2005), we can note that the conflicting norm of Ukrainian national legislation on parental responsibilities has an alternative nature – the child's personal law (the law of Ukraine), as a general rule, or law that is closely related to the appropriate relationship and if it is more favourable for the child should be applied to cases of deprivation of parentage.

When determining the law, that has the closest relationship to the child, it is necessary to take into account whether the child, who enjoys temporary protection, is undergoing integration and how long the child has been on the territory of a foreign country. For example, if a child is on the territory of an EU state under temporary protection status for more than a year, attends an educational institution (school, kindergarten), and already has a permanent registration in that country, then his or her permanent place of residence will be considered the host country. It is the law of this country that will be considered as the law having a close relationship and relevant family relations, but it can be questioned whether the law of the closest relationship will be more favourable to the child than the law of the country of the child's nationality. However, it should be accepted that jurisdiction to issue orders in respect of children is usually determined by one preferred forum, as a rule it is the habitual residence of the child. The dominant reasoning in respect of children is the decision on the best interests of a child. It is accepted almost everywhere and is emphasized in the UN Convention on the Rights of the Child (United Nations, 1989). Provisions that allow exceptions to the general rule and provide the transfer of a case from the court of the habitual residence to the court with greater capacity to hear the case are also justified by the reasoning of "the best interests" (McClean, D., 2023).

Conclusions

Today, the problem of foreign social services applying urgent measures to Ukrainian families abroad who are under temporary protection in EU countries, in the form of removing children from their families and initiating proceedings to deprive/restrict parental rights is quite acute. The problem is growing, but there is no established mechanism to overcome it. The rules of Private International Law have a key influence on the resolution of cases of parental responsibility.

The author identifies and analyses the grounds for removal of children from Ukrainian families enjoying temporary protection in the EU, in particular, they include: suspicion of creating dangerous circumstances for a child; religious grounds; anonymous complaints against parents about child abuse; leaving children alone at home; suspicion of sexual abuse of children Unknown reasons; non-attendance of educational institutions. In most cases, the removal of children from families as a measure of parental responsibility was applied based on improper performance of parental duties, but there are cases in which such measures were preventive.

Jurisdiction in cases of parental responsibility and deprivation/restriction of parental rights is determined in accordance with the rules established by the HCCH 1996 Child Protection and Council Regulation (EU) No 2019/1111. Based on the analysis of the norms of the HCCH Child Protection (1996) and Council Regulation (EU) No 2019/1111, it has been established that the law of the country that has the closest relationship with legal relations will be considered as the legislation and court having jurisdiction to hear such categories of cases, that is, the law of the country, where the child and the parents live based on temporary protection. But there are exceptions to the general rule, since the basic principle in choosing the jurisdiction is the best interests of the child. The best interests of the child are the guiding principle in the protection of children's rights under international law and national law of separate countries.

It is believed that in cases of parental responsibility, in particular, deprivation of parental rights, the law of the closest relationship is not the most favourable in the interests of the child. In the author's opinion, the most favourable law is the law of the child's personal law.

A significant drawback in the regulation of relations in the field of parental responsibility is that Ukraine is not a party to Council Regulation (EU) No. 2019/1111, which complicates the resolution of conflict of laws problems. In addition, the legislation of Ukraine needs to be amended in terms of consolidating the concept of "parental responsibility" at the legislative level.

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Bibliographic References

- Adcmemorial (2023). *The situation of children from Ukraine in European countries after February 24, 2022*. Retrieved from <https://acortar.link/LJbAs6>
- Athens News (2023). *How Ukrainian refugees lose their children in Europe*. Retrieved from <https://en.rua.gr/2023/03/07/how-ukrainian-refugees-lose-their-children-in-europe/>
- Commissioner for Human Rights (2023). *Urgent action needed to reunite Ukrainian children transferred to Russia and Russian-occupied territories with their families*. Retrieved from <https://acortar.link/tIgESp>
- Council of Europe (2000). *Charter of fundamental rights of the European Union (2000/C 364/01)*. Retrieved from https://www.europarl.europa.eu/charter/pdf/text_en.pdf
- Council of Europe (2001). *Council Directive 2001/55/EC of 20 July 2001 on minimum standards for giving temporary protection in the event of a mass influx of displaced persons and on measures promoting a balance of efforts between Member States in receiving such persons and bearing the consequences thereof*. Retrieved from <https://eur-lex.europa.eu/eli/dir/2001/55/oj>
- Embassy of Ukraine in the Federal Republic of Germany (2024). *Legal assistance to citizens of Ukraine in case of removal of children by social services in Germany*. Retrieved from <https://acortar.link/c9Z6xg>
- Embassy of Ukraine in the Kingdom of Spain (2024). *Obtaining legal assistance in case of removal of children from citizens of Ukraine on the territory of the Kingdom of Spain*. Retrieved from <https://acortar.link/JooJD7>
- Embassy of Ukraine in the Republic of Finland and Iceland (2024). *Information for parents/legal guardians in case of removal of children in Finland*. Retrieved from <https://acortar.link/7HINoD>
- Embassy of Ukraine in the Republic of Poland (2024). *Memo on the procedure for providing legal assistance to citizens of Ukraine in case of temporary removal of their children on the territory of the Republic of Poland*. Retrieved from <https://acortar.link/2d4JCa>
- European Union (2019). *Council Regulation (EU) 2019/1111 of 25 June 2019 on jurisdiction, the recognition and enforcement of decisions in matrimonial matters and the matters of parental responsibility, and on international child abduction (recast)*. Retrieved from <http://data.europa.eu/eli/reg/2019/1111/oj>
- Ferrer i Riba, J. (2012). *Parental Responsibility: Scope and Terminology*. Max Planck Encyclopedia of European Private Law. Retrieved from https://max-eup2012.mpipriv.de/index.php/Parental_Responsibility
- Gorban, M. (2024). *Children were taken away in Europe, adoptions and 1759 orphans because of the war. Interview with the head of the social service*. Radio Svoboda. Retrieved from <https://www.radiosvoboda.org/a/syroty-bizhentsi-vidibrani-dity-italia-usynovlennia/32844308.html>
- HCCH (1996). *Convention on jurisdiction, applicable law, recognition, enforcement and cooperation in respect of parental responsibility and measures for the protection of children*. Retrieved from <https://www.hcch.net/en/instruments/conventions/full-text/?cid=70>
- International Union of Judicial Officers (2022). *Entry into application of the Brussels II ter Regulation*. Retrieved from <https://www.uihj.com/2022/09/28/entry-into-application-of-the-brussels-ii-ter-regulation/>
- Kobzar, Y. (2023). *In the EU, children were taken from 240 families of Ukrainian refugees - human rights defenders*. UNIAN. Retrieved from <https://www.unian.ua/world/v-yes-viluchili-ditey-u-240-simey-ukrajinskih-bizhenciv-pravozahisniki-12298419.html>
- Law of Finland No. 13.4.2007/417. On Child Welfare. *Finlex*, 2007. Retrieved from <https://www.finlex.fi/fi/laki/ajantasa/2007/20070417>
- Law of Finland No. 361/1983. On Child Custody and Right of Access. *Finlex*, 1983. Retrieved from <https://www.finlex.fi/fi/laki/ajantasa/1983/19830361>



- Law of Germany. The Basic Law for the Federal Republic of Germany. *Bundestag*, 1949. Retrieved from <https://www.bundestag.de/gg/grundrechte>
- Law of Germany. On the Residence, Economic Activity and Integration of Foreigners in the Federal Territory (Residence Act - AufenthG). *Federal Ministry of Justice*, 2008. Retrieved from https://www.gesetze-im-internet.de/englisch_aufenthg/englisch_aufenthg.html
- Law of Poland. Polish Family and Guardianship Code. 1964a. Retrieved from <https://acortar.link/68Nd0Z>
- Law of Poland. Civil Procedure Code. *Wipo*, 1964b. Retrieved from <https://www.wipo.int/wipolex/en/legislation/details/22373>
- Law of Spanish. Spanish Civil Code. *Ministry of Justice*, 1889. Retrieved from <https://acortar.link/5Yb9Gg>
- Law of Spanish No. 1/1996. On the Legal Protection of Minors, modifying the Civil Code and the Code of Civil Procedure. *BOE* No. 15, 17 January 1996. Retrieved from <http://www.boe.es/buscar/doc.php?id=BOE-A-1996-1069>
- Law of the Kingdom of Sweden. *On The Care of Young Persons*, 1990. Retrieved from <https://assets.hcch.net/docs/28194499-f47e-4b33-8bcc-e63634847d45.pdf>
- Law of Ukraine No. 2947-III. Family Code of Ukraine. *Bulletin of the Verkhovna Rada of Ukraine*, Kyiv, Ukraine, January 10, 2002. Recovered from <https://zakon.rada.gov.ua/laws/show/2947-14#Text>
- Law of Ukraine No. 2402-III. On Childhood Protection. *Bulletin of the Verkhovna Rada of Ukraine*, Kyiv, Ukraine, March 26, 2001. Retrieved from <https://zakon.rada.gov.ua/laws/show/2402-14#Text>
- Law of Ukraine No. 2709-IV. On Private International Law. *Bulletin of the Verkhovna Rada of Ukraine*, Kyiv, Ukraine, June 23, 2005. Retrieved from <https://zakon.rada.gov.ua/laws/show/2709-15#Text>
- Law of Ukraine No. 987-XII. On Freedom of Conscience and Religious Organizations. *Bulletin of the Verkhovna Rada of Ukraine*, Kyiv, Ukraine, April 23, 1991. Retrieved from <https://zakon.rada.gov.ua/laws/show/987-12#Text>
- Lubinet, D. (2023). *The number of Ukrainian children removed abroad has already decreased from 240 to 215*. Ukrinform. Retrieved from <https://acortar.link/526N9u>
- McClean, D. (2023). The transfer of proceedings in international family cases. *Journal of Private International Law*, 19(1), 1-24
- Menjul, M. (2021). *Comparative Family Law: A Study Guide*. Uzhhorod: RIK-U, 296 p. (in Ukrainian)
- Migrant Info (2024). *Should I send my child to school while in Poland?* Retrieved from <https://migrant.info.pl/ua/home-120/navcanna/vazliva-informacia-ta-prakticni-poradi>
- National Board of Health and Welfare of the Kingdom of Sweden (2023). *Information about compulsory care of children by Swedish act LVU*. Retrieved from <https://acortar.link/j96Xyo>
- Operational data portal UNHCR (2024). *Ukraine Refugee Situation*. Retrieved from <https://data.unhcr.org/en/situations/ukraine>
- Pozdnyakova, N. (2023). *Ukrainian refugees in Germany. How and why are children taken from them?* DW. Retrieved from <https://acortar.link/TA7cpk>
- Prucnal-Wójcik, M. (2023). State Interference With the Scope of Parental Responsibilities – Comparative Legal Analysis. *Horizons of Education*, 22(64), 83-93.
- Socialstyrelsen (2023). *Information about compulsory care of children in accordance with Swedish act LVU*. Retrieved from <https://acortar.link/j96Xyo>
- Stralkivska, M. (2023). *Social services in Italy took the child away from Ukrainian women. A mother cannot bring her son back*. SlovoProslovo. Retrieved from <https://slovoproslovo.info/sotssluzhbi-v-italii-zabrali-ditinu-v-ukrainki-mati-ne-mozhe-povernuti-sina/>
- Supreme Court of Ukraine (2008). *Generalization of judicial practice of the Supreme Court of Ukraine. The practice of court consideration of cases related to deprivation of parental rights, renewal of parental rights, adoption, establishment of guardianship and guardianship of children*. Retrieved from <https://zakon.rada.gov.ua/laws/show/n0020700-08#Text>
- Sushch, O. (2023). Problems of Temporary Protection of Ukrainians Abroad in Terms of Armed Aggression of the Russian Federation (European Experience). *Juris Europensis Scientia*, 6, 18-24. <https://doi.org/10.32782/chern.v6.2023.4>
- Sushch, O. (2024). Problems of Protecting Children's Rights who are Citizens of Ukraine Enjoying Temporary Protection in EU Countries. *Law and Innovation Society*, 1(22), 39-51. [https://doi.org/10.37772/2309-9275-2024-1\(22\)-4](https://doi.org/10.37772/2309-9275-2024-1(22)-4)
- United Nations (1948). *Universal Declaration of Human Rights*. Retrieved from <https://www.un.org/en/about-us/universal-declaration-of-human-rights#:~:text=Article-%2026%20,the%20basis%20of%20merit>
- United Nations (1989). *Convention on the Rights of the Child of 1989*. Retrieved from <https://www.ohchr.org/en/instruments-mechanisms/instruments/convention-rights-child>

- Volkova, N., Prytuliak, V., Yanitska, I., Poliuk, Y., & Polunina, O. (2023). Current issues of the application of ECTHR decisions and its implementation in the field of children's rights protection. *Amazonia Investiga*, 12(67), 241-249. <https://doi.org/10.34069/AI/2023.67.07.22>
- Vsirazom (2023). *How in Germany they wanted to deprive Ukrainian parents of 13 children of their parental rights*. Retrieved from <https://vsirazom.ua/news/yak-u-nimechchyni-hotily-pozbavyty-batkivskyh-prav-batkiv-13-ditej>
- Yle (2023). *The guardianship service took the children of the Ukrainian refugee while she went to the store*. Retrieved from <https://yle.fi/a/74-20034478>




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Impact of digital marketing and E-Payments on Saudi online startup consumers

أثر التسويق الرقمي والمدفوعات الإلكترونية على مستهلكي الشركات الناشئة عبر الإنترنت في السعودية

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Abstract

This study explores the impact of digital marketing and payment systems on consumer behavior in Saudi Arabia's online startups. A sample of 291 participants was selected from Hail's region, in Saudi Arabia. The research employs a mixed-method approach, using SPSS version 2025 for descriptive statistical analysis and Structural Equation Modeling with Partial Least Squares (SEM-PLS) to examine the relationships between the key constructs and their effects on online purchase outcomes (OP). The study tests nine hypotheses, revealing that Perceived Innovation (PI) has a weak positive effect on OP, but this relationship is not statistically significant. Similarly, Perceived Security (PS) shows a minimal impact on OP, suggesting that these factors may not be as influential in the context of digital payment adoption as initially expected. The model's high R-square values for intention to purchase online (IPO) (0.654) and OP (0.594) indicate that it successfully explains a substantial portion of the variance in these outcomes. These findings offer valuable insights into the factors driving digital payment adoption and online purchasing behavior in Saudi Arabia. The study underscores the need for businesses to consider regional and cultural contexts when developing digital marketing strategies for effectively promoting digital commerce in diverse markets.

Keywords: Digital Payment Adoption, Digital Marketing Strategies, Consumer Behavior, Online Startups, Saudi Arabia.

List of abbreviations

Factor loadings (FL), Cronbach's alpha (CA), Composite Reliability (CR), Average Variance Extracted (AVE), Perceived Innovation (PI), Perceived Security (PS), Perceived Ease of Use (PEU), Attitude Towards Using (ATU), Intention to Purchase Online (IPO), Online Purchase (OP).

خلاصة

تستكشف هذه الدراسة تأثير التسويق الرقمي وأنظمة الدفع على سلوك المستهلك في الشركات الناشئة عبر الإنترنت في المملكة العربية السعودية. تم اختيار عينة من 291 مشاركاً من منطقة حائل، المعروفة بخصائصها الثقافية والاقتصادية المميزة التي قد تؤثر على سلوك المستهلك. تستخدم الدراسة منهجاً الإصدار SPSS 2025 مختلطاً، حيث يتم استخدام برنامج التحليل الإحصائي الوصفي ونمذجة المعادلات الهيكلية باستخدام لفحص العلاقات (SEM-PLS) المربعات الصغرى الجزئية بين البنى الرئيسية وتأثيراتها على نتائج الشراء عبر الإنترنت. تختبر الدراسة تسع فرضيات، كاشفة أن الابتكار المدرك (OP)، لكن (OP) له تأثير إيجابي ضعيف على الأداء التشغيلي (PI) هذه العلاقة ليست ذات دلالة إحصائية. وبالمثل، يُظهر الأمن، مما (OP) تأثيراً ضئيلاً على الأداء التشغيلي (PS) المدرك يشير إلى أن هذه العوامل قد لا تكون مؤثرة كما كان متوقعاً في للنموذج R سياق اعتماد الدفع الرقمي. تشير القيم العالية لمربع (0.654) و (0.594) لنية الشراء عبر الإنترنت إلى أنه يفسر بنجاح جزءاً كبيراً من التباين في هذه النتائج. تقدم هذه النتائج رؤية قيمة حول العوامل التي تدفع تبني الدفع الرقمي وسلوك الشراء عبر الإنترنت في المملكة العربية السعودية، مما يبرز أهمية فهم تفضيلات واتجاهات المستهلكين المحلية في بيئة رقمية تتطور بسرعة. تؤكد الدراسة على ضرورة أن تأخذ الشركات في الاعتبار السياقات الإقليمية والثقافية عند تطوير استراتيجيات التسويق الرقمي، حيث أن هذه العناصر ضرورية للتفاعل الفعال مع المستهلكين وتعزيز التجارة الرقمية في الأسواق المتنوعة.

الكلمات المفتاحية: اعتماد الدفع الرقمي، استراتيجيات التسويق الرقمي، سلوك المستهلك، الشركات الناشئة عبر الإنترنت، المملكة العربية السعودية.

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Introduction

The rapid expansion of digital technologies has significantly transformed consumer behavior, particularly in emerging markets like Saudi Arabia. As online startups in Saudi Arabia increasingly adopt digital marketing strategies to engage a tech-savvy population, there remains a notable gap in empirical research on how these strategies affect consumer buying behavior in this specific market. This is due to the fact that the market in Saudi which consists of tech-savvy consumers facilitates online startups to thrive (Al Hamli & Sobaih, 2023). So, revenues from e-Commerce in Saudi Arabia stood approximately at 10.44 billion USD in 2022; and it has been forecasted that the figure will surpass 23.46 billion USD by the end of 2027 (Statista, 2022a). In the same vein, the consumers in the KSA who engaged in online transactions were estimated at 25.6 million in 2020, and the figure is projected to be more than 34.5 million users with 92.5% user penetration by 2025 (Statista, 2022b). In addition, it was reported that 93% of online shoppers use their smart phones for online transactions in Saudi Arabia (Bahaddad et al., 2018). To this end, the combination of the Technology Acceptance Model (TAM) and the Chip and Pin Theory offers a structured approach to understanding these impacts, making it crucial for startups aiming to optimize their marketing strategies and achieve growth in the competitive digital landscape (Davis, 1989a)

Furthermore, the government of Saudi Arabia is highly dedicated in enhancing and further developing the entrepreneurship and the startups. Therefore, the government of the KSA budgeted US \$19.2 billion to empower the private sector, and greater percentage was meant to support the SMEs (Alferaih, 2022). Thus, under its Vision 2030 blueprint, the government has pledged to raise the contribution of SMEs to GDP from 20% to 35% by 2030 in an attempt to diversify the economy away from the oil dependent (Ashri, 2019; Khoirunnisa & Nurhaliza 2024).

The problem is that despite the substantial investment in digital marketing by online startups, many still face challenges in effectively reaching and engaging consumers. This issue stems from a limited understanding of how factors such as perceived innovation, attitude, ease of use, and perceived security influence consumer decisions in the Saudi Arabian context. By combining TAM and the Chip and Pin Theory, the research aims to address the identified gap by providing a comprehensive analysis of how digital marketing impacts consumer behavior, thus offering actionable insights for improving marketing effectiveness and startup success (Venkatesh & Davis, 2000). Accordingly, there is a lack of concrete evidence regarding the level of innovative technology adoption among startup founders and co-founders, making it difficult to draw definitive conclusions. The outcomes of such adoption efforts tend to vary significantly depending on the research context, leading to inconsistent findings. This variation suggests that external factors and regional influences may play a critical role in shaping these results. Consequently, generalizing the level of innovation adoption across different settings remains challenging (Giuggioli & Pellegrini, 2023). Thus, research is needed to explore these inconsistencies and identify potential patterns. Furthermore, the adoption of the new technology by startups is beyond just technical issues but also involve behavioural tendencies of the key stake holders (Alateeg et al., 2024). To this end, the interplay of technology, innovation, and human dynamics, enables proper understanding of the intricacies behind startup decisions to adopt the new technology such as digital marketing (Dwivedi et al., 2021; Lévesque et al., 2022)

Justifications for this research are grounded in the increasing emphasis on digital marketing within Saudi Arabia's growing digital economy. With substantial investments in digital infrastructure and technology, it is imperative to understand how digital marketing strategies impact consumer preferences and behaviors. Such research can guide startups in developing more effective marketing strategies, ultimately supporting their success and contributing to the broader economic development of the region (Alanmi & Alharthi, 2023).

Many startups invest heavily in digital marketing but struggle to achieve their business goals due to an inadequate understanding of consumer preferences. This study aims to bridge the gap by investigating how perceived innovation, ease of use, attitude, and security impact consumers' intentions regarding their buying behavior in online startups. Addressing these factors is essential for startups to align their strategies with consumer expectations and improve their chances of success in the competitive digital market (Venkatesh et al., 2003; Alanmi & Alharthi, 2023).

A critical problem justifying this research is the high rate of failure among online startups in Saudi Arabia, which often stems from ineffective marketing strategies and a lack of understanding of consumer behavior.

Despite the substantial investment in digital marketing by these startups, many struggle to achieve significant traction or meet their business objectives. This challenge underscores the need for targeted research to identify the factors that influence consumer buying behavior in the context of Saudi Arabia's unique market dynamics. Especially now the country is implementing a significant economic transformation known as vision 2030 (Alateeg et al., 2024). Thus, huge investments are being made by the government through initiatives such as the Saudi Data & AI Authority (SDAIA) and the National Strategy for Data & AI (NSDAI) (Al Anezi, 2021).

TAM is being used in studies that have to do with new technology adoption and has been found to adequately explain such research (Davis, 1989b). So, by integrating TAM and the Chip and Pin Theory, this research aims to uncover insights into how ease of use, innovation, attitude and security impact consumer engagement with digital marketing, providing startups with evidence-based strategies to enhance their effectiveness and reduce failure rates. Understanding these dynamics is critical for startups to align their marketing efforts with consumer expectations and improve their chances of success in the competitive digital landscape.

Literature Review

In this section, literature review is conducted. This includes the conceptual, empirical and theoretical reviews were all conducted in the section. In addition, the application of the theories to the research context was done as well.

Concept of Online Purchase Behaviour

As stated by Ariff, Sylvester, Zakuan, Ismail, and Ali (2014), internet-based buying behavior is typically characterized as a process in which consumers browse websites to seek, choose, and purchase goods and services to meet their requirements and wants. Nevertheless, Li and Zhang (2002) pointed out that internet-based purchasing behavior is influenced by the psychology of the individual making the transaction. Online purchasing is a popular method of shopping in the digital world (Bourlakis, Papagiannidis, & Fox, 2008). As a result, the more variety and convenience, the easier it is for potential consumers to find what they are looking for online. Additionally, the effect of COVID-19 and the resultant consequences of social distance measures further facilitated the reliance of consumers to purchase goods and services using various online platforms (Alessa et al., 2021).

The Chip and Pin Theory and Its Application to Digital Payment Methods

The Chip and Pin Theory, or the PIN (Perceived Innovation, Convenience, and Security) model, explores how consumers' intentions to use digital payment methods are shaped by various perceived factors. This review examines the key variables of the PIN model—Perceived Innovation (PI), Perceived Security (PS), Intention to Use (ITU), and Actual Usage (AU)—and their importance in comprehending consumer behavior with regards to the online startups in Saudi Arabia.

Perceived Innovation (PI)

Perceived Innovation is an important variable with respect to new technologies, especially in the digital payment sector. It refers to the degree to which a payment method is recognized as modern, advanced, and incorporating the latest technological advancements. Based on Rogers' Diffusion of Innovations theory, innovations that are considered as novel and superior to existing alternatives tend to be adopted more rapidly by consumers (Rogers, 2003). In the current dynamic landscape of digital payments, the integration of cutting-edge technologies such as blockchain, biometric authentication, and artificial intelligence enhances the perceived innovation of these systems, making them more appealing to consumers. For instance, payment methods that utilize blockchain technology are often seen as more secure and transparent, while those incorporating biometric authentication are perceived as offering a higher level of convenience and security (Venkatesh et al., 2012). This perception can significantly influence consumer attitudes and behaviors, leading to a higher possibility of adoption.

Studies further emphasize the significance of perceived innovation in shaping consumer acceptance of digital payment technologies. Research by Behera et al., (2023), highlights that innovation plays a crucial role in consumers' positive attitudes towards adopting new payment methods. As digital payment platforms

continue to evolve, the ability to showcase innovation becomes increasingly vital in attracting and retaining users. For example, (Alateeg et al., 2024) found that in the context of startup sustainability, consumers are inclined to adopt payment systems that they perceive as innovative, particularly those that offer novel features such as AI-driven fraud detection and personalized user experiences. Similarly, Harahonych et al., (2022) noted that the perception of innovation not only enhances consumer trust but also drives the overall adoption of digital payment systems, underscoring the importance of continuous innovation in this competitive market. Thus, as digital payment technologies advance, perceived innovation remains a key determinant of consumer acceptance and market success. To this end, it is hypothesized that:

H1 Perceived innovation has a significant impact on consumer purchase intention in Saudi Arabia's online startups

Perceived Security (PS)

Perceived Security is a critical factor in consumers' assessment of trustworthiness which directly determines their adoption decisions. Security concerns have long been recognized as a significant barrier to the widespread use of digital payments (Pavlou, 2003; Almaiah, 2023). Thus, consumers are more likely to adopt payment methods that they perceive as robust against such threats (Gefen et al., 2003). The presence of advanced security measures, such as encryption, multi-factor authentication, and tokenization, plays a pivotal role in mitigating these concerns and fostering trust among users.

Recent studies continue to underscore the importance of perceived security in the digital payment landscape, particularly as cyber threats evolve and become more sophisticated. Alateeg et al., (2024) highlight that in the context of startup sustainability; perceived security is vital in influencing user adoption, especially in markets like Saudi Arabia, where trust in digital platforms is still being cultivated. Effective security features not only protect consumers from potential threats but also enhance the overall user experience by providing peace of mind, which is essential for driving long-term engagement. Furthermore, research by Alzahrani, (2022). emphasizes that the integration of AI-driven security solutions, such as real-time fraud detection and predictive analytics, has become increasingly important in addressing consumer concerns and boosting confidence in digital payment systems. These advancements not only secure transactions but also contribute to a more seamless and reliable payment experience, ultimately encouraging broader adoption. As digital payment methods continue to evolve, the emphasis on perceived security remains paramount, influencing consumer behavior and the success of payment platforms in an increasingly digital world. Hence, it is proposed that:

H2 Perceived security has a significant impact on consumer purchase intention in Saudi Arabia's online startups

The Technology Acceptance Model (TAM) and Digital Marketing

The second theory utilized in this study is Davis' (1989b) Technology Acceptance Model (TAM), which offers an information systems framework to evaluate how consumers adopt and use technology. TAM has been widely researched and validated through numerous studies that explore individual technology acceptance behaviors across different information system architectures (Surendran, 2012). This model is built upon the foundations of the Theories of Reasoned Action (Fishbein & Ajzen, 1975) and Planned Behavior (Ajzen, 1991), providing a robust structure for analyzing technology usage. According to TAM, the ultimate goal is the actual system use, where individuals fully integrate technological advancements into their daily routines.

TAM is especially valuable for understanding how customers adopt new technologies, particularly in fields like digital marketing. It offers a framework for identifying key factors that influence consumer behavior when interacting with technology. Recognizing these factors, businesses can better understand the drivers behind technology adoption and use, helping them to develop strategies that enhance user experience and engagement. This makes TAM an important tool for examining the intersection of technology and consumer behavior in the rapidly evolving digital landscape.

This study specifically examines four core components of TAM: perceived ease of use (PEU), attitude toward using (ATU), intention to use (ITU), and actual usage (AU). Each of these factors plays a critical role in shaping consumer interactions with technology, especially in the context of digital marketing tools

used by startups. Focusing on these dimensions, the study seeks to determine how they collectively influence consumer behavior and decision-making processes, offering valuable insights into how businesses can improve technology adoption rates.

In the context of Saudi Arabian startups, the study explores how these TAM factors affect consumer behavior in digital marketing. With the rapid digital transformation in the region, understanding how consumers perceive and engage with technology is crucial for businesses aiming to thrive in a competitive market. This research provides a comprehensive analysis of the technological adoption process, with a specific focus on digital marketing for startups in Saudi Arabia, helping to identify the key drivers of success in this dynamic field.

Perceived Ease of Use (PEU)

Perceived Ease of Use (PEU) reflects how effortless a consumer believes it will be to use a particular technology, such as digital marketing tools. Davis (1989a) identified PEU as a critical factor influencing technology adoption, emphasizing that technologies perceived as easy to use are more likely to be embraced by consumers. In the realm of digital marketing, platforms that are user-friendly require minimal training, and offer intuitive interfaces tend to facilitate higher adoption rates. Thus ease of use not only reduces the learning curve for new users but also facilitates the overall user experience, making it more likely for businesses to integrate these tools into their marketing strategies (Venkatesh et al., 2012).

Recent research underscores the importance of PEU in shaping the intentions towards using digital marketing. Consumers are more inclined to adopt digital marketing platforms that streamline processes and reduce complexity. Alateeg et al., (2024) further support this notion, noting that digital marketing tools that offer seamless integration and straightforward usability contribute to more favorable attitudes and higher usage rates. Moreover, Yakaitis et al., (2023). highlight that user-friendly platform, which minimize operational barriers and enhance efficiency, are crucial in maintaining sustained engagement and maximizing the effectiveness of digital marketing efforts. As digital marketing technologies continue to evolve, ensuring their ease of use will remain essential for fostering widespread adoption and optimizing user satisfaction. Based on the forgoing therefore it is proposed that:

H3 Perceived ease of use has a significant impact on consumer purchase intention in Saudi Arabia's online startups

Attitude towards Usage (ATU)

Attitude towards Usage (ATU) represents a consumer's overall evaluation and sentiment towards digital marketing. This attitude is significantly influenced by two: Perceived Usefulness (PU) and Perceived Ease of Use (PEU). According to Ajzen and Fishbein (1980), consumers who perceive digital marketing as user-friendly are more likely to develop a positive attitude towards its use. When digital marketing tools are seen as enhancing performance or outcomes and are easy to operate, consumers are inclined to view them favorably.

A favorable ATU serves as a strong predictor of both the intention and the actual usage of digital marketing tools. Davis (1989a) asserts that positive attitudes towards a technology directly impact users' intentions to adopt and integrate it into their practices. Recent studies reinforce this view, showing that when businesses perceive digital marketing tools as both useful and easy to use; their attitudes towards these tools become more positive, leading to higher adoption rates and consistent usage (Alateeg et al., 2024). Furthermore, Yang et al., (2017) highlight that a positive attitude towards digital marketing not only drives the initial intention to use but also sustains engagement over time. As digital marketing technologies evolve, fostering a favorable attitude among users will be essential for driving continued adoption and maximizing the impact of these tools. Hence, it is presumed that:

H4 Attitude towards usage/purchase has a significant impact on consumer purchase intention in Saudi Arabia's online startups

Intention to Use (ITU)

Intention to Use (ITU) represents the likelihood that a consumer will engage with digital marketing tools and technologies. ITU is considered a precursor to actual usage, as it encapsulates the consumer's readiness and motivation to adopt and regularly use digital marketing methods.

Research consistently shows a strong correlation between ITU and actual usage, highlighting ITU as a critical measure for predicting consumer behavior. Taylor and Todd (1995) found that a higher intention to use digital marketing tools is closely associated with greater actual usage, making ITU a valuable predictor of how likely consumers are to engage with these tools. Recent studies, for instance, Kim et al., (2013) stress that intention to use not only predicts initial engagement but also plays a significant role in long-term usage patterns, emphasizing the need for businesses to foster strong intentions through effective communication and demonstration of the benefits and ease of their digital marketing offerings.

H5 Intention to use/purchase has a significant impact on consumer purchase in Saudi Arabia's online startups

H6 Intention to use/purchase significantly mediate the impact of perceived innovation on consumer purchase in Saudi Arabia's online startups

H7 Intention to use/purchase significantly mediate the impact of perceived security on consumer purchase in Saudi Arabia's online startups

H8 Intention to use/purchase significantly mediate the impact of perceived ease of use on consumer purchase in Saudi Arabia's online startups

H9 Intention to use/purchase significantly mediate the impact of Attitude on consumer purchase in Saudi Arabia's online startups

Actual Usage (AU)

Actual Usage (AU) denotes the extent to which consumers actively engage with digital marketing tools. As the final outcome of the Technology Acceptance Model (TAM), AU represents the practical application of Intention to Use (ITU) and reflects how theoretical intentions translate into real-world behavior (Davis, 1989). High levels of intention to use digital marketing tools generally correlate with increased actual usage, indicating that consumers who are motivated and ready to adopt these tools are more likely to use them regularly.

However, the relationship between ITU and AU is not always straightforward, as actual usage can be influenced by various external factors. Research by Venkatesh et al. (2003) highlights that while strong intentions predict higher usage rates, other variables like personal preferences can also impact how frequently and effectively digital marketing tools are utilized. Recent investigations like that of Alateeg et al., (2024) further emphasize that real-world application of digital marketing is subject to external influences beyond mere intention, underscoring the importance of adapting strategies to address these variables and ensure sustained engagement with digital marketing technologies.

Integrating TAM and the Chip and Pin Theory

Combining two theories of Technology Acceptance Model (TAM) and that of Chip and Pin is crucial for understanding the impact of digital marketing and payment systems on consumer behavior in Saudi Arabia's online startups. TAM as propounded by Davis (1989b), emphasizes the roles of perceived usefulness, ease of use, and attitude towards using technology in influencing consumer behavior. On the other hand, the Chip and Pin Theory, articulated by Shaw, (2015), focuses on perceived innovation, convenience, and security. Combining these theoretical frameworks facilitates a proper understanding how digital marketing affects consumer actions regarding online startups.

The integration of TAM and the Chip and Pin Theory allows for a nuanced exploration of the cognitive and affective dimensions of consumer responses to digital marketing. The variables in TAM affects consumer attitudes toward technology and these attitudes, consequently, influence their intention to adopt and use digital marketing strategies. Meanwhile, the Chip and Pin Theory provides additional insights into how perceptions of innovation, convenience, and security impact these intentions and actual usage of digital payment methods.

For instance, perceived usefulness (TAM) and perceived innovation (Chip & Pin Theory) can collectively shape consumer attitudes towards digital marketing by highlighting its value and novelty. Similarly, perceived ease of use (TAM) and perceived convenience (Chip and Pin Theory) can affect users' willingness to engage with digital marketing tools. By integrating these perspectives, researchers can better understand the interplay between cognitive perceptions of utility and ease, and affective responses related to innovation and convenience.

Furthermore, this combined framework is vital in identifying the factors that drive or impede the adoption of digital marketing within Saudi Arabia's online startup ecosystem. Insights derived from analyzing the relationships between PU, PEU, innovation, convenience, and security can help online startups develop targeted digital marketing strategies that resonate with Saudi consumers (Alanmi, & Alharthi, 2023). Understanding these dynamics enables startups to customize marketing approaches to address the unique preferences of the Saudi market, thereby enhancing their competitiveness and success.

The integration of TAM and the Chip and Pin Theory provides a holistic understanding of consumer behavior towards digital marketing in Saudi Arabia. It does not only elucidates the factors influencing adoption and usage but also offers actionable insights for online startups aiming to effectively engage with Saudi consumers. This comprehensive approach is vital for driving growth and achieving success in the region's burgeoning digital economy.

Finally, it should be noted that some of the variables in the two theories used in this study overlapped to a greater extent. For instance, perceived convenience and PEOU; attitude to usage versus attitude towards payment; intention to use in TAM versus intention to use in Chip and Pin theories; and finally actual usage in TAM versus actual usage in the Chip and Pin theories. Based on this therefore, two variables that do not seem to overlap were used from each of the theories.

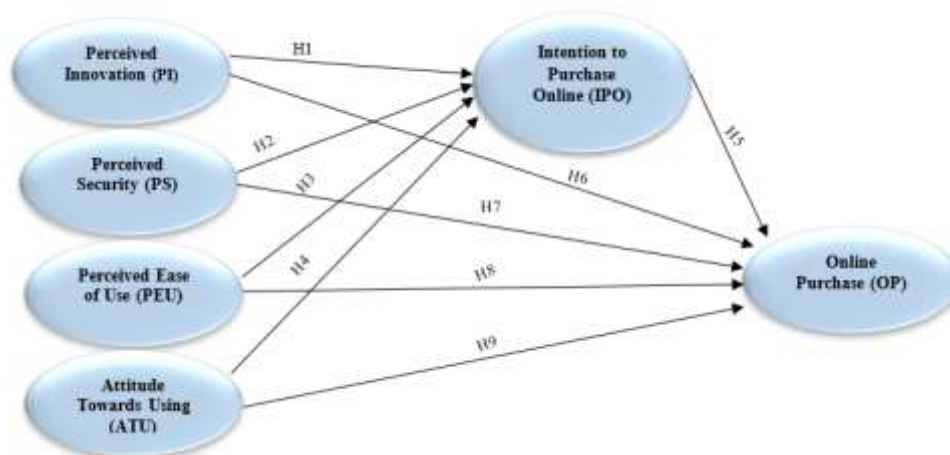


Figure 1. Conceptual Framework

Methodology

The study employs a dual approach to analyze the data collected on the consumer behavior with regards to digital marketing for online startups in Saudi Arabia. SPSS version 2025 was utilized to run the basic descriptive statistics and preliminary checks, including reliability analysis and exploratory factor analysis (EFA). SPSS is selected due to its robust capabilities for handling initial data validation and summarization tasks (Pallant, 2020). It helps in ensuring data quality and preparing the dataset for more complex analyses.

In order to delve deeper into the relationships between variables and test the hypothesized models, this study employs Structural Equation Modeling with Partial Least Squares (SEM-PLS). SEM-PLS is selected because it can handle complex models involving multiple constructs and their interrelationships, especially in exploratory research where theoretical frameworks are still evolving (Hair et al., 2021). Unlike traditional covariance-based SEM, SEM-PLS does not require large sample sizes and is well-suited for scenarios with non-normal data distributions and small to medium-sized samples (Sarstedt et al., 2021). This methodological choice would enable a thorough analysis of the structural paths and the measurement model. Again, it would provide insights into the variables affecting digital payment and marketing strategies.

The study focuses on the Hail region in Saudi Arabia, with a sample size of 291 participants drawn from this area. Hail is selected due to its strategic importance in the region and its unique cultural and economic characteristics, which may provide distinct insights into consumer behavior (Albaqawy et al., 2023). Focusing on this specific region, the study aims to capture localized trends and preferences that might differ from other parts of Saudi Arabia, thereby offering more nuanced findings. This regional focus is justified as it allows for a detailed examination of factors affecting digital payment and marketing adoption in a context that is representative of a growing, yet under-researched, area within the country.

Data analysis and results

This section presents data analysis and results presentation. Thus, descriptive statistics, inferential statistics as well as hypotheses testing are conducted in this section.

Gender Distribution

Table 1 indicates that 73.2% of the participants in the study are male, while 26.8% are female. This significant gender imbalance suggests that the study primarily reflects male perspectives on digital payment adoption and marketing strategies. In Saudi Arabia, societal norms and gender roles have traditionally been more rigid, such a skewed gender representation could lead to findings that do not fully capture the experiences and preferences of female users (Alotaibi, 2023). As women are increasingly becoming active participants in the workforce and digital economy in Saudi Arabia, their perspectives are crucial to understanding digital payment adoption fully (Al-Saggaf & Simmons, 2015). Therefore, the results might not be entirely generalizable across different gender demographics, as the insights are predominantly influenced by the male population's behaviors and attitudes toward digital payments.

Age Breakdown

The age distribution of participants shows that 35.7% are aged between 18-24 years, while 27.1% are 55 years and older. The concentration of younger respondents suggests a demography that is conversant with digital technologies and thus, more likely to embrace digital payment methods. This age dynamic is particularly relevant in Saudi Arabia, where a significant proportion of the population is young, and digital literacy is relatively high among this group (Alnafaiy et al., 2024). Younger individuals often drive technological adoption trends, and their active participation in the digital economy could mean that the study's findings predominantly reflect innovative practices and preferences that resonate with a tech-savvy audience. However, this focus may overlook the adoption barriers faced by older or less tech-oriented demographics, who may have different attitudes towards technology use (Ramírez-Correa et al., 2023).

Table 1.
Demographic data

S/n	Variables	Scale	Frequency	Percent
1	Gender	Male	213	73.2
		Female	78	26.8
		Total	291	100
2	Age	18-24 years	104	35.7
		25-34 years	55	18.9
		35-44 years	26	8.9
		45-54 years	27	9.3
		55+ years	79	27.1
		Total	291	100
3	Education Level	Secondary School and below	63	21.6
		Certificate/ Diploma/ Advanced Diploma	35	12
		Bachelor's Degree	105	36.1
		Postgraduate or higher Degree	88	30.2
		Total	291	100
4	Income Level:	less than 5,000 SAR	111	38.1
		5,000-10,000 SAR	57	19.6
		10,001-15,000 SAR	58	19.9
		15,001-20,000 SAR	22	7.6
		20,001+ SAR	43	14.8
		Total	291	100

Educational Attainment

Regarding educational background, 36.1% of participants hold a Bachelor's degree, and 30.2% possess a postgraduate or higher degree. This high level of educational attainment implies that the respondents are likely well-informed and capable of understanding complex digital payment systems and marketing strategies. In Saudi Arabia, higher education levels correlate with increased digital literacy and a propensity to engage with advanced technologies (Al-Somali et al., 2009). Therefore, the study may reflect insights from a population that is more likely to adopt digital technologies, possibly skewing the findings towards those with a higher educational background. This is particularly important as Saudi Arabia continues to invest in education and digital infrastructure under Vision 2030, aiming to create a knowledge-based economy (Vision 2030, 2016).

Income Levels

The income distribution among participants reveals that 38.1% earn less than 5,000 SAR, while 14.8% earn over 20,000 SAR. This variation in income levels indicates a diverse economic background, which could influence spending habits and the willingness to adopt digital payment methods. In Saudi Arabia, income levels are a significant determinant of consumer behavior, particularly in adopting new technologies (Alalwan et al., 2018). Participants with lower incomes may exhibit caution in adopting digital payments due to financial constraints and concerns about transaction costs. In contrast, higher-income individuals may be more open to utilizing these technologies, seeing them as convenient and secure options for managing finances. This diversity in income levels suggests that income play a vital role in influencing digital payment adoption and marketing strategies, reflecting broader trends in Saudi Arabia's digital transformation (Al-Ghaith et al., 2010).

Assessment of Measurement Model on Construct Validity

The reliability and validity of constructs are assessed when evaluating a measurement model. Construct validity is an essential factor, ensuring that the conceptual construct is accurately measured by observable variables or indicators (Hair et al., 2020). This assessment includes both convergent and discriminant validity. Convergent validity refers to the degree to which indicators of a construct are related, demonstrating that they measure the same underlying concept (Fornell & Larcker, 1981). It confirms that multiple items are indeed capturing the same theoretical notion, providing consistency across the measurement. Discriminant validity, on the other hand, ensures that the construct being measured is distinct from others. This type of validity confirms that the measures of different constructs are not excessively correlated, thereby establishing the uniqueness of each construct in the model (Henseler et al., 2015). Both convergent and discriminant validity are crucial for confirming the overall accuracy and reliability of a measurement model, ensuring that it effectively captures the intended constructs while maintaining distinctiveness from others.

To evaluate convergent validity, several criteria are commonly used, as in Table 2, such as factor loadings, Cronbach's alpha, composite reliability (ρ_c), and average variance extracted (AVE). Factor loadings should ideally be 0.70 or higher; all the factor loadings in Table 2 have exceeded the minimum threshold, with the lowest loading indicating that the indicators have a strong relationship with their underlying construct (Hair et al., 2020). The Cronbach's alpha, which is also used for testing of internal consistency, assesses the reliability of a set of indicators; a value of 0.70 or above is generally considered acceptable (Cronbach, 1951). However, composite reliability (ρ_c) is preferred over Cronbach's alpha in structural equation modeling (SEM) as it accounts for the different loadings of indicators, providing a more accurate reliability assessment. A ρ_c value of 0.70 or higher indicates strong internal consistency, suggesting that the items within the construct are reliably measuring the same concept (Bagozzi & Yi, 1988). The Average Variance Extracted (AVE) assesses the proportion of variance captured by the construct relative to the variance caused by measurement error. An AVE value of 0.50 or higher shows that the construct accounts for more than fifty percent of the variance in its indicators, ensuring a sufficient level of validity (Fornell & Larcker, 1981).

Table 2.
Reliability and validity

S/n	Variables	ITEMS	FL	CA	CR	AVE
1	Perceived Innovation (PI)	PI1	0.8007	0.8976	0.9193	0.6196
		PI2	0.7786			
		PI3	0.7760			
		PI4	0.7453			
		PI5	0.8006			
		PI6	0.8168			
		PI7	0.7900			
2	Perceived Security (PS)	PS1	0.7832	0.885	0.9104	0.5922
		PS2	0.7544			
		PS3	0.7868			
		PS4	0.7504			
		PS5	0.7837			
		PS6	0.7471			
		PS7	0.7802			
3	Perceived Ease of Use (PEU)	PEU1	0.7737	0.8831	0.9089	0.5880
		PEU2	0.7749			
		PEU3	0.7966			
		PEU4	0.7366			
		PEU5	0.7778			
		PEU6	0.7594			
		PEU7	0.7472			
4	Attitude Towards Using (ATU)	ATU1	0.7765	0.896264	0.9182	0.6162
		ATU2	0.7935			
		ATU3	0.7859			
		ATU4	0.7974			
		ATU5	0.7744			
		ATU6	0.7765			
		ATU7	0.7903			
5	Intention to Purchase Online (IPO)	IPO1	Deleted	0.8252	0.8774	0.5889
		IPO2	0.7578			
		IPO3	0.7369			
		IPO4	0.7826			
		IPO5	Deleted			
		IPO6	0.7574			
		IPO7	0.8005			
6	Online Purchase (OP)	OP1	0.7266	0.8857	0.9108	0.5935
		OP2	0.7727			
		OP3	0.7827			
		OP4	0.7825			
		OP5	0.7901			
		OP6	0.7686			
		OP7	0.7678			

A number of methods exist for assessing discriminant validity, among which are the Fornell-Larcker criterion as well as the heterotrait-monotrait (HTMT) ratio. The Fornell-Larcker criterion asserts that the square root of a construct's AVE is required to be greater than its highest correlation between any other construct, demonstrating distinctive characteristics (Fornell & Larcker, 1981). Meanwhile, the HTMT ratio is considered a more stringent assessment of discriminant validity; a value below 0.85 is generally indicative of adequate discriminant validity (Henseler et al., 2015). Together, the assessments in table 3, ensure that the measurement model has good construct validity, thereby confirming the model's suitability for further analysis and interpretation of structural relationships.

Table 3.
 Discriminant validity (*Heterotrait-Monotrait (HTMT) ratio*)

	ATU	IPO	OP	PEU	PI
IPO	0.8231				
OP	0.7999	0.821			
PEU	0.7214	0.8412	0.7898		
PI	0.7207	0.6491	0.6295	0.7628	
PS	0.8582	0.7960	0.7244	0.8088	0.8763

The following table 3 illustrates the heterotrait-monotrait (HTMT) values for the variables that were studied in the study. All HTMT values fell below the minimum threshold of 0.85, exhibiting good discriminant validity. Thus, each construct is sufficiently distinct and not overly linked with any additional construct in the conceptual framework. Such a finding is crucial because it confirms that the measurement model successfully differentiates between the unique dimensions of the theoretical framework, rather than conflating them.

The importance of achieving discriminant validity in the study lies in its impact on the model's reliability and validity. When constructs are clearly distinct, it strengthens the model's ability to accurately reflect the different aspects of digital payment adoption and marketing strategies. This distinction is essential for ensuring that each construct uniquely contributes to the understanding of the theoretical framework without overlapping with others. As a result, the model is more robust and credible, providing a reliable basis for analyzing relationships between different constructs.

Furthermore, the demonstrated discriminant validity enhances the model's capacity to offer precise insights into the dynamics of digital payment adoption and marketing strategies. This clarity allows researchers to draw more accurate conclusions about how various factors influence digital payment behaviors and preferences. Consequently, the findings are more likely to reflect true associations rather than spurious correlations caused by overlapping constructs. Ultimately, these results have significant practical implications. With a measurement model that accurately distinguishes between constructs, researchers and practitioners can develop more effective decision-making processes and targeted strategies in the digital marketplace. By understanding the distinct factors that drive digital payment adoption and marketing effectiveness, organizations could customize their approaches so as to better satisfy different customer segments, leading to more successful outcomes in the digital economy.

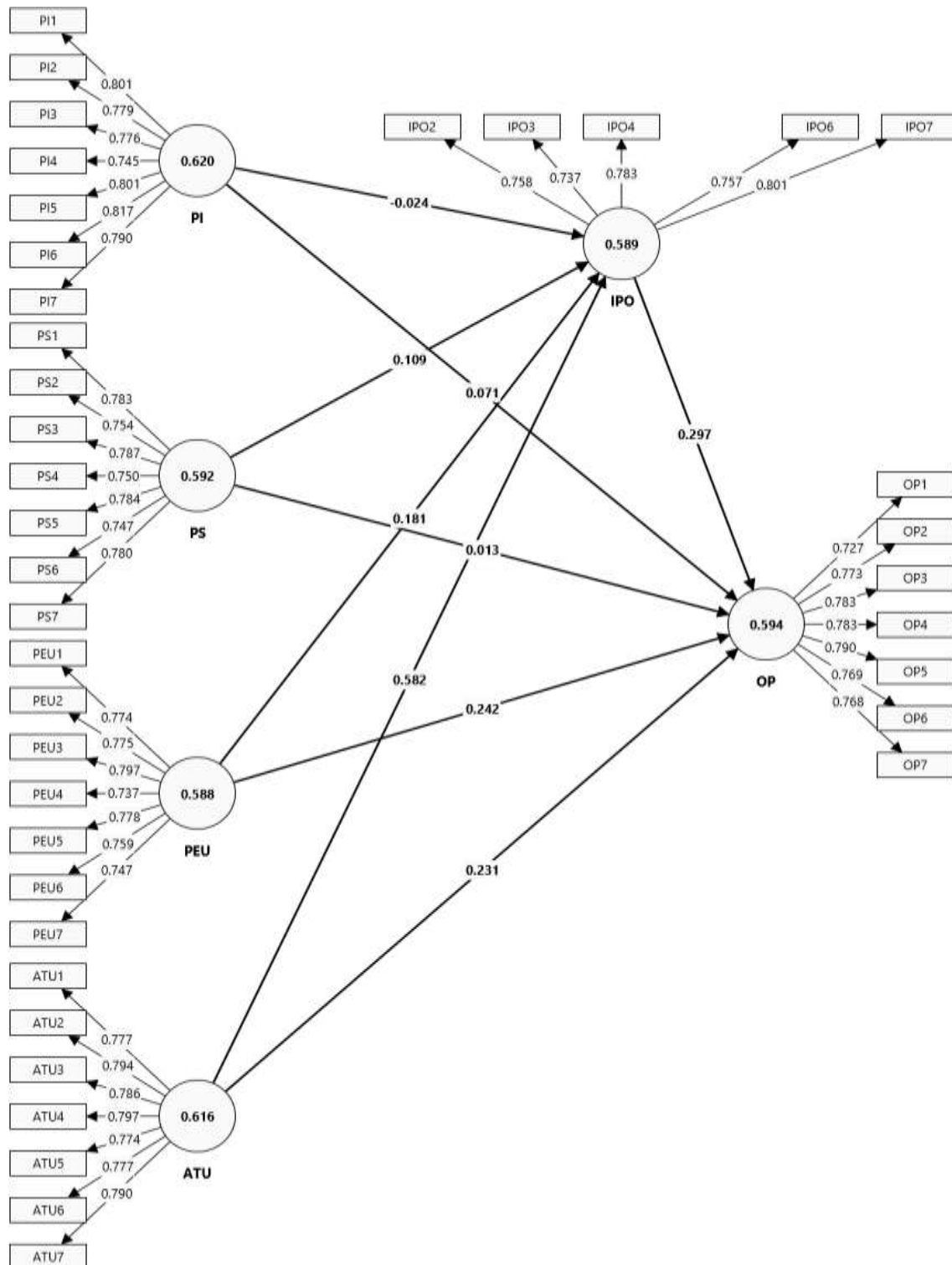


Figure 2. Structural model

Figure 2 presents the structural model, showing the hypothesized relationships among the constructs in the study, while Table 4 summarizes the model fit statistics. The fit indicators, such as the Standardized Root Mean Square Residual (SRMR) of 0.0526, d_{ULS} of 2.2704, d_G of 1.0307, and Chi-square value of 1627.4752, suggest that the model fits the data well. Specifically, the SRMR value is below the acceptable threshold of 0.08, indicating a minimal discrepancy between the observed and predicted correlations, which supports the model's validity.

Table 4.
Model fit summary

Model fit	Saturated model	Estimated model
SRMR	0.052619184	0.052619184
d_ULS	2.270398388	2.270398388
d_G	1.030689295	1.030689295
Chi-square	1627.475209	1627.475209
NFI	0.797923266	0.797923266

However, the overall model fit, as indicated by the Normed Fit Index (NFI) value of 0.7979, shows that while the model provides a reasonable fit, there is still some room for improvement. This indicates that further refinement of the model could enhance its ability to explain the structural relationships depicted in Figure 2, potentially leading to a more robust understanding of the constructs and their interactions within the context of the study.

Table 5.
Variance explain in the endogenous latent variable

	R-square	R-square adjusted
IPO	0.654052	0.649280273
OP	0.593554	0.586521945

Table 5 illustrates the R-square and adjusted R-square values for the two endogenous latent variables, namely Intention to Purchase Online (IPO) and Online Purchase (OP). The coefficient of correlation (R-square) for purchase intention represents 0.6541, which means that the independent variables that make up the model explain approximately 65.4% of the variance in PI. Similarly, the coefficient R-squared of 0.5936 for OP suggests that the model explains about 59.4% of the variation in online purchasing behavioral intention.

These high R-square values suggest that the model is effective in capturing a significant portion of the variability in these outcomes. This implies that the constructs used in the study are highly relevant for understanding the factors influencing digital payment adoption and online purchasing behavior, thereby providing valuable insights into consumer behavior in the digital marketplace.

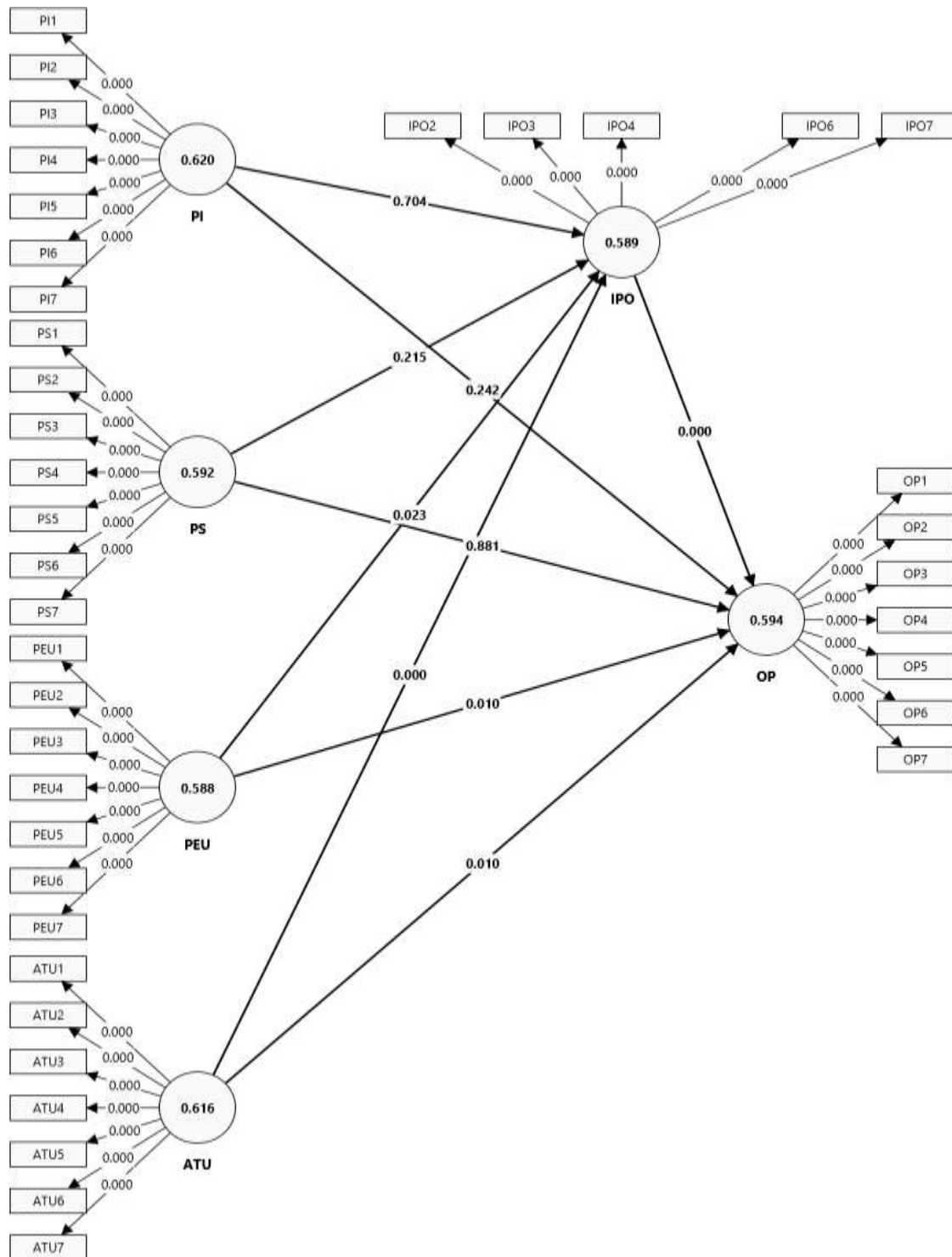


Figure 3. Bootstrapping model

The nine hypotheses in the study analyze various factors influencing online purchase outcomes (OP) and intention to purchase online (IPO) in Saudi Arabia's rapidly evolving digital marketplace. Hypotheses H1, H2, H5, and H6 focus on the direct and indirect effects of Perceived Innovation (PI) and Perceived Security (PS) on OP. The findings indicate that both PI and PS have weak and statistically insignificant direct impacts on OP, aligning with research suggesting that these factors are less critical in driving online purchases compared to other variables. This is consistent with the notion that in Saudi Arabia, consumers prioritize trust and established platforms over novelty and security concerns.

Table 6.
Hypothesis results

Hypothesis	Relationship	Std. Beta	Std. Dev	t-values)	p-values	Findings
H1	PI -> OP	0.071	0.061	1.170	0.242	Not Supported
H2	PS -> OP	0.013	0.088	0.150	0.881	Not Supported
H3	PEU -> OP	0.242	0.094	2.577	0.010	Supported
H4	ATU -> OP	0.231	0.090	2.561	0.010	Supported
H5	PI -> IPO -> OP	-0.007	0.019	0.371	0.711	Not Supported
H6	PS -> IPO -> OP	0.032	0.027	1.180	0.238	Not Supported
H7	PEU -> IPO -> OP	0.054	0.025	2.124	0.034	Supported
H8	ATU -> IPO -> OP	0.173	0.050	3.456	0.001	Supported
H9	IPO -> OP	0.297	0.063	4.756	0.000	Supported

In contrast, Hypotheses H3, H4, H7, H8, and H9 reveal more significant results. Perceived Ease of Use (PEU) and Attitude Towards Use (ATU) both have strong positive effects on OP, with PEU also significantly impacting IPO, which in turn affects OP. These results emphasize the importance of user-friendly digital platforms and positive attitudes towards online transactions in enhancing online shopping behaviors. The strong direct effect of IPO on OP further underscores that a consumer's intention to purchase online is a powerful predictor of actual online buying behavior. These insights suggest that simplifying user interfaces and fostering favorable attitudes towards digital transactions are key strategies for boosting online purchases in Saudi Arabia.

Discussions

The study's nine hypotheses look at the links between various latent factors and how they affect online purchase outcomes (OP) and intention to purchase online (IPO) in the Kingdom of Saudi Arabia. This research is critical, considering the region's rapid adoption of digital technology and growing popularity of online shopping (Al Sawy & Al-Madani, 2021).

H1 (PI -> OP) explores the correlation between perceived innovation (PI) and online purchases (OP). The beta value of 0.071 indicates a weak positive influence; however, the t-value of 1.170 and p-value of 0.242 show that this association is not statistically significant. This finding is consistent with Al Hamli & Sobaih, (2023), who discovered that while innovation is valued, it may not be the key driver of online purchase behavior in Saudi Arabia, where trust and familiarity frequently take priority above innovation.

H2 (PS->OP) investigates the effect of perceived security (PS) on OP. Considering a beta value of 0.013, a t-value of 0.150, and a p-value of 0.881, the results indicate that perceived security does not have a significant impact on online purchases. This is congruent with the results of Almarhabi et al., (2023)., who stated that while security concerns exist in Saudi Arabia, they are generally addressed by robust laws and regulations and the availability of secure, well-known platforms, minimizing the perceived risk when it comes to consumers.

H3 (PEU->OP) examines the effect of perceived ease of use (PEU) on OP and finds a beta value of 0.242, a t-value of 2.577, and a p-value of 0.010, demonstrating a significant positive effect. This confirms the hypothesis and is consistent with the findings of Al-Maghrabi and Dennis (2019), who discovered that the ease of use is a significant factor in strengthening online buying among Saudi customers, who prioritize convenience and simple access to information in digital transactions.

H4 (ATU -> OP) examines the relationship between Attitude Towards Use (ATU) and OP, with a beta value of 0.231, a t-value of 2.561, and a p-value of 0.010, indicating a significant positive effect. This supports the notion that positive attitudes toward using digital payments can significantly enhance online purchase behaviors. According to Alshehri, (2022), in Saudi Arabia, consumer attitudes are heavily influenced by social norms and perceived ease of transaction, both of which enhance positive attitudes towards digital payment systems.

H5 (PI -> IPO -> OP) considers the indirect effect of PI on OP through IPO, revealing a beta value of -0.007, a t-value of 0.371, and a p-value of 0.711, indicating no significant indirect effect. This suggests that in the Saudi context, intention to purchase online do not mediate the effect of perceived innovation on

online purchasing behavior, possibly due to the consumer preference for tried and tested methods over innovative ones (Al-Maghrabi & Dennis, 2019).

H6 (PS \rightarrow IPO \rightarrow OP) explores the indirect effect of PS on OP through IPO. The beta value of 0.032, with a t-value of 1.180 and a p-value of 0.238, shows no significant effect. This finding suggests that perceived security's indirect impact on online purchasing via intention to purchase online is not substantial. This aligns with Almarhabi et al., (2023), who argued that while security is a consideration, other factors such as perceived ease of use and social influence play more significant roles in determining online purchasing behavior in Saudi Arabia.

H7 (PEU \rightarrow IPO \rightarrow OP) posits that perceived ease of use (PEU) has an indirect effect on online purchases (OP) by influencing the intention to purchase online. The beta value of 0.054, with a t-value of 2.124 as well as a p-value of 0.034, demonstrates that the indirect association is statistically significant, hence supporting the hypothesis. This finding is consistent with existing literature in Saudi Arabia, which highlights the importance of simplicity of use in encouraging positive online shopping behaviors (Al-Maghrabi & Dennis, 2019). In the Saudi context, where digital literacy is rapidly increasing, an intuitive and easy-to-navigate platform enhances users' intention to make purchases, which, in turn, translates to actual buying behavior (Alsulaimani, 2018). The significant impact of PEU on IPO and, consequently, on OP suggests that efforts to simplify user interfaces and streamline digital payment processes can effectively boost online shopping activities in the region.

H8 (ATU \rightarrow IPO \rightarrow OP) hypothesizes that a positive Attitude Towards Use (ATU) influences IPO, which subsequently affects OP. The results, with a beta value of 0.173, a t-value of 3.456, and a p-value of 0.001, reveal a strong and significant positive effect, thereby supporting the hypothesis. This finding is particularly relevant in the Saudi Arabian market, where consumer attitudes towards digital payment systems are shaped by cultural factors and social norms (Al Hamli & Sobaih, 2023). A favorable attitude towards using digital platforms significantly enhances the intention to purchase online, which leads to increased online transactions. Given the conservative nature of Saudi society, where trust and social approval are paramount, a positive perception of digital transactions can effectively drive online purchasing behaviors (Almarhabi et al., 2023).

H9 (IPO \rightarrow OP) examines the direct relationship between the Intention to Purchase Online (IPO) and Online Purchase (OP). The findings, with a beta value of 0.297, a t-value of 4.756, and a p-value of 0.000, indicate a strong and statistically significant positive effect, confirming the hypothesis. This relationship highlights that a stronger intention to purchase online is directly associated with an increase in actual online purchases. This is in line with previous research findings in Saudi Arabia, which shows that clear purchase intentions are a significant predictor of online shopping behavior (Anaam et al., 2021). In a market where digital adoption is rapidly growing, understanding the factors that strengthen IPO would avail insights for marketers looking to enhance online sales strategies, particularly through targeted campaigns that reinforce consumer intent.

Conclusion

Based on the statistical results above, the following major conclusions are hereby drawn: Perceived Ease of Use, Attitude towards Using and Intention to Purchase Online are found to have significant positive relationship with Online Purchase. Similarly, Intention to Purchase Online, mediate the relationship between Perceived Ease of Use and Attitude towards Using on Online purchase. On the other hand, Attitude towards Using was not found to have significant mediating effect between Perceived Innovation and Perceived Security on Online Purchase. In the same manner, Perceived Innovation and Perceived Security did not show any significant direct relationship with online purchase. The overall model was found to be significant as 59 percent of the variation in Online Purchase was explained the variables under investigation.

Implications of the Study

This study has far-reaching implications, contributing significantly towards both theoretical and practical applications in the fields of digital marketing and consumer behavior. This study establishes a strong framework for understanding the multiple aspects that influence consumer engagement with digital platforms by combining the Technology Acceptance Model (TAM) and the Chip and Pin Theory. It especially looks at how perceived usefulness, simplicity of use, innovation, and security perceptions

influence consumer interactions with digital marketing technologies. This theoretical innovation not only extends the existing body of literature but also provides a deeper awareness of the psychological and emotional processes that underpin consumer responses to digital marketing initiatives. As such, it sets a foundational basis for future studies aiming to explore these dimensions in greater detail, particularly in the rapidly evolving digital commerce landscape.

From a practical perspective, the findings underscore the critical importance of perceived ease of use and positive consumer attitudes towards digital marketing in shaping online purchase intentions. For businesses, especially startups operating in highly competitive digital environments, these insights are particularly valuable. They suggest that a strategic focus on creating user-friendly digital marketing interfaces that enhance the overall consumer experience can lead to increased engagement and higher conversion rates. Simplifying the user interface and ensuring the intuitiveness of digital marketing tools can significantly lower the barriers to consumer adoption, thereby enhancing their willingness to engage with digital content and complete online transactions. This approach not only improves user satisfaction but also strengthens the brand's position in the digital marketplace by fostering a more engaging and seamless user experience. Furthermore, the study highlights the pivotal role of perceived security in influencing consumer behavior, a factor of growing importance as online shopping becomes increasingly prevalent. Ensuring that consumers feel secure when engaging in digital transactions is paramount to maintaining their trust and encouraging continued engagement. Businesses should prioritize the implementation of robust security measures, such as advanced encryption technologies and multi-factor authentication, to safeguard customer data and protect against potential breaches. Moreover, transparently communicating these security practices to consumers can further bolster their confidence in using digital payment methods. By doing so, companies not only mitigate potential risks but also build long-term customer loyalty, as consumers are more likely to remain with a brand they perceive as trustworthy and reliable in terms of safeguarding their personal and financial information.

Lastly, the implications of this study extend to policymakers and industry stakeholders who are invested in fostering the growth of digital commerce. Understanding the key drivers of consumer acceptance of digital marketing and online purchasing behaviors can inform the development of supportive policies and industry standards that enhance the overall digital ecosystem. For instance, creating regulatory frameworks that emphasize user privacy, data protection, and cybersecurity can help build a safer digital environment that encourages consumer participation. Additionally, promoting educational initiatives that enhance digital literacy among consumers can help reduce apprehensions related to digital transactions, thereby supporting a more dynamic and inclusive digital marketplace. By addressing these areas, policymakers and industry leaders can play a crucial role in promoting the sustainable growth of digital commerce, benefiting consumers and businesses alike through a more secure and user-friendly digital economy.

Limitations and directions for future research

While offering valuable insights into digital marketing and consumer behavior, the study has several limitations that warrant consideration. Firstly, the research is geographically concentrated in the Hail region of Saudi Arabia; this could constrain the generalizability of the findings to other regions or cultural contexts. Furthermore, the specific socio-economic and cultural features of Hail may not represent those of other areas within Saudi Arabia or beyond. Consequently, future research could benefit from a broader geographical scope, incorporating diverse regions and demographic groups to evaluate the proposed model's applicability across different consumer segments and cultural backgrounds, thereby enhancing the study's external validity.

Secondly, the type of data used which is collected using self administered questionnaire presents potential biases, such as social desirability bias and recall bias, which could affect the accuracy of the findings. To address this limitation and strengthen the validity of future studies, researchers could employ mixed-method approaches that combine quantitative surveys with qualitative method. These techniques allows for a more nuanced exploration of consumer behavior, capturing the complexities of their motivations and the variables affecting their acceptance of digital marketing and payment systems.

Furthermore, the study focuses on a limited set of constructs, such as perceived ease of use, perceived security, and attitude toward use, potentially overlooking other influential factors that may impact online purchasing behavior. Other variables such as brand reputation, and broader economic situations were not included in the model and they could significantly affect consumer decisions in digital contexts. Future

research should consider integrating these additional factors to develop an all encompassing model that better captures the multidimensional nature of consumer engagement with digital marketing and online purchasing activities.

Finally, given the rapid pace of technological advancements, it is crucial for future studies to examine the effect of emerging technologies, like artificial intelligence, machine learning, mobile payment innovations and consumer behavior. Understanding how these technological trends shape perceptions of ease of use, security, and overall consumer attitudes will provide businesses with timely insights to adapt their strategies to evolving consumer expectations. Therefore, exploring these areas, researchers can offer practical guidance to marketers and policymakers on how to navigate the dynamic digital landscape and optimize consumer engagement.

Bibliographic References

- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Prentice-Hall.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Alalwan, A. A., Baabdullah, A. M., Rana, N. P., Dwivedi, Y. K., & Lal, B. (2018). Examining adoption of mobile internet in Saudi Arabia: Extending TAM with perceived risk, perceived cost, and trust. *Technology in Society*, 55, 100-110.
- Al Anezi, F. Y. (2021, June). Saudi Vision 2030: Sustainable economic development through IoT. In *2021 10th IEEE International Conference on Communication Systems and Network Technologies (CSNT)* (pp. 837-841). IEEE. <https://ieeexplore.ieee.org/abstract/document/9509592>
- Alanmi, M., & Alharthi, S. (2023). The Impact of Digital Marketing on Consumer Buying Behavior in Saudi Arabia: Brand Popularity as a Mediator. *Journal of Business and Management Review*, 4(6), 412-438.
- Alateeg, S., Alhammedi, A., Al-Ayed, S.I., & Helmi, M.A. (2024). Factors Influencing on Behavioral Intention to Adopt Artificial Intelligence for Startup Sustainability. *Kurdish Studies*, 12(1), 2924-2941. <https://doi.org/10.58262/ks.v12i1.209>
- Albaqawy, G. A., Alnaim, M. M., Bay, M. A., & Touahmia, M. (2023). Assessment of Saudi Arabia's Classification and Selection Criteria for Heritage Sites: A Case Study of Barzan Heritage Area in Hail City. *Sustainability*, 15(2), 1015.
- Alessa, A.A., Alotaibie, T.M., Elmoez, Z., & Alhamad, H.E. (2021). Impact of COVID-19 on Entrepreneurship and Consumer Behaviour: A Case Study in Saudi Arabia. *Journal of Asian Finance, Economics and Business*, 8(5), 0201-0210. <https://doi.org/10.13106/jafeb.2021.vol8.no5.0201>
- Alferaih, A. (2022). Starting a new business? Assessing university students' intentions towards digital entrepreneurship in Saudi Arabia. *International Journal of Information Management Data Insights*, 2(2), 100087. <https://doi.org/10.1016/j.jjime.2022.100087>
- Al-Ghaith, W., Sanzogni, L., & Sandhu, K. (2010). Factors influencing the adoption and usage of online services in Saudi Arabia. *The Electronic Journal of Information Systems in Developing Countries*, 40(1), 1-32.
- Al Hamli, S. S., & Sobaih, A. E. E. (2023). Factors influencing consumer behavior towards online shopping in Saudi Arabia amid COVID-19: Implications for e-businesses post pandemic. *Journal of Kurdish Studies Risk and Financial Management*, 16(1), 36. <https://doi.org/10.3390/jrfm16010036>
- Al-Maghrabi, T., & Dennis, C. (2019). What drives consumers' continuance intention to e-shopping? Conceptual framework and managerial implications in the case of Saudi Arabia. *International Journal of Retail & Distribution Management*, 47(10), 1074-1096.
- Almarhabi, K., Bahaddad, A., & Alghamdi, A. M. (2023). Security management of BYOD and cloud environment in Saudi Arabia. *Alexandria Engineering Journal*, 63, 103-114.
- Alnafaiy, S. M., Alyousef, H., Aljabr, R., Tounsi, A., Almutairi, R., & Albaijan, R. S. (2024). Digital technology implementation in prosthodontics postgraduate programs in Saudi Arabia: a multi-institutional survey of program directors. *BMC Oral Health*, 24(1), 1136.
- Alotaibi, D. M. (2023). *The impact of culture and social norms on female employment in Arab countries in general and Saudi Arabia in particular: based on quantitative and qualitative evidence* (Doctoral dissertation), University of East Anglia.
- Al-Saggaf, Y., & Simmons, P. (2015). Social media in Saudi Arabia: Exploring its use during two natural disasters. *Technological Forecasting and Social Change*, 95, 3-15.

- Al Sawy, Y. M., & Al-Madani, F. M. (2021). Role of social media in academic achievement among Northern Border University students. *Amazonia Investiga*, 10(38), 20-32. <https://doi.org/10.34069/AI/2021.38.02.2>
- Alshehri, O. A. (2022). The Use of Social Media as a Tool for Learning: Perspectives of Masters in Educational Technologies students at Bisha University, Saudi Arabia. *Amazonia Investiga*, 11(51), 113–128. <https://doi.org/10.34069/AI/2022.51.03.11>
- Al-Somali, S. A., Gholami, R., & Clegg, B. (2009). An investigation into the acceptance of online banking in Saudi Arabia. *Technovation*, 29(2), 130-141.
- Alsulaimani, M. M. A. (2018). *Factors influencing citizens' adoption of e-government in Saudi Arabia*. (Tesis) University of Strathclyde.
- Alzahrani, A. (2022). A systematic review of artificial intelligence in education in the arab world. *Amazonia Investiga*, 11(54), 293-305. <https://doi.org/10.34069/AI/2022.54.06.28>
- Anaam, E. A., Yousef Magableh, M. N., Hamdi, M., Rashid Hmoud, A. Y., & Alshalabi, H. (2021). Data Mining Techniques with Electronic Customer Relationship Management for Telecommunication Company. *Amazonia Investiga*, 10(48), 288–304. <https://doi.org/10.34069/AI/2021.48.12.30>
- Ariff, M.S., Sylvestre, M., Zakuan, N., Ismail, K., & Mat, K. (2014). Consumer Perceived Risk, Attitude and Online Shopping Behaviour; Empirical Evidence from Malaysia. *IOP Conference Series: Materials Science and Engineering*, 58, 012007. <https://doi.org/10.1088/1757-899X/58/1/012007>
- Ashri, O. (2019). *On the fast track: Saudi Arabia's entrepreneurship ecosystem*. Entrepreneur Ecosystem. <https://www.entrepreneur.com/article/336766>
- Bahaddad, A. A., Drew, S., Houghton, L., & Alfarraj, O. A. (2018). Factors attracting online consumers to choose e-Malls for e-procurement in Saudi Arabia. *Enterprise Information Systems*, 12(7), 856-887.
- Bagozzi, R.P & Yi, Y. (1988). Specification, evaluation, and interpretation of structural equation models. *Journal of the academy of marketing science*, 40, 8-34
- Behera, R. K., Bala, P. K., & Rana, N. P. (2023). Assessing factors influencing consumers' non-adoption intention: exploring the dark sides of mobile payment. *Information Technology & People*, 36(7), 2941-2976.
- Bourlakis, M., Papagiannidis, S., Fox, H. (2008). E-Consumer Behaviour: Past, Present and Future Trajectories of an Evolving Retail Revolution. *International Journal of E-Business Research*, 4(3), 64-76
- Cronbach, J. (1951). Coefficient Alpha and the Internal Structure of Tests. *Psychometrika*, 16(3).
- Davis, F. D. (1989a). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340. <https://doi.org/10.2307/249008>
- Davis, F. D. (1989b). Technology acceptance model: TAM. *Al-Suqri, MN, Al-Aufi, AS: Information Seeking Behavior and Technology Adoption*, 205, 219.
- Dwivedi, Y. K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T. & Williams, M. D. (2021). Artificial intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice, and policy. *International Journal of Information Management*, 57, 101994. <https://doi.org/10.1016/j.ijinfomgt.2020.101994>
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Addison-Wesley.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, 18(1), 39-50.
- Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in online shopping: An integrated model. *MIS Quarterly*, 27(1), 51-90. <https://doi.org/10.2307/30036519>
- Giuggioli, G., & Pellegrini, M. M. (2023). Artificial intelligence as an enabler for entrepreneurs: A systematic literature review and an agenda for future research. *International Journal of Entrepreneurial Behavior & Research*, 29(4), 816-837. <https://www.emerald.com/insight/content/doi/10.1108/IJEBR-05-2021-0426/full/html>
- Hair Jr., J.F, Howard, M.C., & Nitzl, C. (2020). Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *Journal of Business Research*, 109, 101-110. <https://doi.org/10.1016/j.jbusres.2019.11.069>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM) (3rd ed.)*. Sage Publications.
- Harahonych, O., Panova, L., Doroshenko, L., Mirzayeva, A., & Aliyeva, A. (2022). Digitalization and legal regulation of public and private transactions in the digital environment: Concepts and development prospects. *Amazonia Investiga*, 11(60), 214-223. <https://doi.org/10.34069/AI/2022.60.12.23>

- Henseler, J., Ringle, M.C., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the academy of marketing science*, 43, 115-135. <https://doi.org/10.1007/s11747-014-0403-8>
- Khoirunnisa, K., & Nurhaliza, S. A. (2024). Saudi Vision 2030: Economic Reforms and Sustainable Development in the Kingdom. *Jurnal Public Policy*, 10(1), 10-16.
- Kim, Y. H., Kim, D. J., & Wachter, K. (2013). A study of mobile user engagement (MoEN): Engagement motivations, perceived value, satisfaction, and continued engagement intention. *Decision support systems*, 56, 361-370.
- Lévesque, M., Obschonka, M., & Nambisan, S. (2022). Pursuing Impactful Entrepreneurship Research Using Artificial Intelligence. *Entrepreneurship Theory and Practice*, 46(4), 803-832.
- Li, N., & Zhang, P. (2002). Consumer online shopping attitudes and behavior: an assessment of research. *AMCIS 2002 Proceedings*, 74. <https://aisel.aisnet.org/amcis2002/74>
- Pallant, J. (2020). *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using IBM SPSS (7th ed.)*. Allen & Unwin.
- Pavlou, P. A. (2003). Consumer acceptance of electronic commerce: Integrating trust and risk with the technology acceptance model. *International Journal of Electronic Commerce*, 7(3), 101-134.
- Ramírez-Correa, P. E., Arenas-Gaitán, J., Rondán-Cataluña, F. J., Grandon, E. E., & Ramírez-Santana, M. (2023). Adoption of social networking sites among older adults: The role of the technology readiness and the generation to identifying segments. *Plos one*, 18(4), e0284585.
- Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.
- Sarstedt, M., Ringle, C. M., & Hair, J. F. (2021). *Partial Least Squares Structural Equation Modeling (PLS-SEM): A Comprehensive Guide to Its Applications in Business Research*. Springer.
- Shaw, N. (2015). The mediating role of perceived security: An empirical study of mobile wallet adoption in USA. In *HCI in Business: Second International Conference, HCIB 2015, Held as Part of HCI International 2015, Los Angeles, CA, USA, August 2-7, 2015, Proceedings 2* (pp. 358-369). Springer International Publishing.
- Statista. (2022a). *eCommerce - Saudi Arabia*. Available at <https://www.statista.com/outlook/dmo/ecommerce/saudi-arabia>, Accessed on 1 November 2022.
- Statista. (2022b). *Auction Market Worldwide - Statistics & Facts*. Available at <https://www.statista.com/topics/8930/auction-market-worldwide/>, Accessed on 1 November 2022.
- Surendran, P. (2012). Technology Acceptance Model: A Survey of Literature. *International Journal of Business and Social Research*, 2(4), 175-178
- Taylor, S., & Todd, P. A. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research*, 6(2), 144-176. <https://doi.org/10.1287/isre.6.2.144>
- Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46(2), 186-204. <https://doi.org/10.1287/mnsc.46.2.186.11926>
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425-478. <https://doi.org/10.2307/30036540>
- Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 36(1), 157-178.
- Vision 2030. (2016). *Vision 2030*. Retrieved from <https://vision2030.gov.sa>
- Yakaitis, I., Shakhovnina, N., Nikoliuk, O., Shestakovska, T., Hrykhno, M. H., & Matiukha, V. (2023). Application of information technologies and modeling in management operating systems for improving efficiency and safety. *Amazonia Investiga*, 12(70), 51-62. <https://doi.org/10.34069/AI/2023.70.10.5>
- Yang, Y., Asaad, Y., & Dwivedi, Y. (2017). Examining the impact of gamification on intention of engagement and brand attitude in the marketing context. *Computers in Human Behavior*, 73, 459-469.



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Caracterización de la movilidad en CDMX durante la pandemia de Covid-19 con ecuaciones de tendencia

Characterization of mobility in CDMX during the covid-19 pandemic with trend equations

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Resumen


Se presenta un análisis de la tendencia de la movilidad durante un fenómeno natural como fue el caso de la pandemia provocada por el virus SARS-CoV-2 en la Ciudad de México. Se analiza la preferencia que tiene la población para desplazarse de un lugar a otro teniendo como variables el uso del automóvil, el transporte público y la caminata, recolectando información del 13 de enero de 2020 al 28 de marzo de 2022. A partir de los datos disponibles se obtienen resultados de curvas polinómicas de diverso orden, encontrándose que la de grado 15 es la que presenta un mejor ajuste con respecto a los datos, presentando un coeficiente de determinación $R^2=0.84$ para el modo de transporte público, obteniendo así, una aproximación en la predicción del comportamiento humano en la movilidad bajo fenómenos naturales.


Palabras clave: Modos de transporte, movilidad, transporte público, pandemia, ecuaciones de tendencia.


Abstract


An analysis of the mobility trend during a natural phenomenon such as the pandemic caused by the SARS-CoV-2 virus in Mexico City is presented. The preference that the population has for moving from one place to another is analyzed, taking as variables the use of automobile, public transport and walking, collecting information from January 13, 2020, to March 28, 2022. From the available data, polynomial curves of different orders are determined, finding that the with degree 15 is the one that presents a better fit with respect to the data, presenting a coefficient of determination $R^2=0.84$ for the public transport mode, thus obtaining an approximation in the prediction of human behavior in mobility under natural phenomena.

Key words: Modes of transport, mobility, public transport, pandemic, trend equations.

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Introducción

Debido a la gran concentración urbana que presenta la Ciudad de México y al rápido proceso de urbanización que caracterizó al país (Unikel, 1968) en los últimos años, su territorio se ha ampliado hacia la periferia como se muestra en la figura 1, lo que ha generado la necesidad de reestructurarse para cubrir los requerimientos que presentaba su población, esto generó que se afectara de forma severa la movilidad de la población en la ciudad.

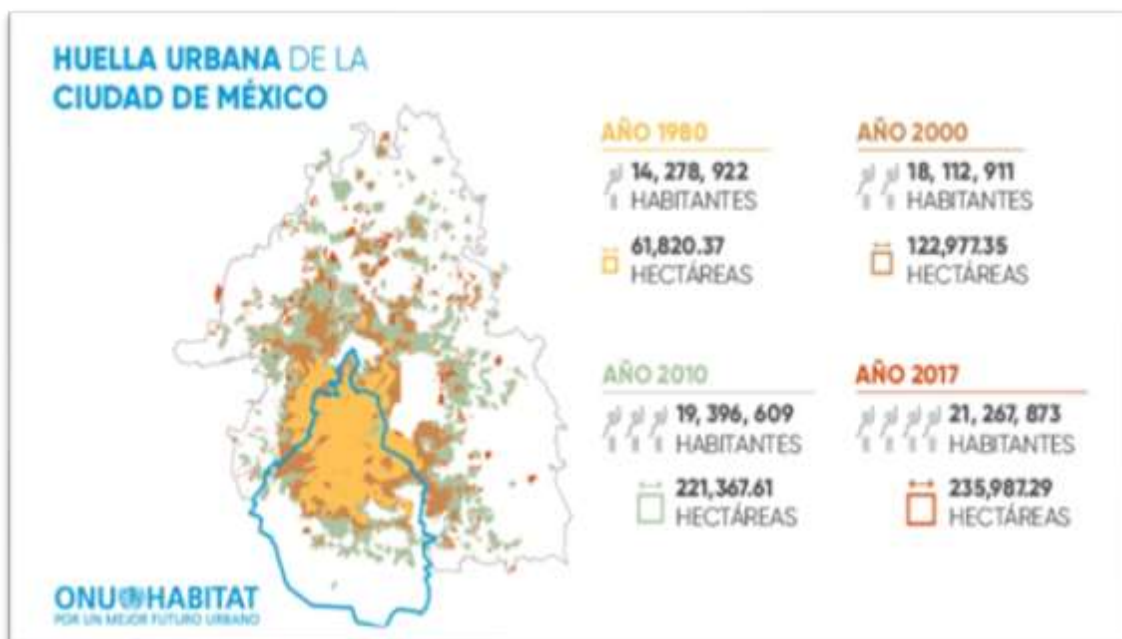


Figura 1. Crecimiento de la Huella Urbana de la Ciudad de México del año 1980 al 2010. La imagen muestra el cómo se ha expandido la mancha urbana en la Ciudad de México en las últimas décadas, rebasando sus límites político-administrativos, creciendo hacia las periferias de la ciudad. Fuente: ONU-HABITAT, 2018.

La movilidad que presenta la ciudad ha desencadenado severos problemas sociales (Fernández Silva et al., 2018), ya que la población de la región está siendo afectada en su economía, en el tiempo de traslado, y principalmente en su salud, debido a las emisiones generadas por los vehículos de combustión (Pineda et al., 2018) (Aliaga Ortega, 2019).

El congestionamiento vial actualmente representa un reto importante a resolver debido al mayor número de personas que necesitan transportarse en las grandes ciudades para realizar distintas actividades económicas, sociales, culturales y de cualquier índole (Pérez et al., 2013).

El congestionamiento vial es uno de los principales problemas no solo en la Ciudad de México, es un problema en todo el mundo y esto ha traído consigo consecuencias importantes. Como se ha mencionado la contaminación es el efecto más dañino y preocupante para la población y el medio ambiente generado por el congestionamiento diario de los vehículos en las principales ciudades del mundo. Otra consecuencia que menciona (Dorantes-Benavidez et al., 2024) es el ruido y los cuellos de botella que, de acuerdo con su investigación, son producto de la falta de infraestructura vial.

En los últimos años, la pandemia de COVID-19 ha provocado propuestas de cambios sin precedentes en todo el mundo, incluida la forma en que operan las ciudades (Sukhonos et al., 2022) (Pevko et al., 2022) (Latkovskyi et al., 2022). Así mismo, la movilidad en la Ciudad de México se vio modificada de manera drástica debido a la pandemia provocada por el virus SARS-CoV-2, este fenómeno impactó en la salud de la población propiciando un aislamiento social que generó una respuesta positiva en la movilidad de la ciudad.

La presente investigación lleva a cabo un análisis de la tendencia de la movilidad que se presentó en época de pandemia en la Ciudad de México. Desarrollando primero un análisis de la literatura con respecto al tema de investigación.

Posteriormente, se utiliza la metodología de Jenkins que nos indica el conjunto de actividades que se deben llevar a cabo para el desarrollo de la aplicación para ejecutar los análisis de las tendencias de movilidad con un enfoque sistémico y sistemático.

Finalmente se presentan los resultados y conclusiones.

Marco Teórico o Revisión de literatura

La Ciudad de México cuenta con una población de 9,209,944 habitantes fijos más 16,992,418 (Instituto Nacional de Estadística y Geografía, I.N.E.G.I., 2020a) habitantes considerados como población flotante (Garrocho, 2011) que circulan diariamente dentro de la ciudad, pero que, sin embargo, tienen su residencia en diversos municipios del Estado de México, como se muestra en la figura 2.



Figura 2. Crecimiento demográfico de la Ciudad de México, comparativa con la Zona Metropolitana del Valle de México. La gráfica muestra con color azul el crecimiento demográfico que ha tenido la Zona Metropolitana del Valle de México desde 1940, mientras que el color gris muestra el crecimiento demográfico de la Ciudad de México desde el mismo año. Fuente: Elaboración propia en base a los censos y conteos de población y vivienda 1940-2020.

Source: (Instituto Nacional de Estadística y Geografía, I.N.E.G.I., 2020a).

La movilidad es una de las actividades humanas más relevantes que se desarrollan dentro de las ciudades (Balseca Clavijo, 2017). En las ciudades modernas es imprescindible contar con un sistema de transporte efectivo que posibilite una movilidad urbana eficiente, así como la accesibilidad poblacional a los servicios. Desafortunadamente su configuración actual está provocando graves situaciones negativas y gran parte de los problemas de sostenibilidad ambiental, social y económica (Lizárraga Mollineado, 2006).

Debido a la gran concentración urbana (Galindo, Escalante & Asuad, 2004) que presenta la Ciudad de México, así como otras ciudades latinoamericanas, se han modificado notablemente los patrones de movilidad diaria de la población, principalmente incrementando los tiempos de traslado entre los espacios donde se realizan las distintas actividades económicas y sociales, así como los lugares de residencia, complejizando la dinámica de desplazamientos de las personas (Cerro Herrero et al., 2021), ya que los modos de transporte (Amézquita et al., 2016), aun con su evolución y mejoras (Vásquez Stanescu et al.,

2019), no son suficientes para ofrecer un servicio eficiente al número de pobladores que se movían dentro de la ciudad, de tal manera que la población tomó al automóvil como su principal opción para desplazarse, trayendo consigo grandes problemas y el correspondiente incremento del parque vehicular (figura 3).

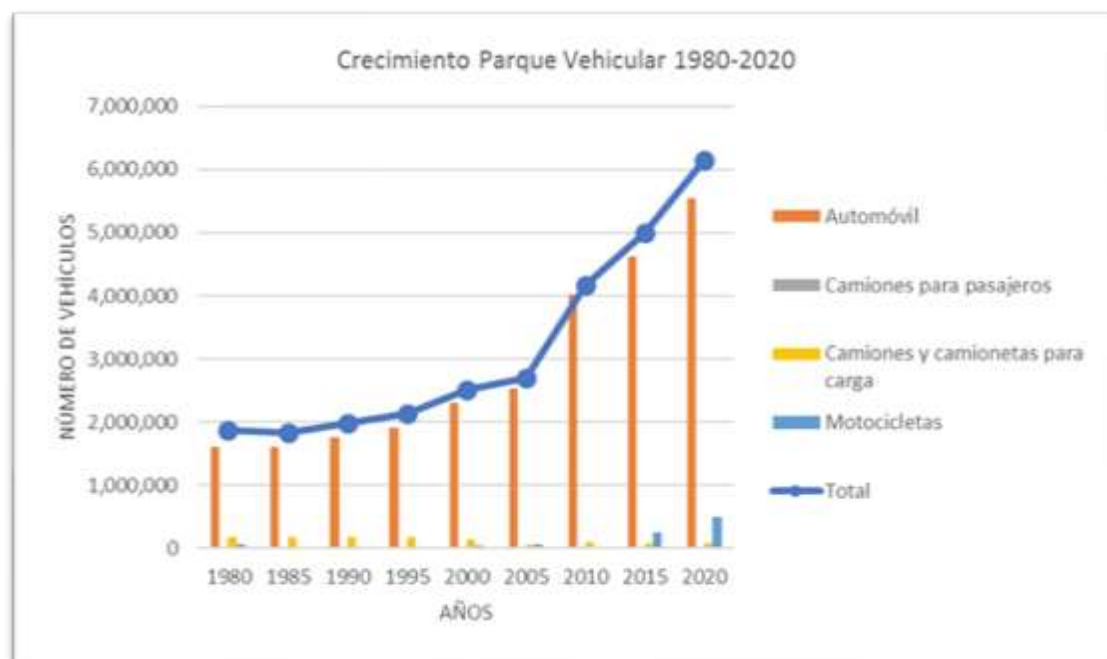


Figura 3. Crecimiento del parque vehicular de la Ciudad de México 1980 – 2020. La gráfica muestra con color azul fuerte el crecimiento total del parque vehicular de 1980 al 2020 indicando un crecimiento acelerado a partir del año 2005; el color naranja muestra el crecimiento del automóvil, el color gris el crecimiento de camiones para pasajeros, el color amarillo el crecimiento de camiones y camionetas para carga y el color azul muestra el crecimiento de las motocicletas en el mismo periodo. Fuente: Elaboración propia en base a tabulados de parque vehicular 1980-2020.

Source: (Instituto Nacional de Estadística y Geografía, I.N.E.G.I., 2021b).

El crecimiento exponencial del parque vehicular (Cruz-Rivera & Ertel, 2008) se ha traducido en severos congestionamientos viales (Oyola Estrada et al., 2017), afectando a las distintas vialidades de la zona, lo que ha incrementado de manera drástica el tiempo de traslado (Lozano et al., 2003) que deben emplear los habitantes de la región para llegar a sus destinos, añadiéndole a esto la población flotante que transita por la región, la cual proviene de zonas ubicadas fuera de la Ciudad de México, ha provocado que la capacidad de la infraestructura vial se vea rebasada.

Como consecuencia de la problemática relacionada con el crecimiento del parque vehicular y la deficiente movilidad que presenta la ciudad, aparecieron severos problemas ambientales (Muñoz Pérez et al., 2021), las emisiones generadas por el gran número de vehículos que circulan cada día y que pasan horas atascados en congestionamientos viales han traído grandes consecuencias a la salud de la población, afectando su calidad de vida. Por esta causa, cada año mueren en nuestro país 14,700 personas por enfermedades asociadas a la contaminación del aire (ONU-HABITAT, 2015).

Como se mencionó, la movilidad tiene una relación directa con la calidad de vida de las personas, específicamente en lo referido a la movilidad activa y en los beneficios que esto trae para la salud (Mueller et al., 2015); de esta manera las personas que se desplazan de forma activa presentan mejor forma física, menos obesidad y riesgos de enfermedades cardiovasculares en comparación a las personas que utilizan medios de transporte motorizados (Reynolds et al., 2010).

A raíz de estos problemas, y a través de los años, se han implementado distintas estrategias para disminuir la contaminación generada por los vehículos de combustión como la aplicación del programa hoy no circula o las verificaciones vehiculares que permiten monitorear a los vehículos, aunque, a pesar de esto, los niveles de contaminación continúan aumentando y afectando a la población (Suleimanov et al., 2018) (Secretaría de movilidad de la Ciudad de México, 2024).

En diciembre de 2019 la Organización Mundial de la Salud (OMS) confirmó la existencia del coronavirus SARS-CoV-2 causante del Covid-19. Y a principios del año 2020 ya era de dominio público el impacto que por motivos de contagio causaba la transmisión de SARS-CoV-2 a nivel mundial. Para el 15 de abril del 2020, se había reportado una cifra que superaba los 1.8 millones de casos y más de ciento diez mil decesos por Covid-19 (Soberón Mora et al., 2021).

La coyuntura sanitaria del Covid-19 se extendió a una escala y velocidad inéditas, obligando a la población de todo el mundo a modificar sus modos de vida por un periodo de tiempo prolongado, ello, con el fin de responder a las nuevas exigencias de seguridad sanitaria que los distintos gobiernos aplicaban, de esta manera gran parte de la población mundial se aisló. Las calles se vaciaron y las viviendas se transformaron en el centro de operaciones de sus vidas, concentrando ahí casi el total de las actividades de las personas (Figuerola & Gurdon, 2021).

Con el inicio de la pandemia, la movilidad fue uno de los aspectos que mayor impacto positivo tuvo, la población comenzó a mostrar distintas preferencias para desplazarse, ya que los niveles de desconfianza en el uso del transporte colectivo incrementaron a raíz de la pandemia (Przybylowski et al., 2021). Así, los sistemas de transporte público experimentaron fuertes disminuciones en el número de usuarios durante la pandemia (Park, 2020).

Este extraordinario evento comenzó a disminuir paulatinamente los niveles de contaminación, llegando a niveles no vistos en los últimos años, los congestionamientos viales disminuyeron considerablemente repercutiendo de manera positiva en los tiempos de traslado (Secretaría del Medio Ambiente, 2020).

Para la población, resultó ser más seguro recorrer distancias cortas a pie, ya que de esta manera evitaba contagios y como resultado de ello, disminuyó de manera considerable el sedentarismo que afectaba al 58.3 por ciento de los mexicanos mayores de 18 años (Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado, 2019), este hecho mejoró la salud de la población, además de disminuir la contaminación que trajo como resultado una mejora en la calidad del aire (Hernández Cerda et al., 2022).

Se puede observar de los párrafos anteriores, que en general ante este problema, diversos autores señalan y coinciden en la problemática involucrada y asociada a la movilidad en las grandes ciudades, lo cual se resaltó con la aparición de la pandemia, esto refleja que la postura ante este problema de interés mundial es uniforme, ante las pertinentes recomendaciones se pudo observar también, que derivado de las restricciones vehiculares, diferentes variables involucradas como el medio ambiente se comenzaban a recuperar de una manera sorprendente y en un tiempo que en términos prácticos fue corto, con lo cual también coinciden diferentes autores consultados.

La pandemia trajo consigo comportamientos en la población que aportaron grandes beneficios. Por esta razón, en el presente trabajo se establece como objetivo principal, caracterizar la movilidad de la Ciudad de México por medio de un modelo matemático.

Metodología

En el desarrollo de esta investigación, se emplea la metodología de Jenkins (Wilson, 1993), la cual consta de 4 etapas principales y sus subetapas asociadas y las cuales se pueden utilizar en función de las necesidades específicas.

Estas cuatro etapas son:

1. Análisis de los Sistemas.
2. Diseño de los Sistemas.
3. Implementación.
4. Operación.

La metodología de Jenkins es tanto sistemática como sistémica, aunque los conceptos de sistemas son sólo un subconjunto pequeño de lo que hoy se conoce como el modelo formal de sistemas, además, es apta para sistemas que tienen un enfoque más técnico.

Para el desarrollo del análisis de los sistemas y con el fin de proporcionar información a las autoridades sanitarias que buscaban formas de mitigar la propagación de COVID-19 Apple lanzó una herramienta que generaba tendencias de datos de movilidad en la aplicación Mapas de Apple, en apoyo a las arduas tareas que se estaban llevando a cabo en todo el mundo para mitigar la propagación del COVID-19. Estos datos de movilidad podían brindar información útil a los gobiernos y autoridades sanitarias locales para usarse como base de nuevas políticas públicas al mostrar los cambios en el volumen de personas que están conduciendo, usando el transporte público o caminando en sus comunidades (Apple, 2020).

En el análisis de los sistemas, es importante establecer las variables principales que intervienen en la investigación. Se establecen las tres condiciones anteriores como variables principales a considerar, es decir, como V_1 – Manejando, V_2 – Transporte público y V_3 – Caminando.

La aplicación genera la información contando el número de solicitudes enviadas a Mapas de Apple para obtener indicaciones en regiones seleccionadas; los datos obtenidos muestran un volumen relativo de solicitudes de direcciones por país o región, en comparación con un volumen de referencia del 13 de enero de 2020. A partir de esta fecha, Apple comienza a recabar datos para generar tendencias de movilidad, este día se tomó como parámetro para que a partir de él se midiera el comportamiento que tenían las personas para desplazarse, como se muestra en la figura 4.

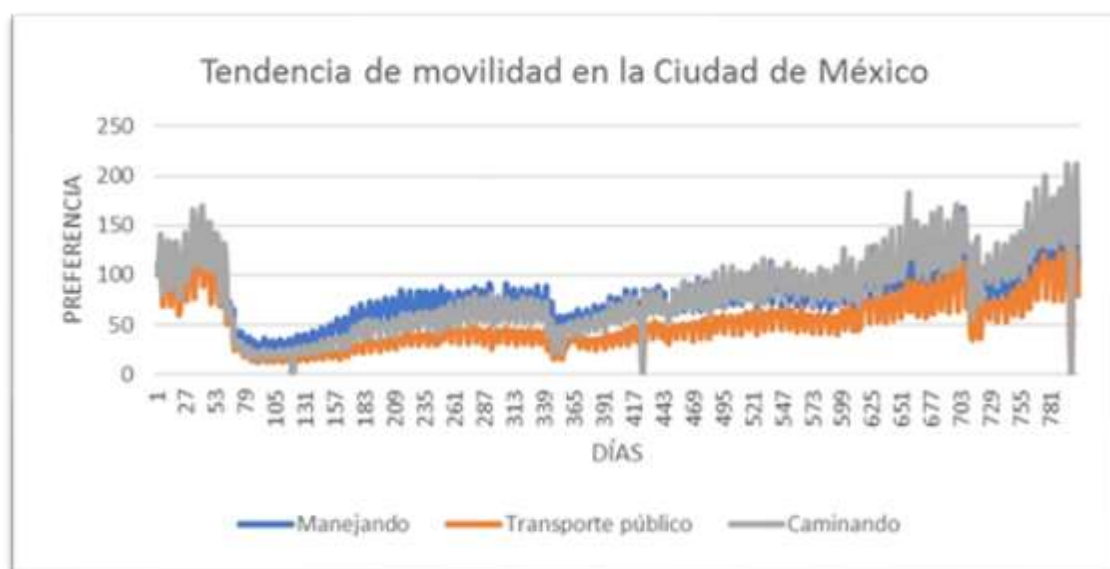


Figura 4. Gráfica que muestra las tendencias de movilidad en la Ciudad de México durante la pandemia por el virus SARS-CoV-2 del 13 de enero de 2020 al 28 de marzo de 2022, mostrando con color azul la preferencia que tenían la población a usar el automóvil particular, con color naranja la preferencia por el uso del transporte público y con color gris la preferencia que mostro la población por hacer sus recorridos caminando.

Fuente: Elaboración propia en base a Mobility Trends Reports de Apple.

Se puede observar en la figura 4, que las curvas presentan una aparente tendencia aleatoria, y que muestra la preferencia que tiene la población hacia uno u otro modo de transporte mostrando un descenso o un aumento como consecuencia de las medidas aplicadas en distintos niveles de gobierno.

Continuando con el diseño de los sistemas, para cada caso se determina una curva con una aproximación a partir de una función polinómica para expresar matemáticamente el fenómeno, y en el cual se busca el mejor ajuste posible de los datos considerando el coeficiente de determinación R^2 .

$$R^2 = 1 - \frac{\sum_{i=1}^n (Y_i - \hat{Y}_i)^2}{\sum_{i=1}^n (Y_i - \bar{Y})^2} \quad (1)$$

n = Número de datos
 Y = Porcentaje de preferencia de movilidad
 \hat{Y} = Curva de ajuste
 \bar{Y} = Media de Y

Donde Y es la preferencia de movilidad, su media \bar{Y} y ajustando con una curva \hat{Y} .

Continuando con la dinámica de la investigación, podemos mencionar que, en esta etapa, también se desarrolló un algoritmo para realizar los análisis pertinentes, a través de la lógica del diagrama de flujo mostrado en la figura 5, cabe mencionar también que, en base al algoritmo, se desarrolló un programa de computación, basado en MatLab versión 2023a para la obtención de los resultados.

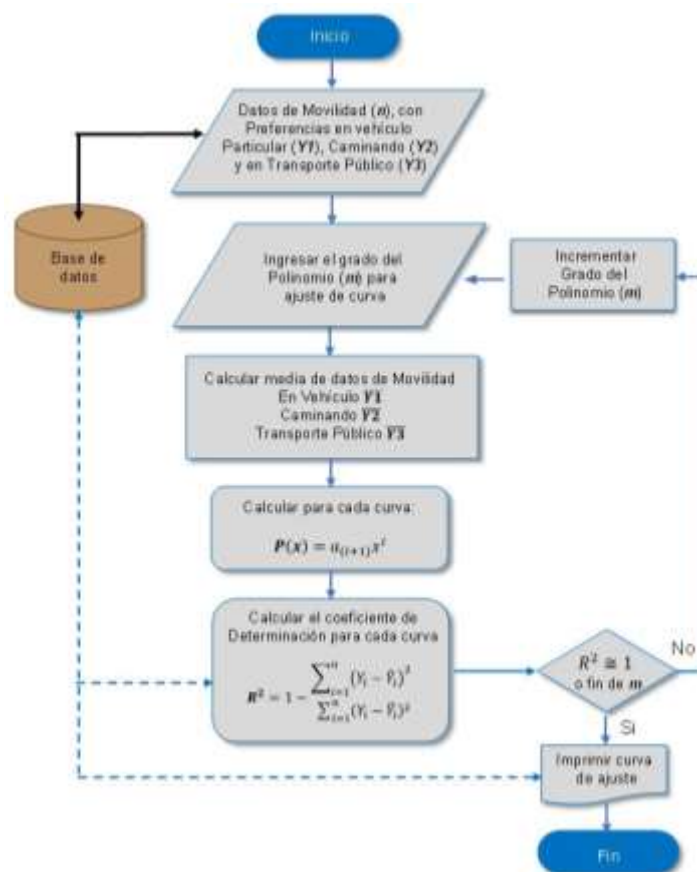


Figura 5. Diagrama de flujo para obtener la R2 de las ecuaciones polinómicas.

Fuente: Elaboración propia.

En el análisis, se utilizó MATLAB para realizar un ajuste polinomial a los datos obtenidos. La función polyfit fue empleada para ajustar polinomios de diversos grados, permitiéndonos manipular el grado del polinomio en función de la complejidad de la curva observada en los datos.

El procedimiento se desarrolló de la siguiente manera:

1. Carga y preprocesamiento de datos: Los datos experimentales se organizaron en dos vectores: x (variable independiente) y y (variable dependiente). Se realizaron verificaciones iniciales para determinar la naturaleza no lineal de los datos, lo que sugería la necesidad de un ajuste polinomial de grado más alto.
2. Ajuste del modelo polinomial: Para capturar de manera precisa la tendencia observada en los datos, probamos polinomios de distintos grados, comenzando desde grado 2 hasta grado 15. Utilizando el comando polyfit, ajustamos polinomios con el siguiente formato: $\text{polyfit}(x, y, n)$, donde n es el grado del polinomio. Por ejemplo, $\text{polyfit}(x, y, 15)$ ajusta un polinomio de grado 15.

- Esta estrategia nos permitió evaluar el grado más adecuado para cada conjunto de datos, asegurando que la elección del grado optimizara el ajuste sin incurrir en sobreajuste. La flexibilidad en la elección del grado es una ventaja de este enfoque.
- Cálculo de la curva ajustada: Una vez determinado el grado óptimo, utilizamos polyval (p, x) para calcular los valores predichos por el polinomio ajustado. Esto permitió una representación gráfica precisa de la curva ajustada en comparación con los datos originales.
- Manipulación del grado del polinomio: La elección del grado polinomial, en este caso de 2 a 15, se hizo en función de la naturaleza de los datos y la necesidad de capturar las características más sutiles de la tendencia. La flexibilidad proporcionada por MATLAB nos permitió ajustar el modelo a la complejidad de los datos, optimizando la precisión del ajuste sin comprometer la simplicidad del modelo.

Para el caso de cada uno de los comportamientos, es decir, manejando, transporte público y caminando se analizaron los datos a través de ecuaciones lineales, logarítmicas y polinómicas, las primeras dos se muestran en los cuadros 1 y 2.

Cuadro 1.

Ecuaciones lineales por modo de transporte.

Tipo de ecuación	Grado	Modo de Transporte	Ecuación por modo de transporte	R ²
Lineal		Manejando	$y = 0.0642x + 52.751$	$R^2 = 0.2787$
		Transporte público	$y = 0.0478x + 33.96$	$R^2 = 0.1732$
		Caminando	$y = 0.0988x + 39.142$	$R^2 = 0.3671$

Fuente: Elaboración propia.

Cuadro 2.

Ecuaciones logarítmicas por modo de transporte.

Tipo de ecuación	Grado	Modo de Transporte	Ecuación por modo de transporte	R ²
Logarítmica		Manejando	$y = 6.7656 \ln(x) + 40.094$	$R^2 = 0.0552$
		Transporte público	$y = 1.1013 \ln(x) + 46.971$	$R^2 = 0.0016$
		Caminando	$y = 10.602 \ln(x) + 18.59$	$R^2 = 0.0754$

Fuente: Elaboración propia.

Para el caso de las ecuaciones polinómicas que se usaron, cabe señalar que estas fueron de diferente grado comenzando con el grado 2 y llegando al grado 15, las cuales se presentan en el cuadro 3.

Cuadro 3.

Ecuaciones polinómicas de grado 2 a 15 por modo de transporte.

Tipo de ecuación	Grado	Modo de Transporte	Ecuación por modo de transporte	R ²
Polinómica	2	Manejando	$y = 0.0002x^2 - 0.1129x + 76.59$	$R^2 = 0.4199$
		Transporte público	$y = 0.0003x^2 - 0.2042x + 67.901$	$R^2 = 0.4934$
		Caminando	$y = 0.0004x^2 - 0.1901x + 78.043$	$R^2 = 0.5759$
	3	Manejando	$y = -6E-07x^3 + 0.0009x^2 - 0.3487x + 92.499$	$R^2 = 0.4644$
		Transporte público	$y = -8E-07x^3 + 0.0013x^2 - 0.5258x + 89.59$	$R^2 = 0.5861$
		Caminando	$y = -9E-07x^3 + 0.0014x^2 - 0.5412x + 101.73$	$R^2 = 0.6308$
	4	Manejando	$y = 3E-09x^4 - 5E-06x^3 + 0.0032x^2 - 0.7604x + 109.21$	$R^2 = 0.5023$
		Transporte público	$y = 4E-09x^4 - 7E-06x^3 + 0.0045x^2 - 1.1033x + 113.03$	$R^2 = 0.6694$
		Caminando	$y = 4E-09x^4 - 7E-06x^3 + 0.0049x^2 - 1.1564x + 126.69$	$R^2 = 0.6777$
	5	Manejando	$y = -1E-11x^5 + 3E-08x^4 - 3E-05x^3 + 0.0098x^2 - 1.5152x + 129.69$	$R^2 = 0.5482$
		Transporte público	$y = -1E-11x^5 + 3E-08x^4 - 2E-05x^3 + 0.0097x^2 - 1.703x + 129.3$	$R^2 = 0.7019$
		Caminando	$y = -1E-11x^5 + 3E-08x^4 - 3E-05x^3 + 0.0108x^2 - 1.8406x + 145.25$	$R^2 = 0.6987$
	6	Manejando	$y = 6E-14x^6 - 2E-10x^5 + 2E-07x^4 - 9E-05x^3 + 0.0217x^2 - 2.4791x + 148.44$	$R^2 = 0.5803$
		Transporte público	$y = 4E-14x^6 - 1E-10x^5 + 1E-07x^4 - 6E-05x^3 + 0.0173x^2 - 2.3153x + 141.21$	$R^2 = 0.7164$
		Caminando	$y = 5E-14x^6 - 1E-10x^5 + 2E-07x^4 - 8E-05x^3 + 0.0213x^2 - 2.6916x + 161.81$	$R^2 = 0.7126$
	7	Manejando	$y = 2E-16x^7 - 5E-13x^6 + 5E-10x^5 - 2E-07x^4 + 2E-05x^3 + 0.0060x^2 - 1.5403x + 134.68$	$R^2 = 0.5950$
		Transporte público	$y = 2E-16x^7 - 5E-13x^6 + 5E-10x^5 - 2E-07x^4 + 4E-05x^3 + 0.0019x^2 - 1.3926x + 127.68$	$R^2 = 0.7322$

8	Caminando	$y = 3E-16x^7 - 7E-13x^6 + 7E-10x^5 - 3E-07x^4 + 6E-05x^3 + 6E-04x^2 - 1.4459 + 143.55$	$R^2 = 0.7270$
	Manejando	$y = -1E-18x^8 + 4E-15x^7 - 6E-12x^6 + 4E-09x^5 - 2E-06x^4 + 0.0003x^3 - 0.0299x^2 + 0.1302x + 115.54$	$R^2 = 0.6196$
	Transporte público	$y = -1E-18x^8 + 5E-15x^7 - 7E-12x^6 + 5E-09x^5 - 2E-06x^4 + 0.0004x^3 - 0.0379x^2 + 0.4598x + 106.47$	$R^2 = 0.7661$
	Caminando	$y = -2E-18x^8 + 6E-15x^7 - 8E-12x^6 + 6E-09x^5 - 2E-06x^4 + 0.0004x^3 - 0.0452x^2 + 0.6825x + 119.18$	$R^2 = 0.7492$
9	Manejando	$y = 1E-20x^9 - 4E-17x^8 + 6E-14x^7 - 5E-11x^6 + 3E-08x^5 - 8E-06x^4 + 0.0014x^3 - 0.1227x^2 + 3.5638x + 83.92$	$R^2 = 0.6785$
	Transporte público	$y = 8E-21x^9 - 3E-17x^8 + 5E-14x^7 - 4E-11x^6 + 2E-8x^5 - 7E-6x^4 + 0.0012x^3 - 0.1083x^2 + 3.0623x + 82.49$	$R^2 = 0.8040$
	Caminando	$y = 1E-20x^9 - 4E-17x^8 + 6E-14x^7 - 5E-11x^6 + 3E-08x^5 - 9E-06x^4 + 0.0015x^3 - 0.1397x^2 + 4.1766x + 86.99$	$R^2 = 0.7831$
10	Manejando	$y = -2E-23x^{10} + 8E-20x^9 - 2E-16x^8 + 2E-13x^7 - 1E-10x^6 + 5E-08x^5 - 1E-05x^4 + 0.0021x^3 - 0.1763x^2 + 5.1853x + 71.62$	$R^2 = 0.6864$
	Transporte público	$y = -2E-23x^{10} + 8E-20x^9 - 2E-16x^8 + 2E-13x^7 - 1E-10x^6 + 5E-08x^5 - 1E-05x^4 + 0.0020x^3 - 0.1638x^2 + 4.7391x + 69.78$	$R^2 = 0.8134$
	Caminando	$y = -2E-23x^{10} + 9E-20x^9 - 2E-16x^8 + 2E-13x^7 - 1E-10x^6 + 6E-08x^5 - 1E-05x^4 + 0.0024x^3 - 0.1992x^2 + 5.9749x + 73.35$	$R^2 = 0.7884$
11	Manejando	$y = -9E-26x^{11} + 4E-22x^{10} - 7E-19x^9 + 7E-16x^8 - 4E-13x^7 + 1E-10x^6 - 2E-08x^5 - 6E-07x^4 + 0.0007x^3 - 0.0926x^2 + 3.0785x + 85.02$	$R^2 = 0.6947$
	Transporte público	$y = -8E-26x^{11} + 3E-22x^{10} - 6E-19x^9 + 6E-16x^8 - 3E-13x^7 + 1E-10x^6 - 1E-08x^5 - 1E-06x^4 + 0.0008x^3 - 0.0922x^2 + 2.9376x + 81.24$	$R^2 = 0.8202$
	Caminando	$y = -9E-26x^{11} + 4E-22x^{10} - 6E-19x^9 + 6E-16x^8 - 3E-13x^7 + 1E-10x^6 - 1E-08x^5 - 3E-06x^4 + 0.0010x^3 - 0.1220x^2 + 4.0333x + 85.70$	$R^2 = 0.7924$
12	Manejando	$y = -4E-28x^{12} + 2E-24x^{11} - 3E-21x^{10} + 4E-18x^9 - 3E-15x^8 + 1E-12x^7 - 5E-10x^6 + 1E-07x^5 - 2E-05x^4 + 0.0027x^3 - 0.1890x^2 + 5.1311x + 73.89$	$R^2 = 0.6998$
	Transporte público	$y = -2E-28x^{12} + 1E-24x^{11} - 2E-21x^{10} + 2E-18x^9 - 2E-15x^8 + 9E-13x^7 - 3E-10x^6 + 9E-08x^5 - 1E-05x^4 + 0.0021x^3 - 0.1579x^2 + 4.3383x + 73.65$	$R^2 = 0.8229$
	Caminando	$y = -5E-28x^{12} + 2E-24x^{11} - 5E-21x^{10} + 1E-17x^9 - 4E-15x^8 + 2E-12x^7 - 7E-10x^6 + 2E-07x^5 - 3E-05x^4 + 0.0036x^3 - 0.2495x^2 + 6.7488x + 70.98$	$R^2 = 0.7973$
13	Manejando	$y = -3E-30x^{13} + 2E-26x^{12} - 4E-23x^{11} + 5E-20x^{10} - 4E-17x^9 + 2E-14x^8 - 9E-12x^7 + 2E-09x^6 - 5E-07x^5 + 5E-05x^4 - 0.0031x^3 + 0.0546x^2 + 0.6791x + 94.74$	$R^2 = 0.7158$
	Transporte público	$y = -2E-30x^{13} + 1E-26x^{12} - 3E-23x^{11} + 4E-20x^{10} - 3E-17x^9 + 2E-14x^8 - 7E-12x^7 + 2E-09x^6 - 3E-07x^5 + 4E-05x^4 - 0.0021x^3 + 0.0193x^2 + 1.0998x + 88.81$	$R^2 = 0.8324$
	Caminando	$y = -3E-30x^{13} + 2E-26x^{12} - 4E-23x^{11} + 5E-20x^{10} - 4E-17x^9 + 2E-14x^8 - 9E-12x^7 + 2E-09x^6 - 4E-07x^5 + 4E-05x^4 - 0.0021x^3 - 0.0059x^2 + 2.2987x + 91.82$	$R^2 = 0.8062$
14	Manejando	$y = 1E-32x^{14} - 7E-29x^{13} + 2E-25x^{12} - 3E-22x^{11} + 3E-19x^{10} - 2E-16x^9 + 1E-13x^8 - 4E-11x^7 + 9E-09x^6 - 1E-06x^5 + 0.0001x^4 - 0.0102x^3 + 0.3110x^2 - 3.3856x + 111.37$	$R^2 = 0.7250$
	Transporte público	$y = 1E-32x^{14} - 8E-28x^{13} + 2E-25x^{12} - 3E-22x^{11} + 3E-19x^{10} - 2E-16x^9 + 1E-13x^8 - 4E-11x^7 + 9E-09x^6 - 1E-06x^5 + 0.0001x^4 - 0.0102x^3 + 0.3094x^2 - 3.4996x + 107.63$	$R^2 = 0.8456$
	Caminando	$y = 2E-32x^{14} - 1E-28x^{13} + 3E-25x^{12} + 4E-22x^{11} + 4E-19x^{10} - 3E-16x^9 + 1E-13x^8 - 5E-11x^7 + 1E-08x^6 - 2E-06x^5 + 0.0002x^4 - 0.0129x^3 + 0.3825x^2 - 3.8600x + 117.02$	$R^2 = 0.8180$
15	Manejando	$y = -1E-35x^{15} + 9E-32x^{14} - 3E-28x^{13} + 6E-25x^{12} - 7E-22x^{11} + 6E-10x^{10} - 4E-16x^9 + 2E-13x^8 - 5E-11x^7 + 1E-08x^6 - 2E-06x^5 + 0.0002x^4 - 0.0129x^3 + 0.3944x^2 - 4.5443x + 115.56$	$R^2 = 0.7255$
	Transporte público	$y = -3E-35x^{15} + 2E-31x^{14} - 5E-28x^{13} + 9E-25x^{12} - 1E-21x^{11} + 9E-19x^{10} - 5E-16x^9 + 2E-13x^8 - 7E-11x^7 + 1E-08x^6 - 2E-06x^5 + 0.0002x^4 - 0.0151x^3 + 0.4642x^2 - 5.6511x + 115.40$	$R^2 = 0.8476$
	Caminando	$y = -3E-35x^{15} + 2E-31x^{14} - 5E-28x^{13} + 9E-25x^{12} - 1E-21x^{11} + 1E-18x^{10} - 6E-16x^9 + 3E-13x^8 - 8E-11x^7 + 2E-08x^6 - 3E-06x^5 + 0.0002x^4 - 0.0179x^3 + 0.5404x^2 - 6.0553x + 124.95$	$R^2 = 0.8190$

Fuente: Elaboración propia.

Dentro de esta tabla se puede observar que la ecuación que tiene un mayor ajuste a los datos es la polinómica de grado 15 para cada uno de los tres modos de movilidad.

Al utilizar datos de Apple para los análisis, se considera que son de confianza, ya que la empresa ha establecido prácticas de recopilación que priorizan la privacidad del usuario, asegurando que la información esté anonimizada y se utilice de manera responsable. Esto permite presentar un análisis que respeta la

integridad de los datos y de las personas de las que se derivan. Además, el uso de estos datos responde a un interés público claro.

Durante la pandemia, la información sobre los patrones de movilidad fue crucial para que los gobiernos pudieran tomar decisiones informadas y proteger la salud de la población. En este sentido, el uso de datos privados se convierte en un acto que busca el bien común, siempre y cuando se maneje de manera ética y responsable.

Es fundamental reconocer los posibles sesgos en estos datos, dado que la recopilación se basa en usuarios de dispositivos Apple, por lo que no representan a toda la población y los resultados deben interpretarse con precaución. Finalmente, la colaboración entre el sector privado y la investigación académica presenta oportunidades valiosas, pero también exige una reflexión ética continua.

Resultados y discusión

Con la finalidad de observar cómo se van ajustando las ecuaciones polinómicas encontradas a los datos reales, en las figuras 6 a la 17 se muestran los ajustes para los diferentes modos de movilidad, es decir, a) Manejando, b) Transporte Público y c) Caminando; se presenta también la ecuación de tendencia (y) y el coeficiente de determinación (R^2), para diferentes grados de la ecuación polinómica de tendencia encontrada, estas son para grado 2, 5, 10 y 15.

a) Manejando

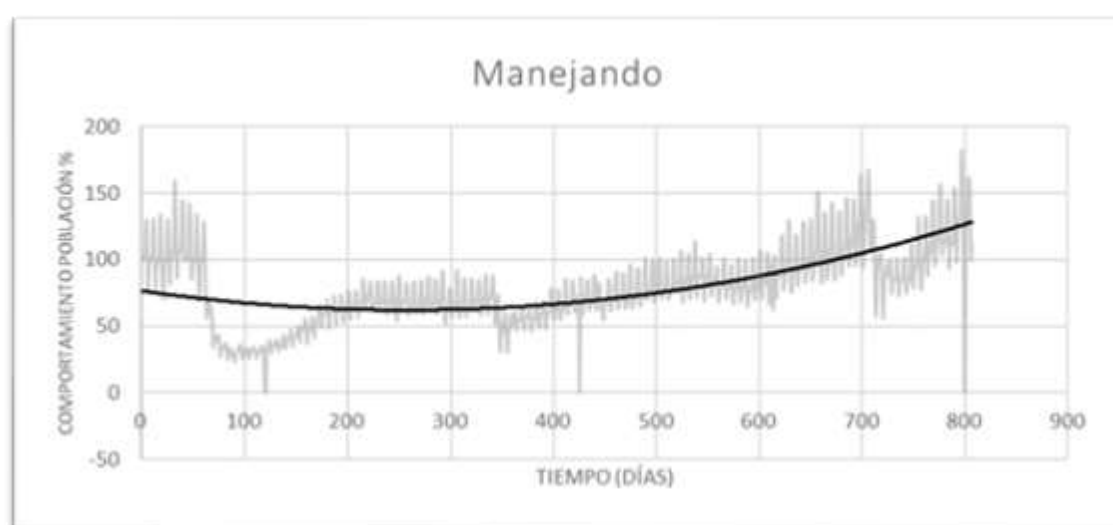


Figura 6. Curva con ecuación polinómica de grado 2 manejando.

Fuente: Elaboración propia.

$$y = 0.0002x^2 - 0.1129x + 76.59$$

$$R^2 = 0.4199$$

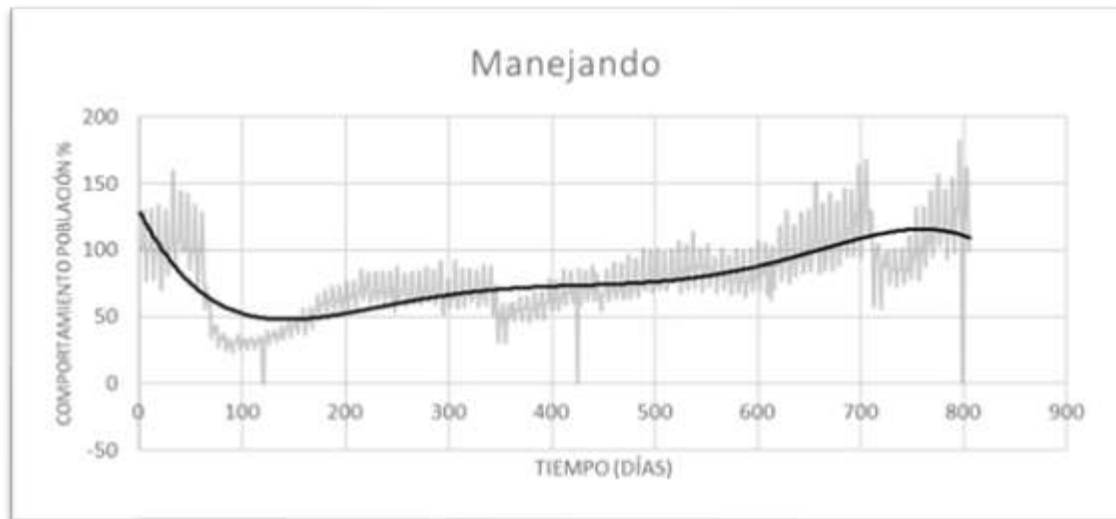


Figura 7. Curva con ecuación polinómica de grado 5 manejando.
Fuente: Elaboración propia.

$$y = -1E-11x^5 + 3E-08x^4 - 3E-05x^3 + 0.0098x^2 - 1.5152x + 129.69$$

$$R^2 = 0.5482$$

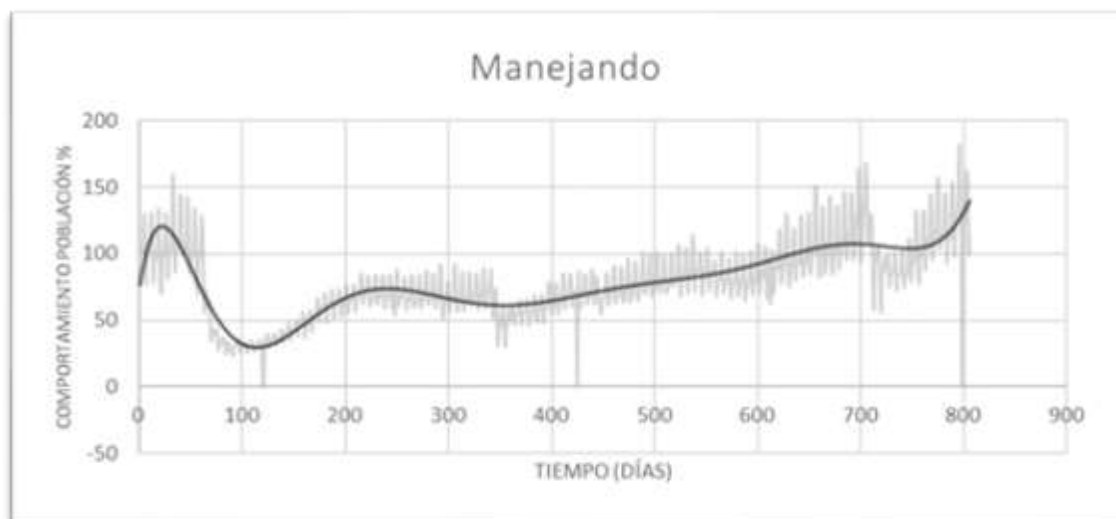


Figura 8. Curva con ecuación polinómica de grado 10 manejando.
Fuente: Elaboración propia.

$$y = -2E-23x^{10} + 8E-20x^9 - 2E-16x^8 + 2E-13x^7 - 1E-10x^6 + 5E-08x^5 - 1E-05x^4 + 0.0021x^3 - 0.1763x^2 + 5.1853x + 71.62$$

$$R^2 = 0.6864$$

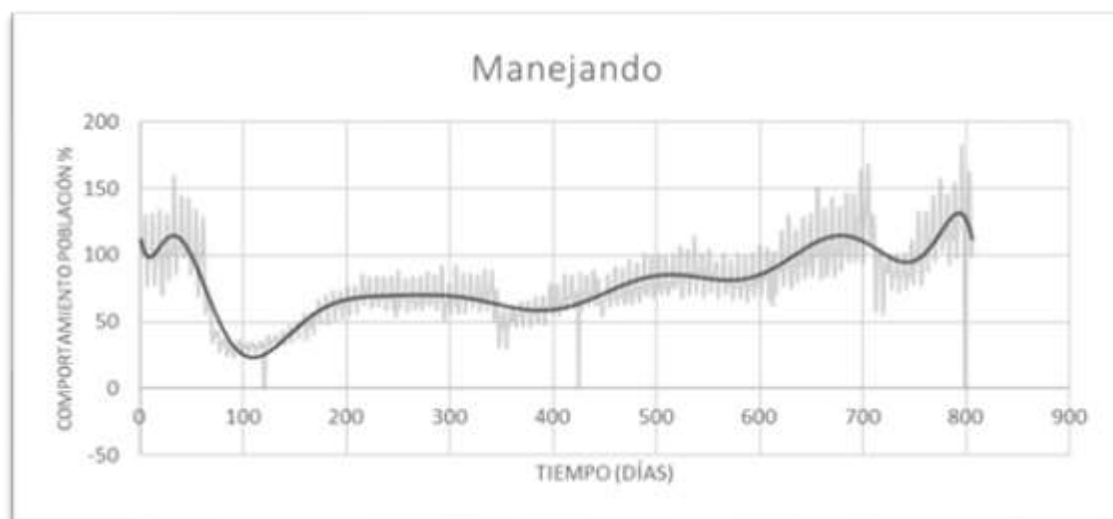


Figura 9. Curva con ecuación polinómica de grado 15 manejando.

Fuente: Elaboración propia.

$$y = -1E-35x^{15} + 9E-32x^{14} - 3E-28x^{13} + 6E-25x^{12} - 7E-22x^{11} + 6E-10x^{10} - 4E-16x^9 + 2E-13x^8 - 5E-11x^7 + 1E-08x^6 - 2E-06x^5 + 0.0002x^4 - 0.0129x^3 + 0.3944x^2 - 4.5443x + 115.56$$

$$R^2 = 0.7255$$

Se puede observar de las gráficas y ecuaciones anteriores para el modo de movilidad Manejando, que mientras va creciendo el grado de la ecuación, se va obteniendo un mejor ajuste de los datos denotado por los coeficientes de determinación más elevados.

b) Transporte Público

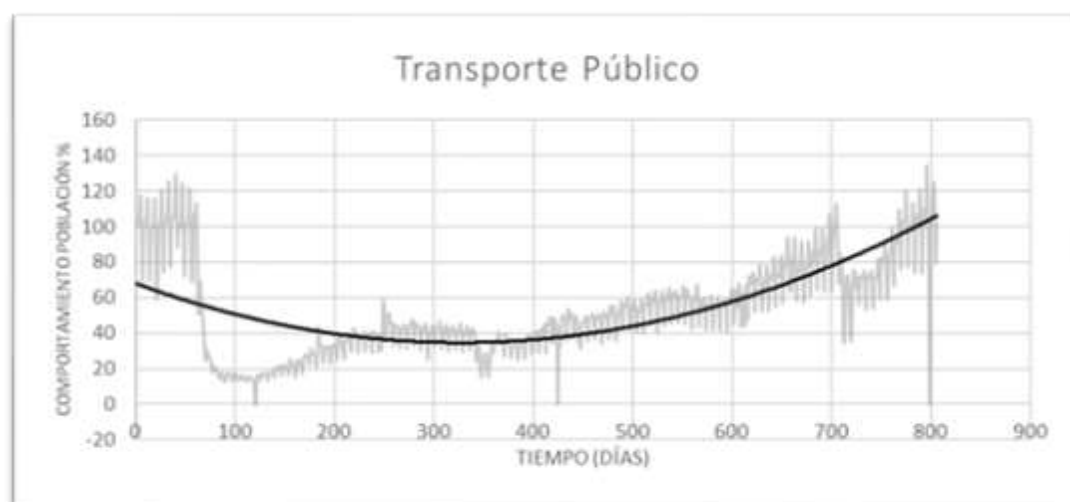


Figura 10. Curva con ecuación polinómica de grado 2 transporte público.

Fuente: Elaboración propia.

$$y = 0.0003x^2 - 0.2042x + 67.901$$

$$R^2 = 0.4934$$

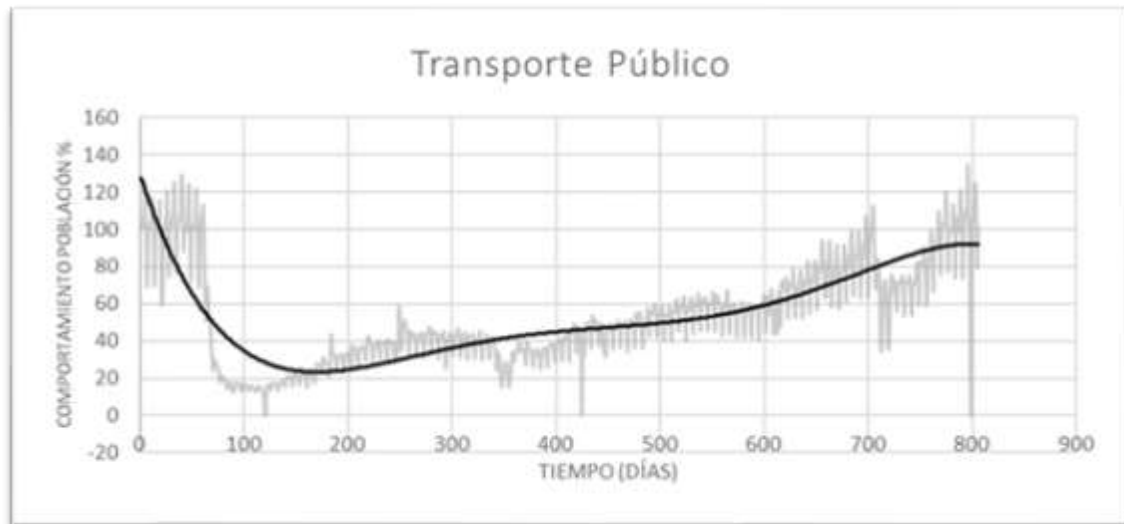


Figura 11. Curva con ecuación polinómica de grado 5 transporte público.
Fuente: Elaboración propia.

$$y = -1E-11x^5 + 3E-08x^4 - 2E-05x^3 + 0.0097x^2 - 1.703x + 129.3$$

$$R^2 = 0.7019$$

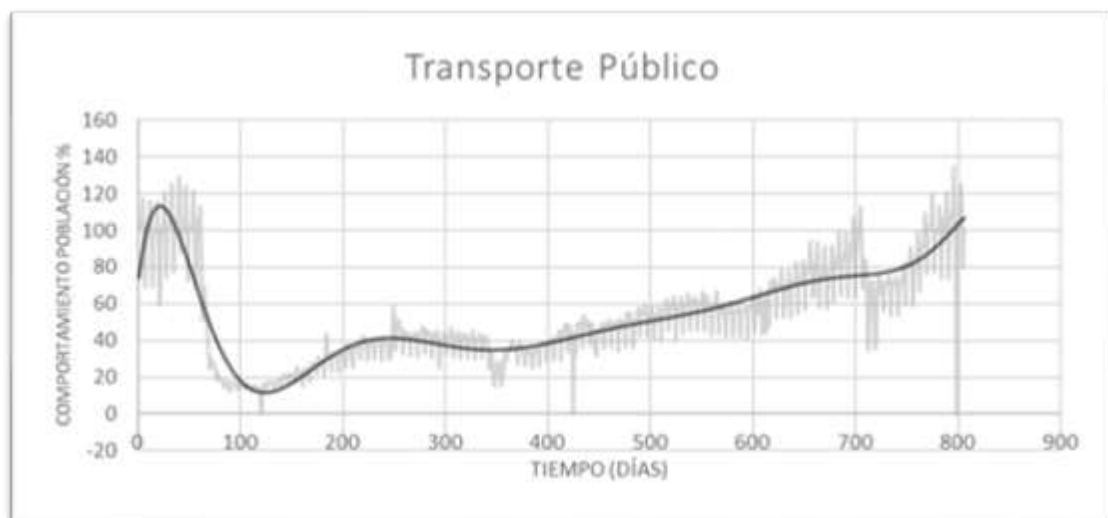


Figura 12. Curva con ecuación polinómica de grado 10 transporte público.
Fuente: Elaboración propia.

$$y = -2E-23x^{10} + 8E-20x^9 - 2E-16x^8 + 2E-13x^7 - 1E-10x^6 + 5E-08x^5 - 1E-05x^4 + 0.0020x^3 - 0.1638x^2 + 4.7391x + 69.78$$

$$R^2 = 0.8134$$



Figura 13. Curva con ecuación polinómica de grado 15 transporte público.
Fuente: Elaboración propia.

$$y = -3E-35x^{15} + 2E-31x^{14} - 5E-28x^{13} + 9E-25x^{12} - 1E-21x^{11} + 9E-19x^{10} - 5E-16x^9 + 2E-13x^8 - 7E-11x^7 + 1E-08x^6 - 2E-06x^5 + 0.0002x^4 - 0.0151x^3 + 0.4642x^2 - 5.6511x + 115.40$$

$$R^2 = 0.8476$$

En el caso del modo de movilidad para el Transporte Público se observa el mismo comportamiento que para el modo de movilidad Manejando, solo que, en este caso, las ecuaciones presentan un mejor ajuste denotado por un mayor coeficiente de determinación (grado 15).

c) Caminando

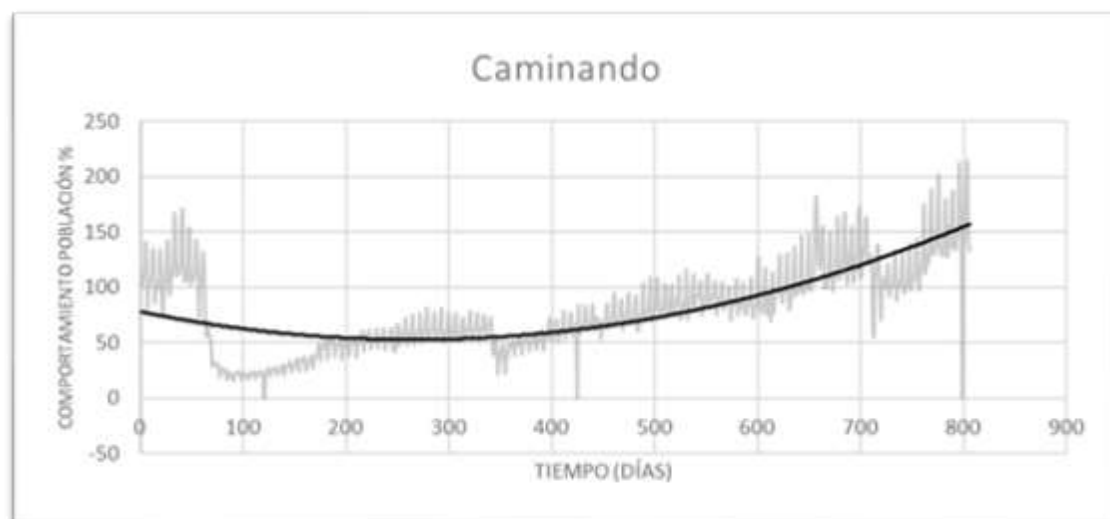


Figura 14. Curva con ecuación polinómica de grado 2 caminando.
Fuente: Elaboración propia.

$$y = 0.0004x^2 - 0.1901x + 78.043$$

$$R^2 = 0.5759$$

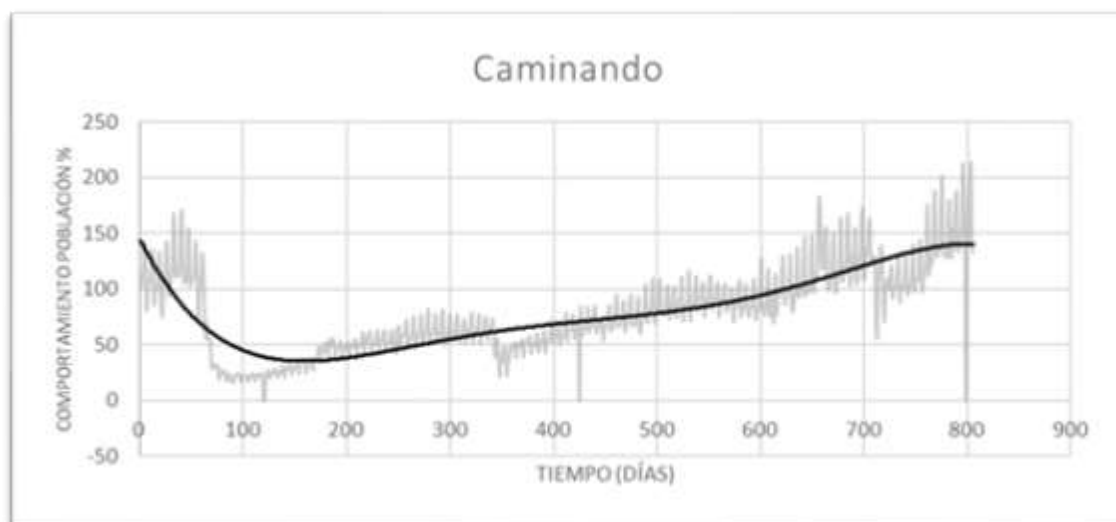


Figura 15. Curva con ecuación polinómica de grado 5 caminando.

Fuente: Elaboración propia.

$$y = -1E-11x^5 + 3E-08x^4 - 3E-05x^3 + 0.0108x^2 - 1.8406x + 145.25$$

$$R^2 = 0.6987$$

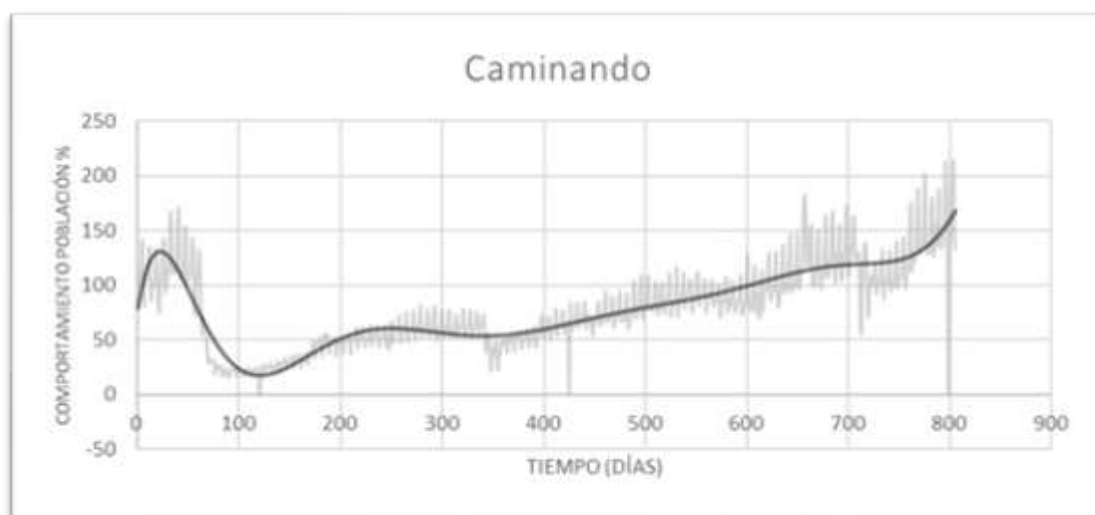


Figura 16. Curva con ecuación polinómica de grado 10 caminando.

Fuente: Elaboración propia.

$$y = -2E-23x^{10} + 9E-20x^9 - 2E-16x^8 + 2E-13x^7 - 1E-10x^6 + 6E-08x^5 - 1E-05x^4 + 0.0024x^3 - 0.1992x^2 + 5.9749x + 73.35$$

$$R^2 = 0.7884$$

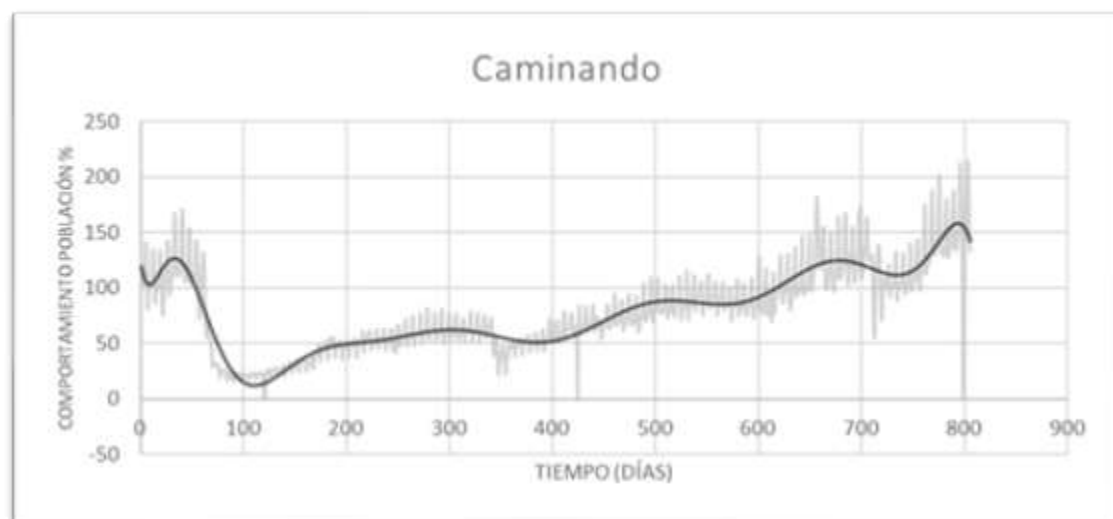


Figura 17. Curva con ecuación polinómica de grado 15 caminando.

Fuente: Elaboración propia.

$$y = -3E-35x^{15} + 2E-31x^{14} - 5E-28x^{13} + 9E-25x^{12} - 1E-21x^{11} + 1E-18x^{10} - 6E-16x^9 + 3E-13x^8 - 8E-11x^7 + 2E-08x^6 - 3E-06x^5 + 0.0002x^4 - 0.0179x^3 + 0.5404x^2 - 6.0553x + 124.95$$

$$R^2 = 0.8190$$

En este último modo de Movilidad Caminando, nuevamente se vuelve a presentar el mismo comportamiento, además se puede observar que el coeficiente de determinación para grado 15, presenta un menor ajuste que el modo de Transporte Público.

Derivado de los resultados anteriores, podemos mencionar que, aunque pareciera complicado el proceso, dado que las ecuaciones que mejor ajustan son las de grado mayor (15), los cálculos son realizados por el software desarrollado.

Los hallazgos encontrados con el desarrollo de los análisis implican que los resultados encontrados presentan un sesgo en el sentido de que los datos utilizados son tomados de una aplicación comercial, que es con la que se disponía para obtener la información para los análisis, dado que no existían datos oficiales. Debemos proceder con precaución al utilizar datos solo de un segmento de la población involucrada en la movilidad, es decir, la que utilizan los dispositivos Apple.

Es importante desarrollar algún análisis que nos permita conocer con mayor precisión el porcentaje de este sesgo, ya que nos permitirá realizar simulaciones más acertadas sobre el total de la población, y a su vez nos ayudará a realizar predicciones de movilidad más acertadas.

Una vez que se pueda considerar un universo más realista de la información, se puede volver a correr el software para encontrar las ecuaciones polinómicas acompañadas de su respectivo coeficiente de determinación R^2 , aunque se esperaría que las nuevas ecuaciones sean parecidas a las encontradas, considerando los respectivos ajustes.

Conclusiones

La movilidad vial en la Ciudad de México y en el Mundo, se modificó drásticamente durante la pandemia, esto a consecuencia de la preferencia que mostró la población para elegir un modo de transporte y moverse para realizar sus distintas actividades de manera más segura. La pandemia provocada por el virus SARS-CoV-2 tenía la característica de contagiarse rápidamente en aglomeraciones humanas, por esta razón las personas evitaban modos de transporte masivos que aumentarían la proliferación del virus por no mantener distancia entre un usuario y otro.

Este hecho disminuyó el congestionamiento vial, la población se mantenía en un estado de aislamiento por recomendaciones gubernamentales, las personas optaron por moverse caminando para hacer recorridos de

distancias cortas, incrementando la movilidad activa de la población, así mismo disminuyó el uso de transporte público y cuando debían moverse los habitantes para realizar recorridos largos optaban por utilizar el vehículo particular disminuyendo los riesgos de contagiarse.

Se obtuvo como resultado principal, la caracterización de la movilidad durante la pandemia, lo que en un futuro apoyará a conocer el comportamiento de la movilidad ante otro fenómeno natural, aunque las implicaciones prácticas de los hallazgos encontrados requerirán para sus posibles aplicaciones de personal especializado para el apoyo en la interpretación de resultados y la toma de decisiones para la realización de distintas estrategias o recomendaciones que el gobierno ponga en marcha. Como se puede observar, las ecuaciones encontradas al ser polinómicas de orden elevado pueden presentar complicaciones prácticas sobre todo en el ajuste de los datos y las consideraciones para predicciones en la toma de decisiones.

Por otro lado, con los resultados obtenidos, se pueden diseñar políticas públicas para la corrección de la planificación urbana con las consecuentes correcciones de los errores cometidos en la permisibilidad de crecimiento desordenado de las grandes ciudades, se puede analizar la manera de planear mejor la incorporación paulatina de la circulación de los diferentes modos de transporte urbano, principalmente de transporte público, rediseñando las rutas existentes y/o creando nuevas para hacerlas más eficientes, con lo que gran parte de la población las prefiera en lugar de usar su automóvil, motivados por invertir menos tiempo y dinero en sus desplazamientos diarios. Aprovechando positivamente los programas más eficientes que surgieron de esta desafortunada pandemia que afectó al mundo entero.

Finalmente, algunas de las recomendaciones que se hacen para disminuir el uso del vehículo y así reducir los tiempos de traslado, los costos y mejorar la calidad del aire son estrategias como el diseño de planes de movilidad laboral que incluyan el uso del vehículo compartido, impulsar la movilidad activa mediante programas de uso de bicicleta compartida acompañada del diseño de ciclovías que permitan a la población circular por toda la ciudad de manera segura, la planeación adecuada de la reubicación de los trabajadores en la medida de lo posible de sus centros de trabajo y finalmente la aplicación de manera más estricta y regular del programa hoy no circula.

Referentes Bibliográficas

- Aliaga Ortega, W. (2019). Congestión vehicular de transporte urbano y su incidencia en salud y medio ambiente en la ciudad de Puno. *Revista Científica Investigación Andina*, 19(1), 226-249.
- Amézquita, L., Durán Matiz, D., & Fajardo Morales, D. (2016). Matriz origen-destino y eficiencia en modos de transporte urbano: Un análisis de la movilidad en Bogotá. *Semestre Económico*, 19(39), 91-112.
- Apple. (abril de 2020). *Apple habilita datos de movilidad para sumarse a la lucha contra el COVID-19*. Obtenido de <https://acortar.link/abO6c3>
- Balseca Clavijo, C. (2017). Determinantes de elección modal del transporte en estudiantes universitarios: un análisis de la literatura actual. *Bolentín De Coyuntura*, (13), 4-6.
- Cerro Herrero, D., Prieto Prieto, J., Tapia Serrano, M., Vaquero Solis, M., & Sánchez Miguel, P. (2021). Influencia de la pandemia COVID-19 en la movilidad futura al centro de trabajo o estudios. *Transporte y Territorio*, (25), 246-263. <https://doi.org/10.34096/rtt.i25.8179>
- Cruz-Rivera, R., & Ertel, J. (2008). Acumulación de productos al final de su vida útil en México, el caso de los vehículos automotores. *Revista internacional de contaminación ambiental*, 24(3), 117-130. Obtenido de <https://www.revistascca.unam.mx/rica/index.php/rica/article/view/21623>
- Dorantes-Benavidez, H., Martínez-Cruz, M. Ángel, Chávez-Pichardo, M., Arenas-Reséndiz, T., & Trejo-Martínez, A. (2024). Sistema evolutivo de simulación de tráfico vehicular en dos intercepciones. *Amazonia Investiga*, 13(74), 22-34. <https://doi.org/10.34069/AI/2024.74.02.2>
- Fernández Silva, P., Suárez Lastra, M., & Quiroz Rothe, H. (2018). *La movilidad en la Ciudad de México. Impactos, conflictos y oportunidades*. Universidad Nacional Autónoma de México. Ciudad de México: Atlántida Coll-Hurtado. <https://librosoa.unam.mx/handle/123456789/2374>
- Figuerola, O., & Gurdon, C. (2021). Movilidad e inmovilidad bajo el COVID-19. ¿Están las TIC'S promoviendo un giro en las ciudades? *Transporte y Territorio* (25), 97-112. <https://doi.org/10.34096/rtt.i25.10959>
- Galindo, M. L., Escalante, R., & Asuad, N. (2004). El proceso de urbanización y el crecimiento económico en México. *Estudios Demográficos y Urbanos*, (56), 289-312. Obtenido de <https://www.redalyc.org/pdf/312/31205602.pdf>

- Garrocho, C. (2011). *Población Flotante, Población en Movimiento: Conceptos Clave y Métodos de Análisis Exitosos*. Consejo nacional de población.
- Hernández Cerda, C., Ávila Galarza, A., & Cerda Alonso, D. (2022). Impacto de la movilidad urbana en la calidad del aire de la zona metropolitana de San Luis Potosí, México. *Revista De Ciencias Ambientales*, 57(1), 1-27. <https://doi.org/10.15359/rca.57-1.8>
- Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado. (05 de abril de 2019). *Sedentarismo afecta al 58.3 por ciento de los mexicanos mayores de 18 años*. Gobierno del Estado de México. Obtenido de <https://acortar.link/XR7HKV>
- Instituto Nacional de Estadística y Geografía, I.N.E.G.I. (2021a). *México en cifras - Demografía y Sociedad - Población 1940 -2020*. <https://www.inegi.org.mx/app/areasgeograficas/#tabMCCollapse-Indicadores>
- Instituto Nacional de Estadística y Geografía, I.N.E.G.I. (2021b). *México en cifras – Vehículos de motor registrados en circulación 1980 – 2020*. <https://acortar.link/tPPVIq>
- Latkovskiy, P., Demchuk, T., Veselyi, V., Shliakhov, I., & Manchul, M.D. (2022). Social policy in Ukraine during the Covid-19 pandemic and its impact on public finance. *Amazonia Investiga*, 11(49), 117-125. <https://doi.org/10.34069/AI/2022.49.01.13>
- Lizárraga Mollinedo, C. (2006). Movilidad urbana sostenible: un reto para las ciudades del siglo XXI. *Economía, Sociedad y Territorio*, 283-321. <https://doi.org/10.22136/est002006260>
- Lozano, A., Torres, V., & Antún, J. (2003). Tráfico vehicular en zonas urbanas. *Ciencias* (70), 34-35.
- Mueller, N., Rojas Rueda, D., Cole Hunter, T., de Nazelle, A., Dons, E., Gerike, R., . . . Nieuwenhuijsen, M. (2015). Health impact assessment of active transportation: A systematic review. *Preventive Medicine*, 76, 103-114.
- Muñoz Pérez, S., Salcedo Reátegui, J., & Sotomayor Mendoza, A. (2021). Contaminación ambiental producida por el tránsito vehicular y sus efectos en la salud humana: revisión de literatura. *Inventum*, 16(30), 20-30. <https://doi.org/10.26620/uniminuto.inventum.16.30.2021.20-30>
- ONU-HABITAT. (2015). *Reporte nacional de movilidad urbana en México 2014-2015*. Onu-Habitat – por un mejor futuro urbano. HS Number: HS/027/15S. ISBN Number: (Volume) 978-92-1-132651-2
- ONU-HABITAT. (2018). *Superficie de CDMX crece a ritmo tres veces superior al de su población*. ONU-HABITAT. El Programa de las Naciones Unidas para los Asentamientos Humanos. <https://acortar.link/ZpsrGu>
- Oyola Estrada, E., Berrú Cabrera, J., Romero Valdiviezo, E., Carrión Romero, L., Aguirre Morales, F., & Tacuri Rivas, M. (2017). Evaluación de la congestión vehicular: Av. Castro Benítez y Vía Pajonal, Machala-Ecuador, año 2016. *Cumbres*, 3(1)135-142. <https://doi.org/10.48190/cumbres.v3n1a17>
- Park, J. (2020). Changes in Subway Ridership in Response to COVID-19 in Seoul, South Korea: Implications for Social Distancing. *Cureus*, 12(4), e7668. <https://doi.org/10.7759/cureus.7668>
- Pérez, F., Bautista, A., Salazar, M., & Macias, A. (2013). Análisis del flujo de tráfico vehicular a través de un modelo macroscópico. *Dyna*, 81(184), 36-40. Obtenido de <https://www.redalyc.org/pdf/496/49630405005.pdf>
- Pevko, S., Romaniuk, V., Perekopskyi, S., Khan, O., & Shaituro, O. (2022). Legality of restrictions on human rights and freedoms in a Covid-19 Pandemic: The experience of Ukraine. *Amazonia Investiga*, 11(53), 122-131. <https://doi.org/10.34069/AI/2022.53.05.12>
- Pineda, B., Muñoz, C., & Gil, H. (2018). Aspectos relevantes de la movilidad y su relación con el medio ambiente en el Valle de Aburrá: una revisión. *Ingeniería y Desarrollo*, 36(2), 489-508.
- Przybylowski, A., Stelmak, S., & Suchanek, M. (2021). Mobility Behaviour in View of the Impact of the COVID-19 Pandemic—Public Transport Users in Gdansk Case Study. *Sustainability*, 13(1), 1-12. <https://doi.org/10.3390/su13010364>
- Reynolds, C., Winters, M., Ries, F., & Gouge, B. (2010). Active transportation in urban areas: Exploring health benefits and risks. *National Collaborating Centre for Environmental Health*, 2, 1-15.
- Secretaría de movilidad de la Ciudad de México. (enero de 2024). *Programa integral de movilidad de la Ciudad de México 2020-2024 – diagnostico técnico*. Gobierno de la Ciudad de México, Secretaría de movilidad. <https://semovi.cdmx.gob.mx/storage/app/media/diagnostico-tecnico-de-movilidad-pim.pdf>
- Secretaría del medio ambiente. (2020). *Calidad del aire en la ZMVM y pandemia COVID-19*. Obtenido de <https://acortar.link/Mw64U1>
- Soberón Mora, J., González Becerril, J., Aguilar Zepeda, R., & Sandoval Forero, E. (2021). Movilidad laboral urbana y Covid-19: los casos de tres zonas metropolitanas de México. *Papeles de Población*, 27(107), 221-242.
- Sukhonos, V., Pakhomov, V., Pylypenko, V., Kolesnikova, M., & Maletov, D. (2022). Administrative and legal bases of implementation of e-government in Ukraine. *Amazonia Investiga*, 11(52), 24-36. <https://doi.org/10.34069/AI/2022.52.04.3>



- Suleimanov, I., Moskova, E., Sabirov, R., Kalimullin, R., & Filippov, A. (2018). Organization of vehicle traffic based on environmental monitoring of the air basin. *Amazonia Investiga*, 7(15), 214-221. <https://amazoniainvestiga.info/index.php/amazonia/article/view/451>
- Unikel, L. (1968). El proceso de urbanización en México: distribución y crecimiento de la población urbana. *Estudios Demográficos y Urbanos*, 2(2), 139-182. <https://www.jstor.org/stable/40601775>
- Vásquez Stanescu, C., Pérez Cedeño, R., Ramírez-Pisco, R., & Osal Herrera, W. (2019). Sistemas de Transporte Urbano en Latinoamérica. TRIM. *Tordesillas, revista de investigación multidisciplinar*, 17, 31-44.
- Wilson, B. (1993). *Sistemas: Conceptos, Metodología y Aplicaciones*. Wiley, Grupo Noriega Editores.



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Economic security of Ukraine in wartime: challenges and prospects

Економічна безпека України у воєнний час: виклики та перспективи

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Abstract

The Russian invasion of Ukraine has dramatically impacted the country's economic security. This paper investigates the critical role of economic security within the broader framework of national security in Ukraine under wartime conditions. The study highlights the significant overlap between economic stability and national resilience while analyzing Ukraine's current economic security model, detailing components such as financial, industrial, food, and energy security. The authors argue that legal and institutional reforms, alongside strategic efforts to enhance market competition, investment climate, and technological innovation, are crucial for sustaining economic growth amidst conflict. Additionally, the research draws parallels between Ukraine's security framework and similar

Анотація

Російське вторгнення в Україну кардинально вплинуло на економічну безпеку країни. У цій статті досліджується критична роль економічної безпеки в ширшому контексті національної безпеки України в умовах воєнного часу. Дослідження підкреслює суттєве збігання між економічною стабільністю та національною стійкістю під час аналізу поточної моделі економічної безпеки України, деталізуючи такі компоненти, як фінансова, промислова, продовольча та енергетична безпека. Автори стверджують, що правові та інституційні реформи разом із стратегічними зусиллями щодо посилення ринкової конкуренції, інвестиційного клімату та технологічних інновацій є вирішальними для підтримки

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strategies in the EU countries and the United States, suggesting that a more integrated approach to economic and national security could bolster Ukraine's long-term stability and global competitiveness. The authors, with their academic perspectives and expertise as law professors and enforcement officials, provide in-depth insights into the legal and institutional challenges faced by Ukraine in maintaining its economic security during wartime.

Keywords: national security strategy, economic security strategy, gross domestic product, public corruption, economic crime, law enforcement.

економічного зростання в умовах конфлікту. Крім того, дослідження проводить паралелі між структурою безпеки України та подібними стратегіями в країнах ЄС і Сполучених Штатах, припускаючи, що більш інтегрований підхід до економічної та національної безпеки міг би зміцнити довгострокову стабільність і глобальну конкурентоспроможність України. Автори, завдяки їхнім академічним поглядам і досвіду як професорів права та співробітників правоохоронних органів, пропонують глибоке розуміння правових та інституційних проблем, з якими стикається Україна під час підтримки своєї економічної безпеки в умовах війни.

Ключові слова: стратегія національної безпеки, стратегія економічної безпеки, валовий внутрішній продукт, публічна корупція, економічна злочинність, правоохоронна діяльність.

Introduction

As a universal concept within the broad scope of global security architecture, economic security strategy can be defined as a comprehensive plan devised by a government to ensure stability, resilience, and sustainable growth of the national economy. It is of mostly protectionist nature (which makes sense) and is also aimed at protecting nation against various economic threats, at maintaining public confidence in the economy and its key parameters, while also serving to strengthen the national security framework by addressing economic vulnerabilities and leveraging economic growth opportunities.

Among various approaches to better interpretation of economic security as a complex, interdisciplinary phenomenon, we were able to outline its key elements, which include: risk assessment, policy framework, developing and implementing policies that address risks and promote economic stability; institutional capacity; economic diversification; infrastructure development; military capabilities research and development; international cooperation with partners and allies.

Effective economic security strategy (National Security and Defense Council of Ukraine, 2021), which obviously any modern nation seeks to implement, integrates these elements into one robust framework, which safeguards the economy from potential threats while fostering sustainable development and resilience of a given nation.

It is noteworthy that economic security is not an isolated phenomenon but rather a component of national security. According to some scholars, "the further development of Ukraine, the implementation of the European integration course, and the very existence of our state in a period of threats and danger even more than in peacetime require the activation of radical reform processes, first of all, in the field of organization and activity of the national security and defense sector" (Chernysh et al., 2023).

The purpose of this research paper is to clarify the essence and key elements of the national security and economic security models of Ukraine as well as to determine the nature of their relationship. On the basis of such a complex analysis with elements of scientific comparison, which form the conceptual basis of the mechanism for ensuring the security of the state, it is planned to determine the main parameters of the security model of Ukraine at the current stage of its statehood development.

The concepts of economic and national security are indeed deeply integrated. In fact, they cannot be exercised separately by the national government: economic security is one of the core pillars of the national security framework; at the same time, national security provides economic stability and development, enables competitive forces of the market economy and also protects national markets from external threats, such as war, annexation, embargo, etc.

The structure of the paper is as follows: 1) the legal framework, in particular, the Law of Ukraine “On the National Security of Ukraine” is researched; 2) national economic security components, including industrial, demographic, energy, foreign economic, investment and innovation, macroeconomic, food, social, and financial security, are discussed; 3) authors’ comments are presented, suggesting that further in-depth research into Ukraine’s economic strategy under wartime conditions is required. Overall, our analyses reflects the intricate relationship between the economic and security sectors in Ukraine, highlighting the importance of both for the country’s stability and future development

Literature review

Our analyses of the available academic literature on the topic at hand reveals that issues of economic security remain a central part of the agenda for both policy makers, private sector representatives and academic researchers. Even more so, this topic is of extreme practical importance, not as some hypothetical concept.

A few scholars have devoted their research to the concepts of national and economic security and their individual components, including such authors as T. Podkovenko (2021), V. Tretyak & T. Gordienko (2010), Yu. Khatnyuk (2020), V. Antonov (2017). One of the co-authors of this paper has also partially explored the issues of economic security within the broader parameters of national security (Kamensky, 2023). At the same time, important theoretical and applied issues of the correlation between provisions of the National Security Strategy and the Economic Security Strategy of Ukraine remain outside the focus of the scientific community today, as well as very limited (fragmentary) consideration of similar program documents in the partner countries of Ukraine.

A group of Ukrainian legal and economic scholars have recently published a comprehensive research paper on the topic of ensuring economic security of Ukraine within the context of the association agreement with the European Union. It highlights key areas of cooperation, including trade, energy, and institutional reforms, aimed at aligning Ukraine with European standards. The authors underline the fact that the agreement provides opportunities for sustainable economic growth, though challenges, such as political instability and external pressures, remain strong. The study calls for strategic efforts to ensure long-term economic stability. Also, a conclusion is formulated that in the modern world, national security cannot be achieved without ensuring a sufficient level of economic security. Using the analytical system applied by the authors, current values of specific indicators can be calculated, thus allowing for a comparison with standard values to analyze various elements of Ukraine’s economic security (Mohilevskyi et al., 2021).

A recently published paper “Economic Security of Ukraine and its Structural Components: Economic and Legal Aspects” examines the economic security model of Ukraine, while focusing on a combination of economic and legal dimensions. It analyzes key indicators of economic security and compares them to standard benchmarks, also identifying the risks and vulnerabilities that threaten Ukraine’s economic stability. The authors of the paper emphasize the importance of timely and effective management of these risks, they also advocate for robust legal frameworks and economic policies to mitigate negative factors and strengthen the nation’s overall security (Kuchmak et al., 2024).

Finally, a recently published paper on the essential elements and purpose of the state’s economic security strategy emphasizes the critical role of creating a secure environment for effective public administration, which relies heavily on achieving the goals of economic security. This involves addressing various structural components and challenges unique to economic security, distinguishing it from other security levels. The text highlights pressing issues, which threaten Ukraine’s economic security, such as high inflation, lack of competitiveness, weak investment policies, high level of unemployment, and corruption, which necessitate immediate government action (Golovko, 2019). It elaborates the concept that national security, through effective public administration, is central to achieving the ultimate goal of economic security and prosperity.

The reader should bear in mind that despite its prominence in recent debates, the term ‘economic security’ is only vaguely, if at all, defined. As Western commentators put it, this term has been used in varying contexts, and at times has been employed as a catch-all for policies aimed at mitigating all kinds of economic shocks, as well as a wide range of ‘national/physical security’ measures. This conflation of different types of risk can unsurprisingly lead to poorly targeted government interventions (McCaffrey & Poitiers, 2024).

Thus, we should be aware of different approaches to measuring economic security parameters as well as understanding the impact of war not only on the national but on the global economy as well.

Methodology

This paper employs several analytical methods with the goal of providing a better academic understanding of the concept of economic security and its key elements. These methods are worth explaining as used to further the research goals.

1. Legal framework analysis: the research uses legal analysis as a key method to examine the national security policies and laws in Ukraine, specifically the Law of Ukraine "On the National Security of Ukraine". This involves a critical examination of normative definitions provided by the law, comparing the scopes of national security (military threats) and state security (non-military threats).
2. Comparative analysis: a comparative approach is employed to differentiate between the concepts of national security and state security and to assess their overlapping areas, especially in relation to economic security. This method also highlights the interplay between military and non-military threats and how they shape Ukraine's security strategies. It should be noted that this key research method is most actively used by Ukrainian scholars in modern scholarship (Movchan *et al.*, 2024).
3. Content analysis of policy documents: the study uses content analysis of key policy documents such as the National Security Strategy and the Economic Security Strategy of Ukraine. This method allows the researchers to extract critical elements such as the main vectors of state policy in national security and the components of economic security.
4. Synthesis of economic security components: the researchers applied synthesis methods to integrate various pillars of economic security (industrial, demographic, energy, foreign economic, etc.) into a comprehensive model. This methodological approach helps in presenting a structured view of Ukraine's economic security and its relation to overall national security.
5. Interpretative approach: interpretative method is used to analyze and draw conclusions from the intersection of national and economic security. The authors reflect on their findings and interpret the implications of these strategies for Ukraine's economic stability and sovereignty, while also pointing to areas for future research.

In summary, the methods include a combination of legal analysis, comparative analysis, content analysis, synthesis, critical review, case-based reasoning, and interpretation to explore the relationship between Ukraine's national and economic security strategies. These methods help in structuring the research, understanding policy impacts, and providing recommendations for future policy and research directions. Carefully crafted research tools have enabled us to better analyze key features of the national economic security model as well as to compare this model with the overall national security paradigm.

Results and Discussion

We would like to start our analyses with a critical acknowledgment of its limits and potential analytical deficiencies. Though the study presents a thorough theoretical and analytical exploration of Ukraine's national and economic security, there are notable limitations that should be acknowledged. First, the research lacks quantitative data to substantiate the relationships between different components of economic and national security, such as the direct impact of military threats on economic stability. While qualitative analysis and theoretical models are valuable, the absence of statistical data or empirical measurements limits the study's ability to quantify the magnitude of the identified threats and their economic consequences.

Additionally, the focus on Ukraine's unique geopolitical and wartime context poses challenges in generalizing the findings to other countries or regions. Ukraine's experience, particularly with external aggression and internal economic instability, may differ significantly from the security conditions faced by other nations, making the transferability of these insights to different contexts less applicable. These limitations suggest the need for further research that incorporates quantitative methods and comparative studies across other geopolitical settings.

As stated in the academic literature, formation and implementation of the state policy of the national security in Ukraine is one of the most important problems of effective management of a society that is being transformed. Ukrainian practice demonstrates that the implementation of doctrines, strategies, concepts and

programs in the field of national security must integrate all aspects of the political activity of the state and is based on sound theoretical foundations, as well as on historical experience. Today, the theory of national security is undergoing a stage of dynamic development in view of the unprecedented conditions in which our state has found itself due to unprovoked military aggression.

It should be emphasized that the Law of Ukraine “On the National Security of Ukraine” (Law of Ukraine No. 2469-VIII, 2018) is the key official “guideline” regarding the concept and content of national security in this country. This law provides, in particular, that the national security of Ukraine essentially embodies protection of state sovereignty, territorial integrity and the democratic constitutional order as well as other national interests of Ukraine from real and potential threats. In turn, state security is the protection of state sovereignty, territorial integrity, democratic constitutional order and other vital national interests from real and potential threats of non-military nature. Therefore, a critical comparison of both normative definitions demonstrates that national security is aimed at protecting Ukraine from threats of primarily military nature; instead, state security represents the state of protection of Ukraine from various threats of a different, non-military nature. This distinction is of key importance in the context of the development of various government strategies in Ukraine, as well as in the activity of authorized state authorities and, to a lesser extent, local self-government bodies.

Further, part 1 of Art. 3 of the discussed Law specifies the main vectors of state policy in terms of national security and defense. It is aimed at protecting: a person and a citizen – their life, dignity, constitutional rights and freedoms, as well as ensuring safe living conditions; separately, society – its democratic values, well-being and conditions for sustainable development; the state itself – its constitutional system, sovereignty, territorial integrity and inviolability; territory and natural environment – from emergency situations (Law of Ukraine No. 2469-VIII, 2018). Thus, we are referring to the main parameters of protecting interests of key “stakeholders” for any modern state – a person (citizen), society, state, territories (environment). These key elements are arranged in the order of their importance for the statehood – person and citizen are put in the first place, which emphasizes the human-centered approach by the democratic, rule of law-based state.

Once again, it is important to underline the fact that key tasks of national and economic security overlap. In particular, Sec. 53 of the National Security Strategy emphasizes the need to ensure sustainable and dynamic growth. To this end, the following measures are proposed: 1) developing market competition, ensuring demonopolization of the economy and the removal of economic relations from the shadows; 2) protecting property rights; 3) ensuring deregulation and preventing pressure on business; 4) creating competitive conditions for attracting investments, in particular foreign ones; 6) ensuring stable functioning of the financial system, consistency of the monetary policy and increase of trust in national financial institutions; 7) improving the legislation on the organization of judicial power and ensuring fair justice; 8) developing research infrastructure, ensure effective interaction of scientists with the public and private sector, stimulate innovation and introduce the latest technologies; 9) modernizing transport infrastructure, including roads, railways, pipelines, airports, sea and river ports (Decree of the President of Ukraine No. 392/2020, 2020).

One should also keep in mind that ensuring Ukraine’s national security in the context of ongoing European integration relies, among other factors, on the the system of state and private actors (Nakonechna et al., 2022).

Based on the results of our own analyses of the National Security and Economic Security Strategies of Ukraine, we were able to elaborate on the comprehensive structure of the latter. Thus, the economic security model of Ukraine includes several integrated components, as reflected in the following diagram.

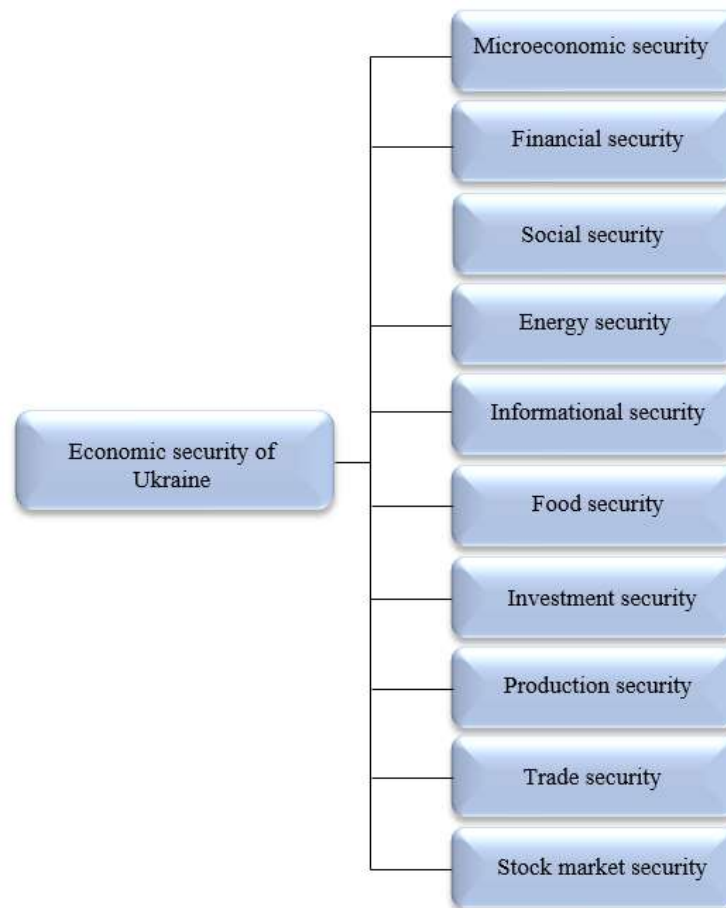


Figure 1. Key elements of the economic security framework in Ukraine.

Source: Authors' own research.

An interim conclusion here: national and economic security strategies are related documents, at least partially, in their content. A careful analysis of their provisions demonstrates that the national security and defense capability of the country cannot be ensured without a strong economic basis, without economic stability of the state. Conversely, it is impossible to develop one's own national model of a market economy without ensuring a regime of its protection against both external (for example, military aggression, terrorism, cyberattacks and various hybrid threats) and internal (economic crime, insecurity of property rights, widespread corruption, prevalence of fraudulent practices in business relations) threats.

In particular, various issues related to the so-called "shadow economy" and, more specifically, to the white-collar crimes remain a big challenge for both policy makers, law enforcement agencies and members of the legitimate business community. We have previously addressed such challenges in our research (Minchenko et al., 2021; Kamensky et al., 2023).

As explained by Ukrainian economists, the main pillars of Ukraine's economic security within its national security framework include industrial, demographic, energy, foreign economic, investment and innovation, macroeconomic, food, social, and financial security (Macroeconomic Digest of Ukraine, 2024). Each of them is an element of the much more complex and wide scale phenomenon of economic security. In the current context, ensuring economic security is especially significant, since it remains fundamental to maintaining sovereignty, competitiveness, defense capabilities, and social stability, while also impacting global economic dynamics (Kuchmak et al., 2024).

As a personal reflection, we and some other commentators believe that some of the mentioned national programs, such as energy security and food security strategies, should be viewed as part of the broader Economic Security Strategy (National Security and Defense Council of Ukraine, 2021). Indeed, prior analyses has revealed that Russian missile and drone strikes against Ukrainian energy grid have targeted

mostly Ukrainian industrial production capabilities, the country's ability to provide various services (Sullivan & Kamensky, 2024).

A recently published report "Toward a U.S. Economic Security Strategy", prepared by a group of American experts, explores how the United States can strengthen its economic security in response to various global challenges, such as supply chain disruptions, technological shifts, and geopolitical tensions. It assesses U.S. economic tools, including tariffs, export controls, and sanctions, while also identifying areas for improvement in domestic agency coordination and international cooperation. The report recommends further enhancement of strategic collaboration with G7 partners by promoting investment, while also building technological resilience, with a focus on long-term economic security and global competitiveness (Benson et al., 2024).

This policy report and similar documents by leading policymakers and experts reveals the fact that every nation has a vested interest in strengthening its national security model, while also understanding all challenges of the modern globalized world. Ukraine is not and should not be an exception here.

At the same time, the space for future scientific research in this direction remains open. We believe that this paper will at least partially address new concepts, principles and challenges that Ukrainian economic strategy faces, especially under the wartime conditions.

Other researchers propose to widen the scope of challenges that the Ukrainian economy currently faces. Among them: the presence and aggravation of the economic crisis in Ukraine in the context of armed aggression by the Russian Federation; growth of corruption; overall deterioration of the population's welfare and increase of unemployment; significant "black market" component in the economic structure; sharp drop in real GDP value due to a number of macro factors; loss of investment attractiveness of Ukraine (Skoruk, 2016). Unfortunately, these obstacles have been negatively affecting Ukrainian emerging economy model for several years now.

Conclusion

Based on our research of some pressing issues of the Economic Security Strategy, the following conclusive remarks can be formulated.

First, this study presents a novel perspective by emphasizing that economic security is not just a component but a critical pillar of Ukraine's national security framework. It demonstrates that economic stability and resilience are indispensable for safeguarding sovereignty and territorial integrity, while also playing a vital role in enabling military defense, social cohesion, and institutional reforms amidst ongoing conflict.

Second, a key contribution of this research lies in its identification of the primary threats to Ukraine's economic security – corruption, political instability, energy dependence, and external economic pressures – within the specific context of wartime conditions. The study offers strategic recommendations, such as legal reforms and enhanced market regulation, which are tailored to reducing economic vulnerabilities in sectors like energy and trade, directly addressing the challenges heightened by external aggression.

Third, the originality of this work is further highlighted by its call for continued research into the correlation between national and economic security, particularly by advocating for integrated policy frameworks that reflect Ukraine's unique geopolitical challenges. This study sets the stage for future explorations into how global economic trends intersect with Ukraine's security, and assesses the effectiveness of existing strategies in countering both domestic and foreign threats.

Finally, the study provides a unique contribution to the discourse on institutional reform, emphasizing that strengthening Ukraine's capacity in law enforcement and judicial reform is fundamental to securing long-term economic stability. It specifically underlines the importance of addressing systemic challenges like property rights protection, anti-corruption measures, and business transparency to create a stable economic environment that can attract sustainable investments, particularly in a post-war reconstruction context.

Bibliographic References

- Antonov, V. (2017). *Constitutional and legal principles of national security of Ukraine: monograph*. Kyiv: TALKOM. (In Ukrainian)
- Benson, E., Mouradian, C., & Palazzi, A. (2024). *Toward a U.S. Economic Security Strategy Twenty-First-Century Guidance for Domestic and International Policymaking*. Center for Strategic and International Studies. Retrieved from: <https://acortar.link/oiAB2L>
- Chernysh, R., Chekhovska, M., Stoliarenko, O., Lisovska, O., & Lyseiuk, A. (2023). Ensuring information security of critical infrastructure objects as a component to guarantee Ukraine's national security. *Amazonia Investiga*, 12(67), 87-95. <https://doi.org/10.34069/AI/2023.67.07.8>
- Decree of the President of Ukraine No. 392/2020. On the decision of the National Security and Defense Council of Ukraine of September 14, 2020 "On the National Security Strategy of Ukraine". *Verkhovna Rada of Ukraine*, 2020. <https://zakon.rada.gov.ua/laws/show/392/2020#Text>
- Golovko, V. (2019). Essential characteristics of the economic security of the state and its main components. *World Science*, 3(51), 4-8. https://doi.org/10.31435/rsglobal_ws/30112019/6778
- Kamensky, D. (2023). Population health as a component of public security: experience of the European Union and Ukraine. *Analytical and comparative jurisprudence*, 5, 335-340. <https://doi.org/10.24144/2788-6018.2023.05.60>
- Kamensky, D., Dudorov, O., Savchenko, A., Movchan, R., & Danyilevska, Y. (2023). Criminal liability for humanitarian aid embezzlement during war: The case of Ukraine. *Cuestiones Políticas*, 41(77), 760-776. <https://doi.org/10.46398/cuestpol.4177.50>
- Khatnyuk, Yu. (2020). Concept and legal support of national security of Ukraine. *Legal novels*, 10, 228-234. <https://doi.org/10.32847/ln.2020.10.32>
- Kuchmak, Y., Litovchenko, V., Zarichnyi, R., Uskyi, M., Muzyka, Y., & Mylyanyk, Z. (2024). Economic Security of Ukraine and its Structural Components. *Economic and Legal Aspects. Path of Science*, 10(5), 1008-1012. <https://doi.org/10.22178/pos.104-25>
- Law of Ukraine No. 2469-VIII. "On the national security of Ukraine". *Verkhovna Rada of Ukraine*, 2018. Retrieved from: <https://zakon.rada.gov.ua/laws/show/2469-19#Text>
- Macroeconomic Digest of Ukraine (2024). *Ukrainian Institute of the Future*. Retrieved from: <https://uifuture.org/publications/dajdzhest-july/>
- McCaffrey, C., & N. Poitiers (2024). 'Instruments of economic security', Working Paper 12/2024. Bruegel. Retrieved from: https://www.bruegel.org/system/files/2024-05/WP%2012%202024_0.pdf
- Minchenko, R., Lutsyuk, P., Kamensky, D., Kolodin, A., & Shamota, O. (2021). Civil and criminal liability in the field of transport relations: the impact of the Covid-19 pandemic. *Amazonia Investiga*, 10(40), 212-221. <https://doi.org/10.34069/AI/2021.40.04.21>
- Mohilevskiy, L., Fursa, V., Sievidova, I., Komziuk, M., Khloponina-Gnatenko, O., & Pidkopai, D. (2021). Ensuring the economic security of Ukraine in the aspect of the association agreement between the EU. *European Journal of Sustainable Development*, 10(2), 171-186. <https://doi.org/10.14207/ejsd.2021.v10n2p171>
- Movchan, R., Kamensky, D., Dudorov, O., Mamedova, S., & Holovchuk, V. (2024). Intentional destruction or damage of objects of plant life as a crime under the law of Ukraine and other European countries: cross-jurisdictional analysis. *Amazonia Investiga*, 13(75), 296-307. <https://doi.org/10.34069/AI/2024.75.03.25>
- Nakonechna, I., Blahodarnyi, A., Servatiuk, L., Makarchuk, V., & Kobko, V. (2022). Framework of national security actors of Ukraine in the context of European integration. *Amazonia Investiga*, 11(60), 47-52. <https://doi.org/10.34069/AI/2022.60.12.5>
- National Security and Defense Council of Ukraine (2021). *Decision dated August 11, 2021. "Strategy of economic security of Ukraine for the period until 2025 (2021)".* Retrieved from: https://ips.ligazakon.net/document/view/U347_21?an=28&ed=2021_08_11
- Podkovenko, T. (2021). National security of Ukraine: axiological and legal aspects. *Actual problems of jurisprudence*, 1(1), 11-18. <https://doi.org/10.35774/app2021.01.011>
- Skoruk, O. V. (2016). Economic security of the state: essence, constituent elements and problems of provision. *Scientific Bulletin of the Uzhhorod National University. Series: International economic relations and the world economy*, 6(3), 39-42.
- Sullivan, J., & Kamensky, D. (2024). Putin's power play: Russia's attacks on Ukraine's electric power infrastructure violate international law. *The Electricity Journal*, 37(2), 107371. <https://doi.org/10.1016/j.tej.2024.107371>
- Tretyak, V., & Gordienko, T. (2010). Economic security: essence and conditions of formation. *Economy and the state*, 1, 6-8.

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The impact of digital transformation on the development of post-war regions of Ukraine

Вплив цифрової трансформації на розвиток повоєнних регіонів України

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Abstract


The relevance of the topic of studying the impact of digital transformation on the development of post-war regions of Ukraine is due to the need to improve the economic and social structures of these regions in the current changing environment. In this context, the study aims to identify the potential of digital technologies to support processes in business, education, healthcare and infrastructure, which will help increase competitiveness and ensure the development of these territories. To achieve the main goal, general scientific methods such as analysis, synthesis, induction and deduction were used to study the state of the digital economy and digital transformation of Ukraine's regions, as well as to assess the current state of the country's economy and trade. The results of the study confirm that digital transformation has a significant impact on the development of Ukraine's post-war regions,


Анотація


Актуальність теми дослідження впливу цифрової трансформації на розвиток повоєнних регіонів України зумовлена необхідністю вдосконалення економічних і соціальних структур цих регіонів у нинішніх мінливих умовах. У цьому контексті дослідження спрямоване на виявлення потенціалу цифрових технологій для підтримки процесів у сфері бізнесу, освіти, медицини та інфраструктури, що сприятиме збільшенню конкурентоспроможності та забезпеченню розвитку цих територій. Для досягнення основної мети використовувалися загальнонаукові методи, такі як аналіз, синтез, індукція та дедукція, що сприяли вивченню стану цифрової економіки та цифрової трансформації регіонів України, а також оцінці сучасного стану економіки та торгівлі країни. Результати дослідження підтверджують, що


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providing them with new opportunities for economic recovery and social growth. Thus, from 2019 to 2022, the export of IT services increased by 400 million US dollars, which indicates the importance of this sector. Despite a 10% decline in IT services exports in 2023 due to the war, the industry remains critically important to the country's economy. Trade deficits caused by restrictions on agricultural exports and blockades of sea routes can be partly solved by digital technologies that help develop new markets. The use of digital tools in education increases the level of professional skills of the population, and the IT sector continues to attract investments, creating new jobs. Digital technologies also increase the efficiency of infrastructure reconstruction, which contributes to the rapid recovery of regions. Thus, digital transformation is a key catalyst for the development of Ukraine's post-war regions, facilitating their integration into the European socio-economic space and improving the overall living standards of the population. The introduction of digital innovations helps to reduce the gap between the regions and national and global development standards, creating the preconditions for sustainable economic growth and social stability.

Keywords: decentralised systems, cryptocurrency, regulatory aspects, fintech innovations, digital identity, cybersecurity.

цифрова трансформація має значний вплив на розвиток повоєнних регіонів України, забезпечуючи їм нові можливості для економічного відновлення та соціального зростання. Так, з 2019 по 2022 рік експорт ІТ-послуг зріс на 400 млн доларів США, що свідчить про важливість цього сектора. Попри зниження експорту ІТ-послуг на 10% у 2023 році через війну, галузь залишається критично важливою для економіки країни. Торговельний дефіцит, спричинений обмеженням експорту агропродукції та блокуванням морських шляхів, може бути частково вирішений завдяки цифровим технологіям, які допомагають розвивати нові ринки збуту. Використання цифрових інструментів в освіті підвищує рівень професійних навичок населення, а ІТ-сектор продовжує залучати інвестиції, створюючи нові робочі місця. Цифрові технології також підвищують ефективність відбудови інфраструктури, що сприяє швидкому відновленню регіонів. Таким чином, цифрова трансформація – ключовий каталізатор розвитку повоєнних регіонів України, що сприяє їх інтеграції в європейський соціально-економічний простір і підвищенню загального рівня життя населення. Впровадження цифрових інновацій дозволяє зменшити відставання регіонів із загальноукраїнськими та світовими стандартами розвитку, створюючи передумови для сталого економічного зростання та соціальної стабільності.

Ключові слова: децентралізовані системи, криптовалюта, регуляторні аспекти, фінтех-інновації, цифрова ідентичність, кібербезпека.

Introduction

In today's world, digital transformation plays a key role in the development of the economy and society, especially in the context of post-war regions. Today, Ukraine needs this transformation more than ever. Digital technologies open up new opportunities in the areas of economy, education, healthcare and infrastructure for regions affected by the war. The introduction of digital innovations increases the competitiveness of regions in the international market, which helps to attract investment and improve the living standards of the local population.

At the same time, it is important to consider not only the positive aspects of digital transformation, but also possible challenges, such as digital inequality and price instability. Nevertheless, it can be argued that the introduction of digital technologies is an integral part of the development of Ukraine's post-war regions, aimed at ensuring sustainable growth and inclusive development of society.

Digitalisation, the digital economy and digital transformation are key terms in the modern world that reflect the transition to new digital realities in all aspects of life, business and the economy. In the modern digital era, countries are actively competing not only in the economy but also in technology, thus creating a new paradigm of global power dynamics (Zhukovska et al., 2023). Artificial intelligence, advanced technologies, digital transformation - these areas can radically change modern society in the near future (Ivankov et al., 2023). Artificial intelligence is gradually occupying its unique niche in the modern world (Silvia, 2023).

Digitalisation is considered to be a key factor in economic growth, as it can positively affect the efficiency, productivity, cost-effectiveness and quality of government policy (Sosnin, 2020). In English, digitalisation is the introduction of digital technologies into all aspects of life: from interpersonal interaction to industrial processes, from household items to children's toys and clothing. This process involves the transition from traditional biological and physical systems to the integration of physical and computational components into cyber-biological and cyber-physical systems. Transition of activities from the real world to the virtual world (online) (Haustova, 2022). Digitalisation is an undeniable driver of the development of modern society and all its components (Kravchuk et al., 2023). It opens up significant opportunities for the labour market and economic growth.

The digitalisation of Ukraine's economy is a process of active implementation of advanced digital technologies and innovations to improve the country's competitiveness and promote its development. The digital economy offers many benefits. Digital technologies are a mechanism of social lifts. They stimulate social progress by increasing citizen engagement and improving the accessibility and quality of public and social services, including healthcare, education and culture. For example, it is now easy to make an appointment with a doctor online and monitor your health using advanced medical technologies (Cherep & Sarbej, 2023).

As Cherep & Sarbej (2023) rightly point out, digitalisation is not only a modern trend, but also an important tool in the recovery of Ukraine's economy after the war. The introduction of digital technologies in various spheres of life and business is becoming a catalyst for effective economic recovery. The authors highlight the following key aspects:

- Reforming social sectors. Digital tools are helping to modernise the healthcare and education sectors. Innovations in e-health and distance learning allow for faster adaptation to new conditions and provide access to critical services;
- Digital platforms for recovery. Creating digital platforms for coordinating and financing recovery projects makes the recovery process more transparent and efficient. It facilitates monitoring by both the government and the public;
- Development of the military-tech industry. Innovative solutions in the military sphere not only strengthen the country's security but also contribute to overall technological development. The creation of a defence technology agency and accelerator is an important step in this direction.

Let us also emphasize that the Ukrainian-Russian war, which began in February 2022, caused significant damage to the economy and infrastructure of Ukraine, especially in the affected regions. The destruction of residential buildings, industrial enterprises and social facilities created an urgent need for rapid reconstruction and modernization. In this context, digital transformation plays a key role, as the introduction of the latest technologies contributes to effective reconstruction, improving the quality of public services and attracting investments. It also opens up new opportunities for long-term development and growth of the country's competitiveness.

Literature Review

The implementation of digital technologies in various spheres of life and business is becoming an important factor for effective economic recovery. First, digital tools are helping to reform affected industries such as medicine and education. Innovative solutions in e-health and distance learning allow for faster adaptation to new conditions and provide access to important services, which is critical in wartime conditions. Secondly, the creation of digital platforms for attracting financial support and coordinating restoration projects makes the restoration process more transparent and efficient. This increases the possibility of monitoring by both the government and the public, which promotes confidence in recovery efforts. Thirdly, the development of the military-tech industry and the implementation of innovative solutions in this area is an important step for ensuring national security. The creation of a defense technology agency and accelerator will not only strengthen the military, but also stimulate overall technological progress (Cherep & Sarbej, 2023).

Pichkurova (2023) emphasizes that the war in Ukraine revealed a number of problems that can be partially or completely solved with the help of digital tools. Among the examples of this is the organization of the termination of the activities of enterprises and their relocation from temporarily occupied territories through digital platforms. Migration problems of the working population are also solved thanks to the possibility of

conducting business abroad with remote registration of all bureaucratic procedures in Ukraine. In addition, digital platforms are being used to capture housing destruction, change logistics strategies for businesses, and combat cyber threats targeting government agencies and critical infrastructure. Digitization in wartime also helps fight corruption by digitizing public services, which reduces the impact of the human factor.

Tulchynska & Dergalyuk (2022) note that the impact of digitalisation on the activation of the regions' potential is carried out through the following mechanisms:

- Improving the efficiency of research and innovation activities and innovative development of regional economic systems. Digital technologies help to accelerate innovation processes and reduce research and development costs, which contributes to the growth of regional competitiveness;
- Intensifying the attraction of investment resources. Digital technologies are creating new opportunities for attracting foreign investment in regional economic sectors, which contributes to their development and modernisation;
- Improving the quality of social services and attracting investment capital to implement social programmes. Digital technologies make it possible to optimise social programmes and increase their efficiency, as well as attract investment for their implementation;
- Increase the level of economic security and resilience of the regions. Digital tools help manage risks and reduce the vulnerability of regions to economic fluctuations and global trends;
- Increasing the competitiveness of the environment. The use of digital technologies enables productivity growth and optimisation of production processes, which in turn increases the region's competitiveness;
- Optimisation and automation of economic regulation processes. Digital tools simplify administrative procedures and improve the efficiency of public administration and regulation of economic processes.

Today, digital transformation is a key factor in ensuring sustainable and long-term economic growth in the post-war regions of Ukraine (Bezrukova et al., 2022).

In a broad sense, digital transformation is an irreversible process that encompasses the introduction of digital technologies in all spheres of life, business, society and the state in order to improve efficiency, innovation and competitiveness (Strutynska, 2019; Tsekhmister et al., 2021). This process reflects the transition to a digital economy, where new opportunities and challenges require constant adaptive response and development. According to a number of scholars (Kovalevska et al., 2022), digital transformation is a productivity growth. The introduction of digital technologies allows us to optimise production and service processes, which leads to increased productivity:

- Improved access to markets. Digital technologies make it easier for regional businesses to enter new markets and conduct marketing and sales via the Internet, which increases their competitiveness;
- Development of innovations. Digital technologies are driving innovation in regional businesses, enabling them to create new products and services that meet modern consumer demands;
- Attracting investment. Regions that are actively implementing digital solutions are able to attract more investment, as their business ecosystems are characterised by a high-tech focus;
- Improving the quality of life. The introduction of digital technologies in education, healthcare, transport and other sectors improves the quality of life of regional residents by providing more convenient and efficient services;
- Reducing environmental impact. Digital innovation can help reduce environmental impact through energy optimisation, waste management and other environmentally friendly practices;
- Support for urbanisation. Digital technologies contribute to the development of modern urban systems, which is important for the effective management of large concentrations of people.

Grazhevskaya & Chygyrinsky (2021) identify the following negative consequences of the digital transformation of the economy:

- Polarisation of the workforce by the level of digital skills. The introduction of digital technologies may widen the gaps between those with high digital skills and those with low skills. This can lead to risks associated with the insufficient matching of quality educational and professional knowledge with the requirements and needs of the labour market;
- Deepening social polarisation. The introduction of digital technologies may increase the level of social inequality. This includes narrowing opportunities for the middle class, blocking social lifts, and

- regressive social mobility. That is, certain groups of the population may remain excluded from the opportunities offered by the digital economy;
- Social and psychological problems. The emergence of digital technologies can lead to social and psychological problems, such as the threat of segregation of the population by the level of their competence in digital technologies. This can impair the functionality and labour skills of staff, as well as change their motivational orientations.

Thus, digital transformation has a strong impact on the development of our country's regions, providing new opportunities to modernise infrastructure, improve the efficiency of public and administrative services, stimulate innovation and attract investment.

It should be noted that most modern scholars study the overall impact of digital transformation on the development of Ukraine's regions. In this study, we will focus more on the development of Ukraine's post-war regions, as this topic is particularly relevant and has great potential to improve the qualitative and quantitative development of the country as a whole. Ukraine's post-war regions face a variety of challenges, including restoration of infrastructure and socio-economic rehabilitation of the population, stimulation of investment and development of innovative industries, etc. Digital transformation can play a key role in addressing these challenges by providing access to modern technologies, increasing the efficiency of administrative and public services, helping to create new jobs and improving the living conditions of residents. This approach will significantly increase the competitiveness of the regions and the overall level of development of Ukraine.

Methodology

The main parts of the study include a detailed analysis of the current state of infrastructure and economic indicators in the regions (gross domestic product of Ukraine (GDP), real GDP of Ukraine, the share of the digital economy in GDP, the digital transformation index of the regions of Ukraine, the dynamics of IT exports of Ukraine), which allows to determine strategies their further recovery and development.

The research is based on general scientific methods, such as analysis (to identify trends and regularities in the development of regions), synthesis (to integrate various types of data in order to form a comprehensive vision of the state of the region), induction (helps to identify new patterns) and deduction (allows to verify already known theories in the context of specific conditions of Ukraine), which contributed to the study of the digital economy and digital transformation of the regions of Ukraine, as well as the assessment of the current state of the country's economy and trade.

In the course of the research, we used data from the State Statistics Service of Ukraine, as well as the results of research conducted by independent analytical centers that focus on digital transformation, the development of the IT sector and its contribution to the economy of Ukraine. These sources of data and methods of analysis allow for a systematic approach to studying the impact of digital transformation on the development of post-war regions of Ukraine, which, in turn, contributes to the well-founded formulation of recommendations for their recovery and development.

Results and Discussion

The current economic environment is characterised by accelerating globalisation and integration, as well as escalating conflicts in various parts of the world. These challenges create high uncertainty, which complicates economic policy-making and development. These challenges are particularly acute for Ukraine, which has been the target of military aggression by the Russian Federation since 24 February 2022. Nevertheless, it is necessary to identify areas for developing strategies and mechanisms for the reproduction and development of the country's economy even before the end of the conflict to ensure sustainability and future development in the face of global change (Bozhkova & Halytsia, 2022). The turn of the twentieth and twenty-first centuries was a period of dramatic changes in the information space in general, which was reflected in the conceptual formation of a new information society (Kryvoshein, 2023). The digitalisation of the Ukrainian economy, which began to develop actively during the COVID-19 pandemic, has become crucial in the context of the war, becoming one of the priorities for Ukraine's economic development and opening up prospects for the country's transformation into one of the global leaders in the digital space. Statistics show that the share of the digital economy in Ukraine's GDP is

gradually increasing. For example, while in 2019 the share of the digital economy in Ukraine's GDP was only 4.3%, by the end of 2023 it was 6%. This figure is forecast to rise to 7.7% by the end of 2024.

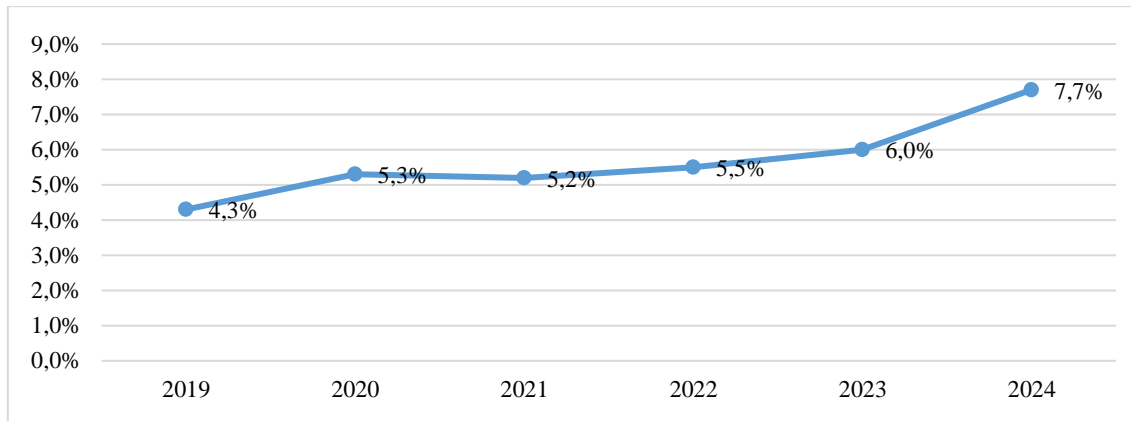


Figure 1. Share of the digital economy in GDP, %.

Source: compiled by the authors based on (Project of the Recovery Plan of Ukraine, 2023)

The digital transformation of industries leads to changes in demand and factors of production, which causes the transformation of both individual industries and the entire structure of the economy and inter-sectoral interaction under the influence of digital technologies. Fig. 2 shows the average annual values of the additional contribution of growth factors to the value added of economic sectors as a result of digitalisation. We can see that the share of the digital economy in Ukraine's GDP is almost 4.0%, which indicates its growing importance as an integral part of the country's economy. Digitalisation has a significant impact on the economic development of sectors of the Ukrainian economy. Different sectors demonstrate different levels of contribution to value added through digital technologies. Sectors that actively use digital innovations, such as finance and transport, show significant positive changes in productivity. At the same time, there are sectors that face challenges in adapting to digital transformation, such as timber and metallurgy.

Today, during the full-scale war initiated by Russia against Ukraine, digital transformation has become more relevant to improve cybersecurity, ensure uninterrupted access to medical and educational services, and ensure the normal functioning of the country's infrastructure. Even in the face of the current challenges, new services and projects have been developed, such as eVorog and eOselya, which allow for the registration of damaged property and the payment of social benefits to internally displaced persons and the unemployed (Ivanova, 2022).

Additionally, the Ministry of Digital Transformation of Ukraine has developed the Digital Transformation Index of Regions, which is a key tool for measuring the processes of informatisation and digitalisation in the regions and allows assessing the capacity of authorities to implement digital solutions, as well as determines the level of digital culture among the citizens of our country (Rogozyan & Vakhlovski, 2023).

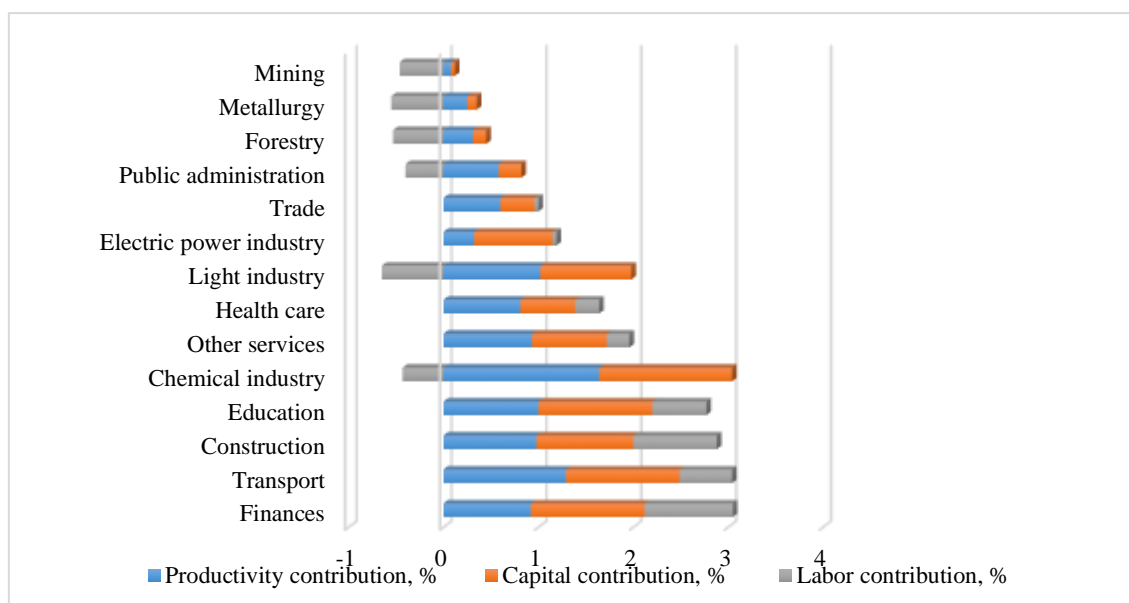


Fig. 2. Average annual values of the additional contribution of growth factors to the value added of economic sectors as a result of digitalisation in 2019-2030.

Source: compiled by the author according to (National Institute for Strategic Studies, 2023)

It is worth noting that in 2023, the average score of the Digital Transformation Index was 0.632 (Fig. 3).

The highest values of the index were recorded in Dnipro region (0.908), Lviv region (0.891), and Poltava region (0.833). Some regions showed positive dynamics in improving this indicator.

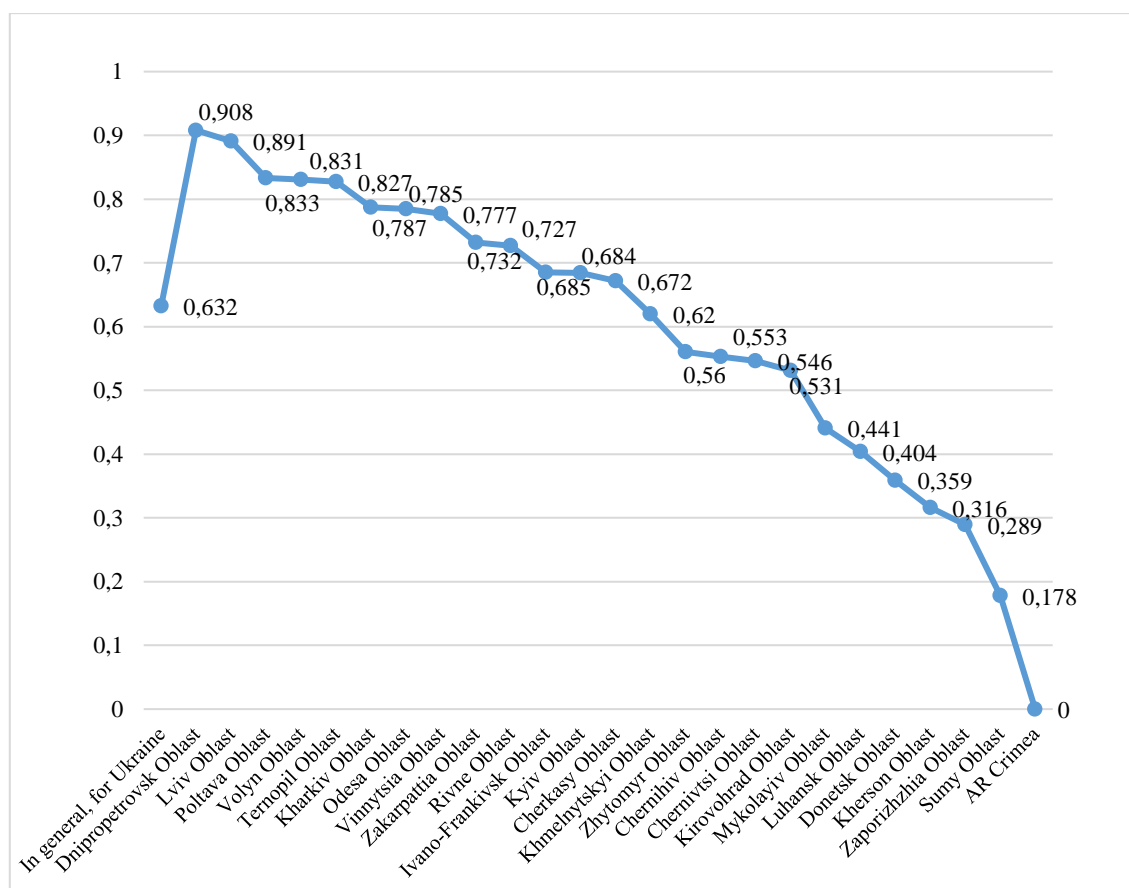


Fig. 3. Indicators of the Digital Transformation Index of Ukrainian regions in 2023.

Source: compiled by the author based on data from the Ministry of Digital Transformation of Ukraine (2023)

In 2023, the Digital Transformation Index contained 8 sub-indices (Table 1).

Table 1.
Index of Digital Transformation of Ukrainian Regions in 2023 by sub-indices

	Institutional capacity	Development of the Internet	Development of ASCs	Paperless mode	Digital education	Business card of the region	Basic e-services	Sectoral DH
Vinnitsia	0.9	0.784	0.712	0.868	0.92	0.6	0.551	0.848
Volynska	0.88	0.87	0.808	0.865	0.624	0.9	0.947	0.747
Dnipro Petrovska	1	0.902	0.908	0.923	0.968	1	0.901	0.826
Donetsk	0.32	0.118	0.369	0.605	0.546	0.6	0.569	0.272
Zhytomyrska	0.38	0.769	0.515	0.743	0.552	0.1	0.566	0.511
Transcarpathian	0.8	0.602	0.683	0.813	0.82	1	0.847	0.688
Zaporizhzhya	0.598	0.185	0.432	0.141	0.658	0.05	0.428	0.065
Ivano-Frankivsk	0.9	0.769	0.643	0.599	0.24	0.6	0.61	0.69
Kyiv	0.685	0.689	0.744	0.718	0.542	1	0.728	0.534
Kirovohradska	0.32	0.619	0.589	0.622	0.524	0.5	0.528	0.454
Lviv	0.88	0.914	0.905	0.951	0.84	0.6	0.885	0.918
Mykolaivska	0.167	0.609	0.51	0.487	0.656	0.9	0.534	0.105
Odesa	1	0.849	0.706	0.819	0.62	1	0.904	0.601
Poltava	0.8	0.917	0.709	0.902	0.936	1	0.738	0.836
Rivne	0.96	0.609	0.653	0.853	0.472	1	0.733	0.732
Sumy	0.3	0.173	0.066	0.182	0.398	0	0.416	0.104
Ternopil'ska	1	0.916	0.747	0.856	0.732	1	0.672	0.773
Kharkiv'ska	0.728	0.926	0.696	0.809	0.968	0.5	0.809	0.773
Kherson	0.286	0.179	0.383	0.612	0.834	0.5	0.286	0.092
Khmelnytska	0.8	0.756	0.504	0.667	0.458	0.1	0.664	0.637
Cherkassy	0.656	0.595	0.711	0.731	0.686	0.5	0.687	0.719
Chernivetska	0.5	0.374	0.733	0.74	0.546	0.5	0.589	0.447
Chernihiv'ska	0.612	0.404	0.63	0.536	0.546	0.6	0.72	0.509

Source: compiled by the author based on data from the Ministry of Digital Transformation of Ukraine (2023)

The Digital Transformation Index of Ukraine's Regions in 2023 shows significant variations in the level of digital readiness of the country's regions. The leaders in terms of the overall level of digital transformation are Dnipro, Ivano-Frankivsk, and Odesa regions, which have shown high results in most sub-indices. While these regions have made significant progress in Internet development, digital education, and the introduction of e-services (Donetsk and Sumy regions), they remain far behind. This demonstrates the need for targeted government policy and investment in digital technologies for the balanced development of all regions of Ukraine.

In order to understand the possible development options for the post-war regions of Ukraine, it is important to first assess the current state of the Ukrainian economy. In this study, we will look at two main areas: the economy and trade.

In the first year of the war, the economic and social situation in Ukraine deteriorated significantly, which had a negative impact on the business environment. Thus, according to the State Statistics Service of Ukraine, real GDP decreased by 29.1% in 2022, which was the deepest decline in the history of Ukraine's independence. At the prices of the previous year, excluding inflation, GDP amounted to UAH 3.86 trillion, compared to UAH 5.45 trillion in the previous 2021 (Table 2).

Table 2.
Gross domestic product of Ukraine in 2022 (trillion UAH)

Period	Nominal GDP (in actual prices)	Real GDP (in 2021 prices)	Difference (real - nominal)	
Q1.			-0.15	-13.4%
II quarter.	1.03	0.78	-0.25	-24.1%
III quarter.	1.45	1.08	-0.37	-25.6%
IV quarter.	1.62	1.06	-0.56	-34.4%
for the year	5.19	3.86	-1.32	-25.5%

Source: compiled by the author based on data from the Official website of the State Statistics Service of Ukraine (2024)

The decline in real GDP was quite significant (Figure 4). However, this decline was smaller than expected at the beginning of the invasion, thanks to the high adaptability of businesses and households, as well as the resilience of the energy system.

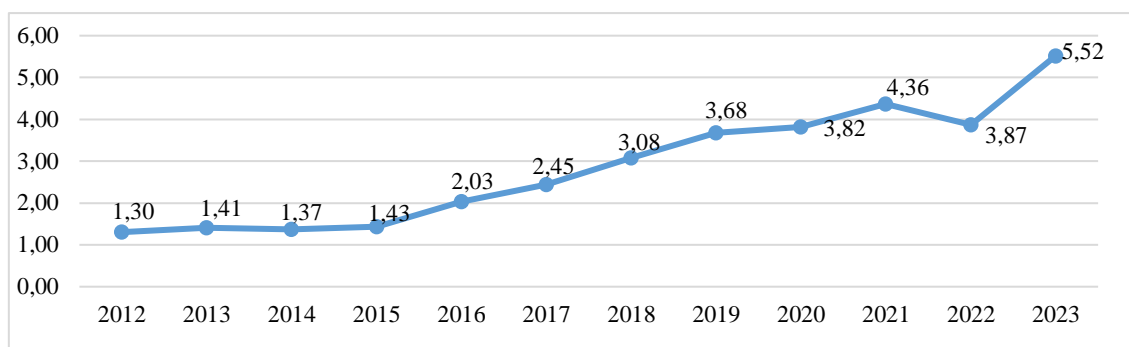


Figure 4. Real GDP of Ukraine from 2012 to 2023 (trillion UAH)

Source: built by the author according to (UNIAN Information Agency, 2022)

Ukraine's industrial complex continues to be the main core of the country's GDP generation (Voloshina-Sijdei et al., 2023). Overall economic activity has declined by 30-50%. The political and economic situation in Ukraine has led to an increased likelihood of crisis phenomena at enterprises, which is manifested in lower financial results or even losses, reduced financial stability and production volumes, and deterioration in the quality of services and products (Mukhalchenko et al., 2023). Approximately 30% of employees were displaced, leading to staff shortages in some regions and sectors. Infrastructure, civilian housing and social institutions also suffered significant losses.

Trade in Ukraine also faced significant challenges during the conflict. The blockade of the sea route by Russia, which was our country's largest trade channel, has led to a significant reduction in export opportunities. Currently, only agricultural products are being exported, and it is too early to talk about a recovery in exports.

Ukraine continues to trade through the EU, but the throughput is critically low and limited mainly to land. This leads to an accumulation of trade deficits, as imports are 80-90% of the previous military level, while exports have declined significantly. At the same time, it is important to note that in 2019-2022, IT exports showed steady growth. Although the growth rate was the lowest in the first year of the war, at only 5.8%, the volume of IT exports increased by almost USD 400 million. The volume of IT exports increased by almost USD 400 million (Figure 5).

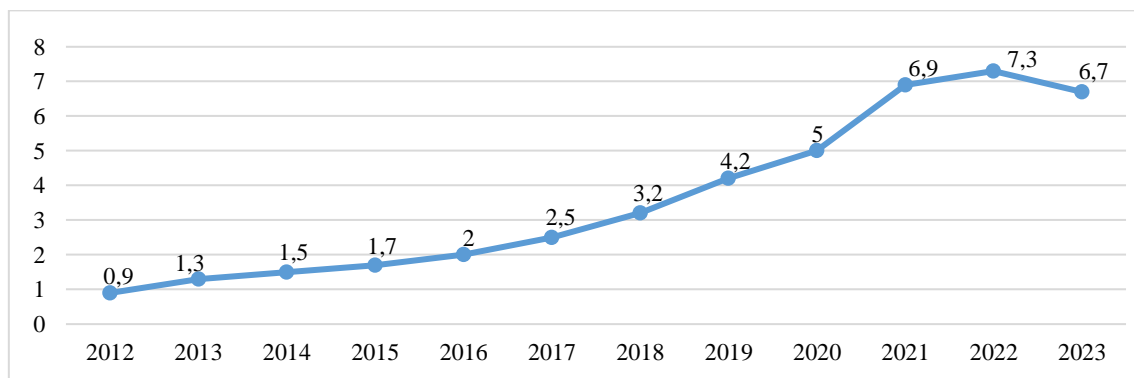


Figure 5. Dynamics of Ukraine's IT exports in 2012-2022.

Source: compiled by the author according to (Community of DOU programmers, 2023)

In 2023, Ukraine's exports of IT services recorded a year-on-year decline for the first time, indicating a significant downward trend in market size. As domestic demand for IT services is limited, this drop of almost 10% indicates the significant challenges facing the Ukrainian IT sector in the current environment. The IT industry in Ukraine is an important component of the country's economic base, so immediate action is needed to curb this decline and introduce additional tools to stimulate its development and exports.

The reconstruction of Ukraine's post-war regions promises to be one of the largest projects of its kind in Europe since the Second World War. The size of the reconstruction tasks and the capabilities of modern technologies create unique challenges and open up opportunities for creative approaches to address them. Therefore, it is now extremely important for Ukraine to use all available resources in the state and the

private sector efficiently, openly and transparently, and to intensify partnerships with all categories of international partners.

Shapoval et al., (2022) divided all recovery processes into three groups:

- **Systematisation of recovery.** This includes the creation of a unified system for the distribution and accounting of recovery projects, project identification, prioritisation, selection of contractors, as well as accounting and control of processes;
- **Resource allocation.** This includes the distribution of state property (corporate rights, real estate, mineral resources, land, forests, etc.), concessions, public-private partnerships and project financing for new construction, modernisation and reconstruction, non-financial assistance (reconstruction goods, energy), distribution of confiscated Russian property, humanitarian aid and social support, compensation for damage and lost profits;
- **Export promotion.** This includes exporting products to the EU, for example, on a pickup basis, and creating new exchanges for Ukrainian products, such as agricultural products in the Black Sea.

Digital transformation has the potential to significantly improve the development of Ukraine's post-war regions in several key ways:

1. **Effective resource management.** The introduction of digital technologies will allow for more effective recovery management, including systems for monitoring and analysing data on resource allocation, project planning and monitoring.
2. **Digital infrastructures and connectivity.** The development of digital infrastructures and improved access to high-speed Internet will facilitate the integration of post-war regions into the global economic system, promoting new opportunities for businesses and the economy as a whole.
3. **Education.** Digital technologies can improve access to education and improve the skills of the population of post-war regions through distance learning, online courses and other forms of education that allow them to adapt to modern labour market requirements.

The development of Internet technologies is facilitating the creation of new forms of information exchange. To this end, new dynamic e-learning platforms are being created to replace traditional ones. In particular, the use of technology for training specialists is gaining popularity due to the widespread introduction of e-learning using the Internet and various electronic tools (Aljad, 2023).

4. **Digital tools for business.** The introduction of digital tools will help local businesses improve production efficiency, increase competitiveness, and develop new sectors of the economy, such as IT, e-commerce, etc.

Thus, the recovery and development of Ukraine's post-war regions requires the effective use of digital tools that will allow for the country's rapid and efficient reconstruction, reducing the risks of inefficient use of resources and possible manipulation. The introduction of these tools should complement and accompany the development process, promoting the implementation of best practices in resource management at all levels of government. The most important aspect is to receive timely financial support from international partners, as investment in the restoration and development of Ukraine's regions is an important step towards ensuring security and economic stability in Europe and the world.

Conclusions

Digital transformation is having a significant impact on the development of Ukraine's post-war regions, providing them with new opportunities for economic recovery and social growth. The integration of digital technologies helps to improve access to education and healthcare services, which is key to improving the quality of life of the local population. Digital tools also help to attract investment and develop entrepreneurship, creating new jobs and contributing to economic stability. New technologies also help to increase the transparency of governance and reduce corruption, which is an important factor for the development of democracy and the rule of law. Thus, digital transformation is a key catalyst for the development of Ukraine's post-war regions, facilitating their integration into the European socio-economic space and improving the overall standard of living.

Limitations

The limitations of this study can be considered in the context of several key circumstances:

- Limited selection of sources. The selected sample consists of only 35 sources, which may limit the representativeness of the study and not take into account all possible opinions about the research topic. For greater credibility and objectivity of the research, a wider list of sources and approaches should be considered;
- The need for constant data updates. Given the rapid changes in today's economic and political environment, this analysis may become outdated within a short period of time.

To ensure the highest level of relevance and validity of data and results, it is necessary to constantly update and expand sources of information, as well as use new methods of research and data collection. Further scientific research can be directed to the thematic analysis of the impact of digital transformation on the development of specific post-war regions of Ukraine, which will allow identifying specific challenges and opportunities in each of them. This may include research into specific sectors such as IT, education and infrastructure, as well as case studies of successful implementation of digital technologies in reconstruction. In addition, a comparative analysis with other countries that have experienced similar conflicts will allow us to identify best practices and adapt them to the conditions of Ukraine.

Bibliographic References

- Aljad, R. R. (2023). Analysis of Development Trends and Experience of using LMS in Modern Education: An overview. *E-Learning Innovations Journal*, 1(2), 86-104. <https://doi.org/10.57125/ELIJ.2023.09.25.05>
- Bezrukova, N., Huk, L., Chmil, H., Verbivska, L., & Komchatnykh, O., & Kozlovskiy, Y. (2022). Digitalisation as a Trend of Modern Development of the World Economy. *WSEAS Transactions on Environment and Development*, 18, 120-129. <https://repo.btu.kharkov.ua/handle/123456789/9921>
- Bozhkova, V., & Halytsia, I. (2022). Mechanisms to ensure the development of the economy of the future in the context of global change. *Future Economics & Law*, 2(2), 4-13. <https://doi.org/10.57125/FEL.2022.06.25.01>
- Cherep, A., & Sarbej, L. (2023). Digitisation as a tool for rebuilding the economy of Ukraine in the post-war period. *Young Scientist*, 12(124), 184-188. <https://doi.org/10.32839/2304-5809/2023-12-124-4>
- Community of DOU programmers. (2023). "It looks like this will be the first year that the IT industry does not grow." *How the war and the global market affect IT exports of Ukraine - analytics and expert opinions*. <https://dou.ua/lenta/articles/how-war-effects-it-export>
- Grazhevskaya, N. I., & Chygyrinsky, A. M. (2021). Digital transformation of the economy in conditions of increased global risks and threats. *Economy and the State*, 8, 53-57. <https://doi.org/10.32702/2306-6806.2021.8.53>
- Haustova, M. G. (2022). Concept of digitisation: national and international approaches. *Law and Innovation*, 2(38), 7-18. <https://openarchive.nure.ua/handle/document/22796>
- Ivankov, V., Chukhlib, A., Stender, S., Azarenkov, G., & Nazarenko, I. (2023). Análisis de las perspectivas de introducción de las tecnologías digitales en la economía y la contabilidad ucranianas. *REICE: Revista Electrónica De Investigación En Ciencias Económicas*, 11(22), 68-86. <https://doi.org/10.5377/reice.v11i22.17343>
- Ivanova, N. (2022). Digital development of the regions of Ukraine: trends of the pre-war period and prospects for post-war recovery. *Problems and Prospects of Economics and Management*, 4(32), 209-213. [https://doi.org/10.25140/2411-5215-2022-4\(32\)-208-217](https://doi.org/10.25140/2411-5215-2022-4(32)-208-217)
- Kovalevska, N., Nesterenko, I., Lutsenko, O., Nesterenko, O., & Hlushach, Y. (2022). Problems of accounting digitalisation in conditions of business processes digitalisation. *Amazonia Investiga*, 11(54), 132-141. <https://doi.org/10.34069/AI/2022.56.08.14>
- Kravchuk, N. O., Rymar, O. G., & Bortnik, N. V. (2023). Economics as one of the areas of development of the post-war economy of Ukraine. *Market Economy: Modern Management Theory and Practice*, 21(3(52)), 155-169. [https://doi.org/10.18524/2413-9998.2022.3\(52\).275799](https://doi.org/10.18524/2413-9998.2022.3(52).275799)
- Kryvoshein, V. (2023). Transformation of Political Perceptions in the Age of Information Technologies: Analysing the Impact on Political Beliefs. *Future of Social Sciences*, 1(3), 20-32. <https://doi.org/10.57125/FS.2023.09.20.02>



- Ministry of Digital Transformation of Ukraine. (2023). *Results of digital transformation in the regions of Ukraine for 2023*. <https://thedigital.gov.ua/news/rezultati-tsifrovoi-transformatsii-v-regionakh-ukraini-za-2023-rik>
- Mukhalchenko, M., Zhuravlova, I., Zhalinska, I., Saienko, V., & Ovander, N. (2023). Digital tools for anti-crisis management of enterprises: the Ukrainian case. *Amazonia Investiga*, 12(64), 291-299. <https://doi.org/10.34069/AI/2023.64.04.30>
- National Institute for Strategic Studies (2023). *Ukraine-2030. Strategy for changing the future*. <https://niss.gov.ua/sites/default/files/2020-12/ukraine-2030-1.pdf>
- Official website of the State Statistics Service of Ukraine (2024). *Gross domestic product (1990-2022)*. https://www.ukrstat.gov.ua/operativ/operativ2020/vvp/vvp_rik/arh_vvp_rik_90-18u.htm
- Pichkurova, Z. (2023). Development of Ukraine's digital economy under martial law. *Economy and society*, (58). <https://doi.org/10.32782/2524-0072/2023-58-73>
- Project of the Recovery Plan of Ukraine. (2023). *Materials of the working group "Recovery and development of the economy"*. <http://surl.li/hvidlq>
- Rogozyan, Yu.S., & Vakhlovski, V.V. (2023). Theoretical and methodological aspects of assessing the effectiveness and efficiency of digitalisation of the economy of local territories of Ukraine in wartime and post-war times. *Academic Visions*, 19. <http://dx.doi.org/10.5281/zenodo.7989723>
- Shapoval, N., Fedoseyenko, M., Grybanovskiy, O., & Tereshchenko, O. (2022). Post-war reconstruction of Ukraine. *New markets and digital solutions*. KSE. <https://kse.ua/wp-content/uploads/2022/09/Digital-instruments-in-Ukrainian-recovery.pdf>
- Silvia, B. (2023). Modern Digital Technologies and AI ethics: Moral Relevance. *Future Philosophy*, 2(3), 71-85. <https://doi.org/10.57125/FP.2023.09.30.05>
- Sosnin, O. (2020). *Digitization as a new reality of Ukraine*. Lexinform. <https://lexinform.com.ua/dumka-eksperta/tsyfrovizatsiya-yak-nova-realnist-ukrayiny/>
- Strutynska, I. V. (2019). Definitions of the term "digital transformation". *Black Sea Economic Studies*, 2, 91-96. http://bses.in.ua/journals/2019/48_2_2019/19.pdf
- Tsekhmister, Y. V., Kotyk, T. M., Matvienko, Y. S., Rudenko, Y. A., & Ilchuk, V. V. (2021). La efectividad de la tecnología de realidad aumentada en la educación STEAM. *Apuntes Universitarios*, 12(1), 250-267. <https://doi.org/10.17162/au.v11i5.932>
- Tulchynska, S.O., & Dergalyuk, M.O. (2022) The impact of digitalisation on the activation of the potential of regions in modern conditions. *Business, Innovations, Management: Problems and Prospects: Coll. Theses III International Science and Practice Conf.* (Kyiv, December 8, 2022). Kyiv: KPI named after Igor Sikorskyi; Polytechnic Publishing House. <https://confmanagement-proc.kpi.ua/article/view/272018>
- UNIAN Information Agency (2022). *Ukraine's GDP fell by 29.2% by the end of 2022 - Ministry of Economy*. <https://acortar.link/UelliL>
- Voloshina-Sijdei, V., Yevseeva, O., Maslyan, O., Syrtseva, S., Nesterenko, O., & Harkusha, S. (2023). Strategic guidelines for the development of the economy in the conditions of global challenges and military aggression (Ukrainian case). *Financial and Credit Activity Problems of Theory and Practice*, 1(48), 219-228. <https://doi.org/10.55643/fcaptop.1.48.2023.3942>
- Zhukovska, V., Goi, V., Cherednychenko, V., Zabolotna, O., & Shyshliuk, V. (2023). Retos económicos de la propiedad intelectual en la era digital: aspectos jurídicos, económicos y sociales. *REICE: Revista Electrónica De Investigación En Ciencias Económicas*, 11(21), 235-262. <https://doi.org/10.5377/reice.v11i21.16553>



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History as a weapon: narratives and propaganda in the Russo-Ukrainian war


Історія як зброя: наративи та пропаганда російсько-української війни

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
Abstract


The Russian-Ukrainian war highlights the role of historical memory as a tool for shaping public sentiment and legitimizing political action. This study investigates how historical narratives are used in the information war between Russia and Ukraine, and the means employed to manipulate historical memory. Through content analysis of scientific literature and data synthesis, the research reveals how the Kremlin regime re-appropriates historical concepts, particularly the history of Rus' and the victory in World War II, to promote a distorted historical memory and justify its aggressive policies. The selective presentation of historical facts, coupled with the active dissemination of manipulated information through digital technologies, underscores the destructive potential of historical memory as a weapon in modern hybrid warfare. Special emphasis is placed on the history of Rus, which in modern


Анотація


Російсько-українська війна підкреслює роль історичної пам'яті як інструменту формування суспільних настроїв та легітимізації політичних дій. Це дослідження досліджує, як історичні наративи використовуються в інформаційній війні між Росією та Україною, а також засоби, що використовуються для маніпулювання історичною пам'яттю. За допомогою контент-аналізу наукової літератури та узагальнення даних дослідження показує, як кремлівський режим перепривласнює історичні концепції, зокрема історію Русі та перемогу у Другій світовій війні, для сприяння викривленню історичної пам'яті та виправдання своєї агресивної політики. Вибіркова презентація історичних фактів у поєднанні з активним поширенням маніпульованої інформації за допомогою цифрових технологій підкреслює

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Russian propaganda is understood in accordance with the old Soviet paradigms. Another important aspect is the mythologised idea of victory in the Second World War. The conclusions indicate that Russian propaganda selectively presents historical facts, focusing on selected events, which contributes to the formation of distorted historical memory.

Keywords: historical memory, Russian-Ukrainian war, propaganda, Rus, manipulation.

деструктивний потенціал історичної пам'яті як зброї в сучасній гібридній війні. Особливий акцент робиться на історії Росії, яка в сучасній російській пропаганді розуміється відповідно до старих радянських парадигм. Іншим важливим аспектом є міфологізована ідея перемоги у Другій світовій війні. У висновках зазначено, що російська пропаганда вибірково подає історичні факти, акцентуючи увагу на обраних подіях, що сприяє формуванню спотвореної історичної пам'яті.

Ключові слова: історична пам'ять, російсько-українська війна, пропаганда, Русь, маніпуляції.

Introduction

In the history of mankind, military events have always been accompanied not only by physical battles but also by hybrid information wars (Sanetra-Półgrabi, 2022). One of the most important tools in these wars is historical memory, which is used as a kind of tool or weapon to shape public sentiment or legitimise political actions and even mobilise society. In the current Russian-Ukrainian war, historical memory plays an important role in creating narratives that, on the one hand, prove to Ukrainians their importance in history, and, on the other hand, can justify aggression by creating images of the enemy. Historical memory becomes a "weapon of war" in the framework of the use of propaganda and disinformation through the manipulation of past facts to justify current political or military actions. In such cases, history plays the role of a special tool for the formation of national identity and the legitimization of a certain government or regime.

Since the annexation of Crimea and the outbreak of hostilities in eastern Ukraine in 2014, historical narratives have become an actively used tool. In particular, the Russian Federation, based on the concept of a 'common historical space' and the 'protection of the Russian-speaking population', is trying to justify its actions by appealing to the common past and historical justice. On the other hand, Ukraine should use historical arguments to emphasise its independence, sovereignty and struggle for freedom, referring to the pages of national history and recalling periods of repression and occupation. Therefore, it is also important to identify the origins of the war and certain mythologies used in today's Russia (Kyrydon & Troyan, 2022).

It should be noted that contemporary authors have studied various theoretical aspects of the development of hybrid warfare and identified its components. Based on these results, the Russian-Ukrainian war has entered a new phase of hybrid warfare, which uses a variety of methods and techniques, including cyber warfare (Siddi, 2016). Therefore, this analysis will focus on how historical narratives are used in the information war between Russia and Ukraine, and what means are used to manipulate historical memory. Understanding these processes is important primarily for the purpose of developing effective strategies to counter disinformation and propaganda in the context of modern hybrid wars.

Theoretical Framework or Literature Review

Modern researchers have characterized various aspects of the functioning of historical memory. According to Belavusau et al., (2021) although memory laws first appeared in the context of Western Europe about thirty years ago, in the 2010s, they began to proliferate throughout Central and Eastern Europe. Contrary to its roots, this growing corpus of legislation seems to reinforce a victimization that is sanctioned by the state and aims to create a more favorable version of history in the minds of the public by legal means (Belavusau et al., 2021). Therefore, the phenomenon of historical memory occupies an important place in modern society.

Researchers who have studied other conflicts have determined that Historical Memory is becoming a "weapon of war" through the use of propaganda and disinformation through the manipulation of past facts (Belavusau et al., 2021; Bakke et al., 2024; Schwenkel, 2006). In particular, the government or certain propaganda organizations can deliberately change or distort historical facts. This is done with the aim of forming a narrative favorable to the authorities. In addition, instead of presenting a complete picture of

historical events, propaganda can focus on individual moments that ignore the true demonstration of events (Igreja, 2008; Schwenkel, 2006).

According to research by Bakke, Rickard, O'Loughlin & Toal (2024) people's impressions of past violence influence a lot of current events choose to highlight or minimize historical events according to how well they align with their current identities and worldviews. In general, modern authors have characterized various aspects of the use of history, especially in the context of hybrid warfare. Danilets (2024) described the main methods of information warfare in Ukraine, the author analyzed linguistic, cultural and historical aspects related to the information war and compared them with Ukrainian realities. Finney (2002) described the relationship between memory, identity and war, and the author also analyzed how historical memories shape national identity and influence the perception of military conflicts.

On the other hand, Kasianov (2022) identified the relationship between history, politics and memory in Ukraine in the 1990s-2000s. The author described how historical memory can be used for political purposes, and what results this has for Ukrainian identity and the current political situation. Khardel & Vyzdryk (2020) analyzed how cinema as a tool for influencing historical consciousness is used within the framework of the Russian-Ukrainian information war. The authors described the main cinematographic works that influence public opinion and historical memory.

The papers by Dunford (2023) and Dapo Thomas (2023) into an in-depth exploration of the theoretical and practical intricacies associated with hybrid warfare. The theoretical framework is meticulously outlined, elucidating the nuances of specific concepts and terms. The investigation further endeavors to clarify the signs, prerequisites, features, forms, and methods employed in the execution of a hybrid war orchestrated by the Russian Federation against Ukraine (Dapo, 2023).

Simultaneously, Latysh's (2023) paper delved into the securitization of historical memory within the Russian-Ukrainian war context. The scholar investigates the utilization of historical narratives as instruments for securitization amid the conflict, providing insights into the nuanced impact on historical narratives and memory. However, the historical conditions of the Russian-Ukrainian war through the prism of international relations are insufficiently explained in modern works. According to Latysh (2023), the historical policy of Russia in recent decades has viewed memory and history as an existential threat.

This is particularly evident in the concept of victory over Nazism in the Second World War. Thus, modern authors have characterized various aspects of the use of history during the Russian-Ukrainian war. However, this issue is not fully clarified and needs to be clarified. In particular, it is important to demonstrate certain constructed myths used in Russian history and their influence.

Methodology

This study is qualitative. Therefore, the analysis of scientific literature is taken into account as the main sources of this study.

Data collection

Data collection was carried out in stages using Prisma. First, the primary scientific and metric databases were selected: Web of Science and Scopus. Key words such as historical memory, Russian-Ukrainian war, Ukraine, narratives, history, manipulation, hybrid warfare were entered into these search databases. A total of 78 results were found. Additional databases were subsequently selected: PubMed, Jstor. The same keywords were entered. Another 41 items were found here. In total, 119 items were found.

The selection of the study was carried out in several stages. At the first stage, an initial analysis of the titles was carried out and those that were not relevant to the study were excluded (thus, the list was narrowed to 83 items). Subsequently, a full-text analysis of the selected articles was carried out and duplicates and articles written by Russian authors were excluded. Thus, the list of articles was reduced to 68 items. Next, the papers were critically analysed, including an analysis of the abstract, methodology, and results. The papers that did not meet the inclusion criteria were rejected. In particular, the authors formed 4 inclusion criteria based on content: the study describes historical narratives, hybrid warfare, historical memory, language (preference was given to English-language publications) and year of creation (emphasis is on inclusion of modern literature).

Inclusion criteria:

1. The study is written in English or contains an English-language abstract.
2. The work is devoted to the use of historical narratives.
3. The study describes the theoretical foundations of hybrid or information warfare.
4. Preference was given to publications from 2014 - the beginning of the active phase of the confrontation. Previously published works may be included if they provide an important theoretical basis.

Exclusion criteria related to such factors as scientific novelty, lack of methodology, and inconsistency with the topic of the selected research.

Exclusion criteria

1. The study has no scientific novelty.
2. The methodology for studying the problem is not described.
3. Publications that do not analyse the phenomenon of historical memory.

Thus, 33 items of literature were selected for the study (see Table 1).

Table 1.
Scheme of use of PRISMA

Identification	
N of publications found (based on databases)	119
Excluded duplicates	8
N after excluding duplicates	111
Selection	
Primary selection by titles and abstracts	83
Excluded at this stage	28
Screening	
Full-text analysis	83
Excluded due to non-compliance with the criteria	15
Inclusion	
Publications included in the qualitative synthesis	68
Exclusion of articles based on analysis of methodology and results	19
Exclusion of literature that does not have scientific novelty	16
Generally accepted for research	33

Source: Author's development

Therefore, based on the Prisma approach, 33 literature items were selected for analysis.

Data analysis

Excel software was used for data analysis. The main findings and opinions from the selected studies are presented in tables in this analysis software. The tables were divided into data such as year of publication, author, main results and conclusions. It was found that the topic of hybrid warfare was in particular demand in 2016, with many papers written in 2022 and 2023 (see Figure 1).

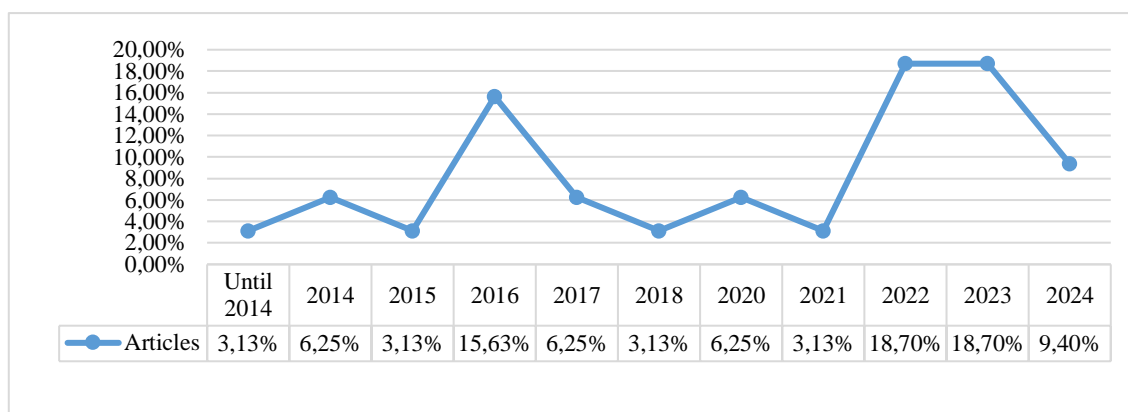


Figure 1. Diagram of writing papers related to research.

Thus, based on the Prisma approach, 32 literature sources were selected for analysis.

Data analysis

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Results and Discussion

In Russia's narratives, Moscow sees itself as the successor to Kievan Rus, which highlights the possibilities of historical and cultural ties. However, this historical narrative is challenged by Ukrainians who assert their national identity. In his study, Derviş (2023) emphasised that while the Ukrainian people do not harbour any animosity towards the Russian people, the role of patronage that Russia seeks to assert over Ukraine has never been accepted by Ukrainian society. The ongoing war between Ukraine and Russia goes beyond the usual territorial disputes that have marked the history of neighboring nations. In fact, it is a colossal confrontation with far-reaching consequences that go beyond the immediate battlefield, forever changing the geopolitical balance.

The well-known historian Zalizniak (2016) aptly called this clash a 'war of the worlds', describing it as a fierce battle between societies rooted in fundamentally different mentalities, cultural orientations, historical memory and traditions. Not only Ukrainian but also Russian philosophers, writers and historians have studied the depth of the Ukrainian-Russian mental split. Echoing these thoughts, the prominent Russian writer Alexei Tolstoy sharply distinguishes between Kyivan Rus and Moscow Rus (Shevel, 2016; Dolzhenko, 2022).

In Tolstoy's view, Kyiv's roots are in world and, at least in European terms, cultural history. In contrast, Muscovy is depicted as a desert - Taiga Rus - with Mongol influences. It should be acknowledged that the Moscow princes, acting as intermediaries between the Horde and the Rus'ian territories, fervently promoted the Golden Horde version of Eastern-style despotism. This period saw the consolidation of power dynamics, where the influence of the Golden Horde penetrated Moscow's governance structures, shaping the course of Eastern-style despotism in the region.

The 'gathering' of Rus'ian lands under Tatar patronage, as Alexander Nevsky did, meant a pragmatic approach that illustrated Moscow's reasonable orientation in geopolitical dynamics (Kominek et al., 2022).

The active spread by Moscow princes of the Golden Horde version of Eastern-style despotism reflected their commitment to the ruling structures, demonstrating their adaptability to the political realities of the time. In addition, this period of consolidation not only shaped Moscow's governance structures, but also laid the groundwork for understanding the Golden Horde's lasting influence on the trajectory of Eastern-style despotism in the historical space.

Already under Ivan IV the Terrible, the royal title was introduced, and the state ideology was reduced to the myth of the Third Rome – Moscow, which would never fall because there would be no Fourth Rome (Zhurzhenko, 2022). Coupled with the inherited Tatar centralism, Moscow's brutality escalated into a permanent war that led to a process that Russian historians would later call the 'reunification of the Russian lands'. In reality, it was a long, bloody war that ended with the conquest of the remaining Golden Horde and the beginning of the conquest of Siberia (Tolstov, 2022). Active conquest campaigns ceased after the Rurikovich dynasty faded from the Moscow throne. After a long 'Time of Troubles' in the 17th century, the Romanov dynasty came to power.

The turbulent transformations of the 1990s, marked by widespread neoliberal atomisation through consumerism and depoliticisation, have largely shaped the current shape of Russian society. This environment, of course, has become a breeding ground for the propaganda of the so-called 'post-truth'. These factors have resulted in a cynical society that is now incapable of any meaningful political participation. A general scepticism about any ideology or even morally based politics was instilled by the collapse of the Soviet Union. The Putin administration has actively cultivated this way of thinking (Todorov, 2015, pp. 74-77).

The new self-understanding that has emerged, despite the claims of various contemporary commentators, is shaped primarily by a deeply neoliberal approach to governance, in relation to an allegedly essentialist understanding of the Russian nation. This approach involves making efforts to artificially stimulate market interactions between isolated individuals, imposing utilitarian and individualistic common sense and forcing them to engage in fierce competition - an allegedly economically viable model (Wylegała, 2017; Vyhivskiy et al., 2024).

The brand of neoliberalism we see in contemporary Russia, which is inherently sceptical of left-wing politics and, as has been shown, of any morally driven thinking, is a more extreme manifestation than that which has been limited to left-wing solidarity traditions in Western countries. This form of neoliberalism denies the reality of anything that goes beyond the self-interest of individuals (Khomyakov, 2023, pp. 225-263). Such a strategy has led to inequality, promoting a depoliticised and atomised society where any public political action is systematically discouraged.

In the context of preparing the population for war through propaganda, working with an atomised society required a clear and painstaking approach. The use of history and historical memory as a propaganda tool opened up new opportunities for an aggressive state regime to use the population for its own purposes (Kappeler, 2014). To achieve this effect, special emphasis was placed on several aspects.

The coexistence was disrupted by the Mongol invasion, when, as a result of an external upheaval, the lands of Rus' were finally divided and absorbed by neighbouring states. As a result, the early modern Muscovy of the Moscow Kingdom came up with the idea of gathering the lands and reuniting them under common rule. The actualisation of this image through TV series, films (*The Viking*), cartoons (*Alyosha Popovich and the Tugarin Snake*, etc.), and the active appropriation of the history of the medieval Kyivan state and individual principalities (Chernihiv, Pereyaslav, Smolensk, Novgorod, etc.) in scientific and popular science works became a significant propaganda tool that turned historical memory into a weapon.

It is worth noting that Russian forces and pro-Russian forces in Ukraine have been preparing public opinion for a long time (Derviş, 2023). For example, in 2008, a rather odious project by the Inter TV channel held a vote for the most famous 100 Ukrainians. The victory in this 'competition' was quite unexpectedly won by Kyivan Prince Yaroslav the Wise. At the same time, Prince Yaroslav the Wise also won a similar competition on Russian television at the same time. In such an interesting and manipulative way, the idea that Ukrainians and Russians have had common heroes since the princely times was asserted.

The second important aspect was undoubtedly World War II and the victory over Nazi Germany, which is still referred to in Russian popular science as fascist (Riaño Alcalá & Uribe, 2016; Suprunenko et al., 2024). The special emphasis on the victory of Russian weapons allowed the Kremlin regime to promote the thesis that Russians could have defeated the Wehrmacht without the help of other Soviet nations (Kiss, 2014). Although this possibility is doubtful (and historical science does not operate with conditional constructions), the influx of cheerleading patriotism, large-scale rallies and parades dedicated to the anniversary of the victory over Nazism played a role in shaping an aggressive foreign policy (Vushko, 2017).

All those who disagreed with the Kremlin regime and its policies in the post-Soviet space were called 'fascists', which automatically relegated them to the status of 'enemies' whose opinions did not require attention. This glorification of the 1945 victory resulted in the deformation of historical memory, which was supported by literary fiction, relevant films, the dissemination of pre-falsified xenophobic information on social media, etc. At the same time, the facts of the USSR's open cooperation with Germany in 1939 and the first half of 1941, the importance of American assistance to the Land-Lease, the opening of the Second Front in Europe, etc. were suppressed (Kasianov, 2022). The selective presentation of information, the actualisation of only selected materials did not contribute to scientific research of the issue, and the activity of propaganda minds turned historical memory into an extremely destructive weapon that only complemented the existing Kremlin narratives.

Thus, taking into account both sides, it is obvious that Ukraine positions itself as a state that protects its sovereign rights and opposes aggressive actions and manipulations by Russia. Russia's propaganda strategies are based on the use of diplomacy and media, which it actively spreads. At the same time, Ukraine is trying to protect itself and its history. Official statements of Ukraine constantly emphasize the illegality of the annexation of Crimea and military aggression. In addition, Ukraine is actively resisting Russian informational aggression, which is trying to discredit it on the international stage. In this aspect, Ukraine is actively involving the international community in resolving the war.

Discussion

The study demonstrates that the use of historical memory as a manipulative weapon is a rather urgent problem, as it clearly links historical science to modern political authoritarian regimes. Attempts to put history at the service of politics lead to numerous distortions and falsifications, omissions and speculations, which, due to aggressive dissemination through controlled media, Internet resources and 'experts', have a destructive impact on public opinion. These results generally confirm the thesis of scholars that justifying territorial claims by historical circumstances, on the one hand, is not a new phenomenon in politics, but in the twenty-first century it has had an extremely destructive effect (Datsiuk et al., 2023), as digitalisation and the speed of information dissemination have given a completely new impetus to propaganda and information and psychological special operations.

The findings also correlate with the study by Pakhomenko, Tryma & Francis, (2018), which describes the use of historical memory as a significant tool of information warfare during the Russian-Ukrainian war. First of all, the authors focused on the events in Donbas. The authors also considered how different narratives of the past are used to manipulate public opinion and support political goals.

Modern authors have proven that Russian power structures have been trying to eradicate the historical memory of Ukrainians for centuries. In particular, the concept of "citizens" without real citizenship (Knott, 2017) – was actively used – part of the Russified population perceived themselves as Russians. These tendencies were supported by Russian propaganda – it was these people who started the confrontation in 2014, and they were the ones who could really rejoice at the annexation of the Crimean peninsula, as they were themselves immigrants or descendants of immigrants from Russia. This perception of belonging to another ethnic group was one of the reasons for the outbreak of war.

The results also demonstrate that modern Russian political elites have not altered their methods in the struggle against Ukraine. Same results has Khomyakov (2020). He described the current methods of Russian policies and wrote about modern Russian society and its agreement with Putin's mind (Khomyakov, 2020). It is important to emphasize that researchers consider multiculturalism to be one of the achievements of the Ukrainian cultural tradition (Zalizniak, 2016). This opinion is also confirmed in the results of the work.

Contrary to essentialist understandings, a distinct self-perception has emerged, shaped by a neoliberal governance approach. This approach involves creating artificial market-like interactions among individuals, promoting utilitarian and individualistic values, and fostering cutthroat competition. Khomyakov (2020) proved this thesis. Also, he wrote, that the manifestation of neoliberalism in contemporary Russia, marked by skepticism toward leftist politics and moral-driven thinking, represents an extreme departure from the leftist traditions of solidarity in Western countries (Khomyakov, 2020).

In contrast to the communist ideology's optimistic goal of "building God's kingdom on Earth," Putin's neoliberal regime operates on a pessimistic assumption that life offers no genuine happiness, only its illusion. This worldview eliminates the prospect of a freer, more democratic, or morally upright society, creating a void in meaningful political action and a conspicuous absence of values or moral ideals.

This study has certain limitations in the methodology used. First of all, only English-language scientific materials were studied. Given the criteria for selecting the literature, some works that could have made some important generalisations about the purpose of the study and demonstrated the use of historical memory as an aggressive tool could have been left out of the research. At the same time, attention has been paid primarily to the historical context, while historical memory also includes the language issue.

The active imposition of the Russian language in Ukraine is demonstrated only in passing, as a result of historical development. However, it is possible that the language issue also had its impact on historical development. Although the proposed limitations do not fundamentally affect the quality of the study and its results, they open up opportunities for further elaboration of the research problem of analysing the narratives of the Russian-Ukrainian war and the use of historical memory as a weapon and tool of propaganda.

Conclusions

Thus, Russia's propaganda tactics have demonstrated the possibility of using historical memory as an aggressive tool during the Russian-Ukrainian war. The Kremlin regime is re-using concepts that are well-known in Russian propaganda history and have gained new prominence due to the modern capabilities of digital technologies and the spread of information in the world. First of all, the thesis that the modern Russian state is the heir to Rus' with its capital in Kyiv is being re-actualised. Emphasising this historical and cultural connection denies the existence of the Ukrainian nation and Ukraine as a separate state. Such an attitude to the historical past has demonstrated that the Russian-Ukrainian war is, to a certain extent, a clash between different societies with different mental and cultural orientations.

The historical roots of this dichotomy are relevant. The Moscow princes, under the influence of the Golden Horde, were actively building an Eastern-type state with features of despotism. The aggressiveness of such an entity became clear in the Middle Ages, when many territories were captured as a result of long conquests. Another 'special' period that Russian propaganda actively emphasises is the Second World War. The use of historical memory, in particular the history of Kyivan Rus and the victory in World War II, has become a key tool of Russian propaganda. This has allowed the Kremlin to manipulate public opinion and shape its aggressive foreign policy. Russian propaganda selectively presents historical facts, focusing on selected events, which contributes to the formation of a distorted historical memory. This complements Kremlin narratives and supports aggressive policies.

At the same time, it is also worth noting that modern Russian society is shaped by a neoliberal approach to governance, which promotes atomisation and depoliticisation. Propaganda uses historical memory to manipulate public opinion and, thanks to appropriate training of the population, has had considerable success. Labelling, manipulation and glorification of Russian successes have become a significant feature of modern Russian propaganda. The use of such tools fully demonstrated its destructive potential during the Russian invasion of Ukraine, when the ideology of 'land gathering' was continued.

Bibliographic References

- Bakke, K. M., Rickard, K., O'Loughlin, J., & Toal, G. (2024). Politicizing memory: Evidence from Ukraine. *Problems of Post-Communism*, 1-20. <https://doi.org/10.1080/10758216.2024.2316037>
- Belavusau, U., Gliszczynska-Grabias, A., & Mälksoo, M. (2021). Memory laws and memory wars in Poland, Russia and Ukraine. *Yearbook of Public Law*, 69(2021), 95-117. <https://doi.org/10.2139/ssrn.3806091>
- Danilets, A. A. (2024). Means of information warfare during a full-scale war in Ukraine: The experience of the post-Yugoslav space. In *Interaction of the experience of post-Yugoslav and Ukrainian areas: Cultural, linguistic, literary, artistic, historical, and journalistic aspects*. Baltija Publishing. <https://doi.org/10.30525/978-9934-26-393-4-37>

- Dapo, T. (2023). Errand war: An observer's perspective on Russian-Ukrainian war. *The International Journal of Humanities & Social Studies*, 11(6), 123-131. <https://doi.org/10.24940/theijhss/2023/v11/i6/hs2306-022>
- Datsiuk, T., Kutska, O., Plazova, T., Hulyma, O., & Golyk, M. (2023). The historical policy plan as it relates to the progression of the Russian-Ukrainian war. *Amazonia Investiga*, 12(64), 306-314. <https://doi.org/10.34069/ai/2023.64.04.32>
- Derviş, L. (2023). Transformation of geopolitical perceptions in the Russian-Ukrainian war: Impact on regional relations in the future. *Futurity of Social Sciences*, 1(1), 21-34. <https://doi.org/10.57125/fs.2023.03.20.02>
- Dolzhenko, A. (2022). Ukrainian-Russian dimension of hybrid war: Prerequisites and features. *European Political and Law Discourse*, 9(6), 81-88. <https://doi.org/10.46340/eppd.2022.9.6.5>
- Dunford, M. (2023). Causes of the crisis in Ukraine. *International Critical Thought*, 13(1), 89-125. <https://doi.org/10.1080/21598282.2022.2163417>
- Igreja, V. (2008). Memories as Weapons: The Politics of Peace and Silence in Post-Civil War Mozambique. *Journal of Southern African Studies*, 34(3), 539-556. <https://doi.org/10.1080/03057070802259720>
- Finney, P. (2002). On memory, identity and war. *Rethinking History*, 6(1), 1-13. <https://doi.org/10.1080/13642520110112092>
- Kappeler, A. (2014). Ukraine and Russia: Legacies of the imperial past and competing memories. *Journal of Eurasian Studies*, 5(2), 107-115. <https://doi.org/10.1016/j.euras.2014.05.005>
- Kasianov, G. (2022). *Chapter 10 history, politics and memory (Ukraine 1990s – 2000s)*. In *Memory and Change in Europe* (pp. 193-211). Berghahn Books. <https://doi.org/10.1515/9781782389309-014>
- Khardel, R., & Vyzdryk, V. (2020). Cinema as a tool for influencing historical consciousness in Russian-Ukrainian information warfare. *Codrul Cosmin*, 26(2), 281-302. <https://doi.org/10.4316/cc.2020.02.001>
- Kiss, C. (2014). Historical memory in post-cold war Europe. *The European Legacy*, 19(4), 419-432. <https://doi.org/10.1080/10848770.2014.919189>
- Khomyakov, M. (2020). Russia: Colonial, anticolonial, postcolonial empire? *Social Science Information*, 59(2), 225-263. <https://doi.org/10.1177/0539018420929804>
- Khomyakov, M. (2023). Thinking of war, facing the catastrophe: The Russian-Ukrainian war. *European Journal of Social Theory*, 26(4), 514-526. <https://doi.org/10.1177/13684310231172599>
- Knott, E. (2017). Quasi-citizenship as a category of practice: analyzing engagement with Russia's Compatriot policy in Crimea. *Citizenship Studies*, 21(1), 116-135. <https://doi.org/10.1080/13621025.2016.1252714>
- Kominek, Ł., Staśkiewicz, U., & Maciąg, M. (2022). Russia-Ukraine. war? New war? Old war? *National Security Studies*, 26(4), 11-20. <https://doi.org/10.37055/sbn/152883>
- Kyrydon, A., & Troyan, S. (2022). The Russian-Ukrainian war (2014-2022). Basic preconditions and causes. *Balkan Social Science Review*, (20), 157-179. <https://doi.org/10.46763/bssr2220157k>
- Latysh, Y. (2023). Securitization of historical memory during the Russian-Ukrainian War. Scientific Papers of the Kamianets-Podilskyi National Ivan Ohienko University. *History*, (38), 178-188. <https://doi.org/10.32626/2309-2254.2022-38.178-188>
- Pakhomenko, S., Tryma, K., & Francis, J. A. (2018). The Russian-Ukrainian war in Donbas: Historical memory as an instrument of information warfare. In *The Use of Force against Ukraine and International Law* (pp. 297-312). T.M.C. Asser Press. https://doi.org/10.1007/978-94-6265-222-4_14
- Riaño Alcalá, P., & Uribe, M. V. (2016). Constructing memory amidst War: The historical memory group of Colombia. *International Journal of Transitional Justice*, 10(1), 6-24. <https://doi.org/10.1093/ijtj/ijv036>
- Sanetra-Pólgrabi, S. (2022). The philosophy of the newest development strategy in the public management in Poland: Analysis of concepts and results of implementation. *Futurity Philosophy*, 1(4), 4-15. <https://doi.org/10.57125/FP.2022.12.30.01>
- Schwenkel, C. (2006). Recombinant History: Transnational Practices of Memory and Knowledge Production in Contemporary Vietnam. *Cultural Anthropology*, 21(1), 3-30. <https://doi.org/10.1525/can.2006.21.1.3>
- Shevel, O. (2016). The battle for historical memory in postrevolutionary Ukraine. *Current History*, 115(783), 258-263. <https://doi.org/10.1525/curh.2016.115.783.258>
- Siddi, M. (2016). The Ukraine crisis and European memory politics of the Second World War. *European Politics and Society*, 18(4), 465-479. <https://doi.org/10.1080/23745118.2016.1261435>
- Suprunenko, S., Pishenina, T., Pitel, N., Voronkova, A., & Riabovolyk, T. (2024). Analysis of the impact of globalization trends in the digital economy on business management and administration systems of enterprises. *Futurity Economics&Law*, 4(2), 131-147. <https://doi.org/10.57125/FEL.2024.06.25.08>



- Todorov, I. (2015). Modern Ukrainian-Russian war: background and geopolitical dimension. *Skhid*, (3(135)). [https://doi.org/10.21847/1728-9343.2015.3\(135\).46589](https://doi.org/10.21847/1728-9343.2015.3(135).46589)
- Tolstov, S. V. (2022). The existential meaning of the Russian-Ukrainian war. In *The Russian-Ukrainian war (2014–2022): Historical, political, cultural-educational, religious, economic, and legal aspects* (p. 671–677). Izdevniecība “Baltija Publishing”. <https://doi.org/10.30525/978-9934-26-223-4-80>
- Vyhivskiy, I., Martyniuk, O., Rossokha, S., Shchupakivskiy, R., & Strunevych, O. (2024). Investigating war crimes in de-occupied territories: the role of the National Police of Ukraine. *Amazonia Investiga*, 13(78), 58-71. <https://doi.org/10.34069/AI/2024.78.06.5>
- Vushko, I. (2017). Historians at war: History, politics and memory in Ukraine. *Contemporary European History*, 27(1), 112-124. <https://doi.org/10.1017/s0960777317000431>
- Wylegała, A. (2017). Managing the difficult past: Ukrainian collective memory and public debates on history. *Nationalities Papers*, 45(5), 780-797. <https://doi.org/10.1080/00905992.2016.1273338>
- Zalizniak, L. (2016). Historical origins and civilizational preconditions of Russian-Ukrainian war of 2014-2016. *Ukrainian Studies*, (3(60)), 26-39. [https://doi.org/10.30840/2413-7065.3\(60\).2016.141199](https://doi.org/10.30840/2413-7065.3(60).2016.141199)
- Zhurzhenko, T. (2022). Legislating historical memory in post-soviet Ukraine. In *Memory Laws and Historical Justice* (pp. 97-130). Springer International Publishing. https://doi.org/10.1007/978-3-030-94914-3_5

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The influence of historical memory on the formation of national identity: a response to the challenges of the Russian-Ukrainian war

Вплив історичної пам'яті на формування національної ідентичності: відповідь на виклики російсько-української війни

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Abstract

The Russian aggression against Ukraine influenced on the role of history in war and its use. The purpose of the article is to analyze the influence of historical memory on the formation of national identity in the context of the Russian-Ukrainian war. A number of scientific methods were used, including content analysis of professional scientific literature. Based on a strict approach to data collection (7 criteria for inclusion), 35 relevant sources from the selected issues were selected. Based on Microsoft Excel, the coding of the sources was carried out. In results it is highlighted the intimate relationship between society and individuals that shapes historical memory, as well as the impact of outside events on the formation of national memory. There are obstacles in the way of this process, chief among

Анотація

Російська агресія проти України вплинула на роль історії у війні та її використання. Мета статті – проаналізувати вплив історичної пам'яті на формування національної ідентичності в контексті російсько-української війни. Для вирішення поставленого завдання використано низку наукових методів, зокрема контент-аналіз фахової наукової літератури. На основі строго підходу до збору даних (7 критеріїв включення літератури) обрано 35 актуальних джерел із обраної проблематики. На основі Microsoft Excel здійснено тематичний аналіз та кодування обраних джерел. Ці етапи сприяли якісному підходу до реалізації дослідження. У результатах висвітлено тісні стосунки між суспільством та окремими людьми, які формують історичну

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them being the misuse of political power by those with low moral standards who attempt to manipulate history and specific facts for propaganda purposes (as the current Kremlin dictatorship does). There are many different ways that historical memory affects present Ukrainians' sense of national identity. In conclusions it is concluded, that Due to international interest in Ukraine's past, historical memory has also had an impact on international processes.

Keywords: historical memory, strategies of national unity, cultural narratives, restoration of historical truth, national identity.

пам'ять, а також вплив зовнішніх подій на формування національної пам'яті. На шляху цього процесу існують перешкоди, головною з яких є зловживання політичною владою особами з низькими моральними стандартами, які намагаються маніпулювати історією та конкретними фактами в пропагандистських цілях (як це робить нинішня кремлівська диктатура). Історична пам'ять різними способами впливає на почуття національної ідентичності нинішніх українців. У висновках зроблено висновок, що через міжнародний інтерес до минулого України історична пам'ять також мала вплив на міжнародні процеси.

Ключові слова: історична пам'ять, стратегії національної єдності, культурні наративи, відновлення історичної правди, національна ідентичність.

Introduction

Historical memory is a critical element of the formation of the national identity of any nation in the world. The close relationship between historical memory and national identity is a scientifically proven fact. In particular, many contemporary works raise the issue of this connection. Contemporary authors also emphasise the importance of historical policy and historical education in the system of shaping the values of the people. However, this issue remains an object of intensive research in the discourses of various interdisciplinary studies (history, sociology, political science, philosophy, cultural studies, etc.). Given the available works, this topic has been mostly studied in the context of global transformations and other wars. However, the Russian-Ukrainian war has brought this issue to the forefront, and it requires more study. In addition, its relevance is driven by the interest in national change in critical situations (including wars), which increases the value of national identity, the most essential feature of which has been and remains historical memory (Averianova & Voropaieva, 2020). At the same time, in the realities of Russian aggression, the study of historical memory has become particularly relevant. In particular, this issue is important in terms of actualising and rethinking historical events and symbols that have become a key element in resisting aggression and maintaining national unity.

Russia's aggression against Ukraine has not only threatened the territorial integrity of the state, but also contributed to the need to strengthen the national consciousness of Ukrainians (Haranet al., 2019). Thus, this large-scale war has become an important driver for revising many historical narratives and has influenced the search for new ways to strengthen national identity. Besides, the study of historical memory is particularly important. The study of the role of historical memory in the formation of national identity in the context of the Russian-Ukrainian war is also important in terms of analysing the main mechanisms of cultural resistance and preservation of national unity. At the same time, such research will require taking into account the existing limitations: the theoretical nature of many studies, taking into account certain criteria for the selection of literature, according to which certain scientific developments could be overlooked.

Thus, the purpose of this paper is to study the impact of historical memory on the formation of national consciousness in the context of the Russian-Ukrainian war. Thus, this paper will help to find out how certain historical events can influence the formation of modern Ukrainian society. The practical significance of this work consists in summarizing certain scientific experience in the interpretation of the influence of historical memory on the evolution of national identity, which can be useful when writing textbooks, generalizing monographs, reporter studies.

Literature Review

The issue of the impact of historical memory on the formation of national identity has attracted the attention of many scholars. At the same time, a number of contemporary studies have focused on analysing the

historical aspect of the formation of Ukrainian national identity. Contemporary works on the impact of war on national identity include those by Himka (2015) and Kasianov (2023). Kuzio (2018) describes how war contributes to redefining national identity and strengthening national unity. The author found that the war with Russia was an important stimulus for the formation of new national myths and new heroes. Smoor (2017) characterised the different narratives that explain the Ukrainian crisis. The author explored the issues of identity and regional diversity. This study is important because it describes the influence of different historical, cultural and political factors on the understanding of the war.

The researchers also singled out episodes of the outbreak of war from 2014 as a component of the post-colonial status of Ukraine after the collapse of the USSR. The authors described the main transformations in the system of national identity and political preferences of local residents. Sasse & Lackner (2018) described the impact of the war in Donbas on the formation of national identity of the region's residents. Törnquist-Plewa & Yurchuk (2017) identified the role of memory politics in contemporary Ukraine from a postcolonial perspective. The authors described the impact of historical memory on the formation of national identity and political legitimacy. They also identified the role of past narratives in shaping contemporary political discourses. Wood et al. (2015) identified the main causes and circumstances of Russia's war against Ukraine. In particular, the authors drew attention to historical, political and economic factors. In general, researchers consider the deployment of hostilities in Ukraine to be a planned action by the Russian regime, which, however, had accomplices among the local Ukrainian population, which did not come out of the post-Soviet paradigm.

Separately, it is worth pointing out the importance of research on the formation of historical science for Istrian politics and nation-building. Vushko (2017) described the role of historians in shaping the politics of memory in Ukraine during the war. The author identified the importance of historians using their work to influence political debate and identity formation. Wylegała (2017) described the complex management of the past in Ukraine through collective memory and public debate. Some researchers also consider the formation of historical politics as part of modern democratic values (Goshovska et al., 2022), but the role of professional historians in this process remains decisive. Thus, the authors characterized various theoretical aspects of historical memory and national identity formation. However, research gaps include an analysis of the conceptual understanding of historical memory, research trends in understanding its impact on nation-building processes in general. These issues determine the value of this study.

Methodology

The type of this study is qualitative. It involved the use of content analysis of contemporary literature on historical memory, historical politics, factors shaping national consciousness and specific issues of the Russian-Ukrainian war. However, the method of content analysis has its limitations - first of all, we are talking about the importance of comparing the received research hypotheses with existing statements in other studies.

Data collection

First, the main scientific and metric databases were selected: Web of Science and Google Scholar. They were chosen because they contain peer-reviewed articles. In addition, Google Scholar has a user-friendly interface for searching for sources. Key words such as 'Russian-Ukrainian war', 'historical memory', 'historical education', 'historical policy', 'national consciousness', 'identity' were entered into these search databases. The works whose titles corresponded to the research topic were selected. The initial result of the found works was 1034. Initially, the sources that did not relate to the realities of Ukraine were excluded (this did not apply to fundamental theoretical studies).

Also, those results that contained little meaningful information were excluded: articles of up to 5 pages. This resulted in 578 results. After that, the range of sources was reduced, as only papers published in the last 10 years were taken into account. Also, as a result of a detailed analysis of the abstracts, we selected those sources that contained scientific value and information from which could be further used for further research. The main list of sources was reduced to 234 items. The following inclusion criteria were then applied to the selected sources:

1. Relevance: the study should provide valuable and relevant information.

2. The study provides information on the peculiarities of the formation of the concept of national consciousness.
3. The study provides a thorough review of the importance of historical memory.
4. The research described the factors in the formation of national consciousness.
5. The paper identified theoretical aspects of historical memory in the realities of the Russian-Ukrainian war.
6. The research is written in English (or at least has an English-language abstract).
7. The work presents a clear and step-by-step course of research implementation.
8. The study has a detailed methodology.
9. Preference was given to articles published in peer-reviewed journals.

Thus, 35 items of scientific literature were selected using these criteria. Table 1 demonstrates all the stages and process of selecting materials for the study.

Table 1.
Stages and processes of selecting of the materials

S	Description	N
1	Selection of scientometric databases (Web of Science, Google Scholar)	N/A
2	Entering keywords ('Russian-Ukrainian war', 'historical memory', 'historical education', 'historical policy', 'national consciousness', 'identity') into databases	N/A
3	Initial result of the found works	1034
4	Elimination of sources that did not relate to the realities of Ukraine (except for fundamental theoretical studies) and articles up to 5 pages	578
5	Selection of papers published in the last 10 years and detailed analysis of abstracts	234
6	Application of the inclusion criteria:	N/A
6.1	Relevance of the study	-15
6.2	Information on the peculiarities of the formation of the concept of national consciousness	-56
6.3	A thorough review of the importance of historical memory	-34
6.4	Description of the key factors in the formation of national consciousness	-21
6.5	Identification of theoretical aspects of historical memory in the realities of the Russian-Ukrainian war	-18
6.6	Availability of an English-language annotation or article written in English	-16
6.7	Clear and step-by-step implementation of the research	-21
6.8	Detailed methodology	-10
6.9	Preference for articles published in peer-reviewed journals	-8
7	Final list of selected sources	40

Source: Authors' development.

Thus, the collection of materials for the study involved the use of clear and strict inclusion criteria. This, in turn, resulted in 35 of the most relevant and scientifically valuable papers.

Data analysis

Microsoft Excel software was used to process and analyse the data. Data such as author, year of publication, concept of national consciousness/concept of historical memory, and main conclusions are entered in each table. This allowed for thematic analysis and, in some cases, coding. For the latter, the main themes for coding the texts were first identified: historical memory, national identity, war, historical politics, and national symbols. After collecting the data, the textual information was coded. This was done by assigning certain codes to text fragments in accordance with the previous themes. This was done manually without any special software. Once the coding was done, the authors of the article proceeded to the analysis. At the analysis stage, the main relationships between the categories were identified. The final stage was the interpretation of the results. Discourse analysis was also used for this purpose - a scientific method, the essence of which is to determine not only the opinions of scientists, but also the context in which they were created.

Results and Discussion

It is worth noting that there are differences in scientific views on how historical memory should be understood, what its theoretical and methodological foundations of functioning are. Some scholars

emphasise that the concept of historical memory is the ability of the human mind to preserve individual and collective experiences of human relationships, forming, on the basis of this synthesis, an idea of history as a whole and one's personal place in it (Kulyk, 2016). This implies that historical memory is an important link for social development and identification within society, both at the individual level of the community and the wider collective.

In such circumstances, historical memory (both individual and collective) is the result of a joint interaction between the individual and social environments. In the absence of such interaction, the phenomenon of historical memory disappears. At the same time, other researchers point out that historical memory is not only the concept of mass knowledge about the past, but also the process of understanding the past as a certain kind of heritage that turns into an instrumental value (Markovych & Maraieva, 2024). As soon as memory becomes an organic part of the system of searching for identities, questions of objectivity become secondary. In such circumstances, 'abuse of memory' is possible, i.e. the creation and use of memory as a mechanism of ideological warfare (Mälksoo, 2015).

The researchers emphasise that the politics of memory in such circumstances should be analysed not only as an epistemological concept, but also as an ethical concept (Prayogi, 2024). The third group of scholars points out that historical memory, as a national-political element, is the basis for the further formation of nationality and national identity (Klymenko, 2022; Pyrohovska et al., 2024). Given the commonality of images of the past, which are approximately equally shared by millions of citizens who identify themselves with the victories and defeats of their predecessors, with the presence of common heroes, certain sacred locations for national memory, certain common achievements of folk culture, etc., a unified view of history and its features is created.

Representatives of this group of researchers argue on the basis of theoretical studies that the historical memory of each individual nation is not a stable category, so each new challenge inevitably leads to a certain reaction, adjustment of this type of memory, which accordingly leads to certain changes in the consciousness and national identity of its bearers.

In fact, the emergence of crises on the historical path of development leads to an interest in history, which often tries to find answers to questions about the sources of existing challenges. Relevant in this particular context are the opinions of scholars that the experience of modern processes of nation-building points to the following process: counteracting the growth of crisis phenomena and overcoming them in terms of national identity is directly related to the actualisation of the development of historical memory, its consolidation and unifying properties (Barrington, 2022).

Any national projects generate requests for the creation of a projection in historical memory that would fulfil the mission of a national identity framework in difficult conditions. In addition, the state organism, along with the capabilities of intellectual and political elites, becomes the main subject for creating this kind of public demand, an important part of which is the creation of the nation's historical memory.

In such circumstances, historical memory becomes the basis for further formation of national consciousness (Arel, 2018). The interconnections between historical memory and national consciousness can be significantly traced on the basis of the pan-European experience, which is also relevant in the realities of the Russian-Ukrainian war. Certain peculiarities of this process were manifested, first of all, in certain possibilities of sacralisation of historical traditions (the importance of religious components in historical consciousness), a characteristic combination of mythological and scientific components in the process of nation-building, the influence of mythological on the formation of the scientific historical sphere, excessive attention to understanding the distinctive features of historical development, especially the stages of the state component of such development (Hruzevskyi, 2023; Gai et al., 2024).

The increased attention to Ukraine's state development during the Russian aggression played a role. First of all, we are talking about the emphasis on the history of Rus and the Cossacks as an integral part of Ukraine's state development, and the emphasis on the liberation struggle after the fall of the Russian Empire. These periods are particularly important for the historical memory of Ukrainians, as they allow us to emphasise the development of the national idea that led to the restoration of independence in 1991 and further independent development.

In the context of the Russian-Ukrainian war, the historical memory of Ukrainians played an important role. It is worth agreeing with researchers who emphasise that part of the Ukrainian national idea is based on the historical past, which has prevented the spread of misinformation about the inferiority of Ukrainian history and its traditional statelessness. The specific impacts of historical memory can be summarised in Table 2.

Table 2.

Influences of historical memory on the national identity of Ukrainians (consequences of Russian aggression)

Effect	Description	Scientific literature
Increased role of national identity in the lives of Ukrainians	The Russian-Ukrainian war led to further consolidation of Ukrainian society around the defence of the ideas of sovereignty and Ukrainian independence. Given the peculiarities of modern social development, until 2022, some Ukrainian citizens identified themselves by their Soviet or even Russian identity. As a result of the war, the percentage of such citizens has decreased to a minimum. Accordingly, the popularity of Ukrainian statehood and its symbols has increased.	Budrytė (2018); Latysh (2023); Halytska-Didukh et al. (2023).
Interest in the historical past	The war has led to a certain reconsideration of the role and significance of historical events and figures of the Ukrainian past. Accordingly, public interest in studying the real-life heroes of Ukrainian history, in particular those who had long been banned from study by the Soviets, has increased. This interest in the past has also led to the promotion of historical truth and the holding of relevant events: research, documentaries and feature films, exhibitions, etc.	Nashyvochnikov (2023); Pakhomenko, Tryma and Francis (2018).
Changes in the meaning of history in educational and cultural initiatives	The introduction of an additional educational load aimed at emphasising the role of history was also a consequence of Russian aggression. Such processes have been gradually unfolding since 2014, when the Kremlin regime occupied the Crimean Peninsula and launched hybrid warfare, but have become much more relevant after 24 February 2022. Methodological developments have been made to new textbooks and curricula that address the issues of Ukrainian national self-determination. Similarly, cultural initiatives have also become more relevant, aimed not only at shaping historical memory among Ukrainians, but also at influencing the foreign lobby and its formation.	Lauer (2017); Blau (2020); Goshovska et al. (2022)
Psychological consequences	National memory has led to a strengthening of the processes of social cohesion, further creation of national identity and its markers.	Navalpotro, Andriichenko, Popova and Sytdykova (2023)
International role of historical memory	In the context of Russia's invasion of Ukraine, the demonstration of Ukraine's independent statehood led to the formation of a positive image of the state in the international arena, presenting Ukraine as a long-standing part of the European environment with strong democratic elements. This made it possible to counter Russian propaganda.	Krasnodemska and Chechelnytska (2022).

Source: Authors' development.

Therefore, the purpose of the study was to investigate the impact of historical memory on the formation of national identity as a result of responding to the challenges of the Russian-Ukrainian war. It is demonstrated that understanding the impact of historical memory and its functioning during martial law has its own specifics (Kasianov, 2023). In particular, it is proposed to support the version of researchers that counteracting the growth of crisis phenomena and overcoming them in terms of national identity is directly related to the actualisation of the development of historical memory, its consolidation and unifying properties. History has become a convenient field for addressing the nation to demonstrate its independence and historical rights to development.

The study emphasizes how important it is to incorporate historical memory into school curricula in order to foster a more profound comprehension of the country's past. Diverse historical narratives that reflect

many locales, ethnic groups, and social experiences should be encouraged by public policies. By avoiding prejudices that might cause social divisions, this encourages critical thinking and assists students in forming a balanced perspective of history. A more inclusive, pluralistic society can be achieved by designing educational programs to promote contemplation on historical events and their relevance today.

The Russian aggression, as researchers rightly note, contributed to the interest of Ukrainians in their past (Arel, 2018). The findings also support the researchers' hypotheses that the development of Ukrainian historical memory has also attracted interest from European environments, as understanding Ukraine as an integral part of the European democratic world revives interest in its history in general (Kuo & Marwick, 2021). The findings also confirm the conclusions of other scholars, in particular that as a result of Russian aggression, Ukrainians have only begun to take a real interest in their past (Mieliekiestsev, 2022). Thus, the further impact of historical memory on nation-building still needs to be studied, as this dynamic process will only gain momentum.

The results also confirm the views of scholars on the problem of manipulation in the formation of national memory. Selected (partly fictionalised and glorified) problems from history can be used for political purposes of the present (Oleksienko et al., 2020). After all, the examples of the Nazi regime in Germany and the Fascist government in Italy show that the glorification of the past is part of the propaganda machine in the hands of totalitarian regimes (Dreyer, 2018).

A similar model existed in the Soviet Union, and propagandists in the Russian Federation work in the same way today. These results point to the seriousness of the moral and ethical challenge that is underestimated in research. For example, scholars emphasise the importance of researching true history, which will form the basis of historical memory, but do not explain what to do with deliberate manipulators who pursue unethical goals (Marzęda-Młynarska, 2023; Dreyer, 2020). Besides, the using of history as a tool in political games has become particularly widespread during the Russian-Ukrainian war. Besides, the Russian authorities' attempts to prove that independent Ukraine never existed directly point to special manipulations that can glorify one nation while denying the existence of other.

The proposed methodology, however, has certain limitations. First of all, the most up-to-date research in the field of historical memory formation was used (respectively, the literature published after 2014). This may lead to certain subjective assessments of the material, since this was the beginning of Russian aggression and, accordingly, the actualisation of the historical memory of Ukrainians. Against this background, the 'pre-war' ideas about the formation of historical memory as a structural element of nation-building were left out. This limitation was deliberately made to emphasise the role of war in nation-building processes. One of the main limitations of content analysis is its dependence on the researcher's interpretation. Researchers may interpret the meaning of words, phrases, or content differently, which may lead to differences in results. At the same time, the stages of the formation of Ukrainian national memory before 2014 could be the subject of a separate study.

Conclusions

Therefore, the analysis of the impact of historical memory on the formation of national identity, as a result of the crisis challenge of the Russian-Ukrainian war, showed significant changes in Ukrainian society. The main focus was on the study of the concept of historical memory, which is part of the national life of our time. In particular, the study emphasised that historical memory is the result of close interaction between society and individuals: as a result of this interaction and the influence of external circumstances, national memory is formed. This process has its challenges, primarily related to the abuse of political elites, who, due to their low level of morality, will try to use history and certain facts for propaganda (as the current Kremlin regime does).

The impact of historical memory on the national consciousness of modern Ukrainians is characterised by multifaceted effects. In particular, there is a gradual increase in the role of national identity, as a result of which almost all Ukrainian citizens adhere to Ukrainian identity (for a long time there was a problem of citizens with Soviet or even Russian identity in Ukraine). Russian aggression (including information) has led to interest in the Ukrainian historical past. The Russian-Ukrainian War should be taught in historical education in a fair, multi-perspective manner, highlighting both Ukrainian resistance and global reactions to the conflict. By exposing pupils to a range of perspectives, such as those of troops, citizens, and foreign observers, this method would foster critical thinking. Avoiding one-dimensional narratives, educational

materials should critically analyze the war's causes, the geopolitical environment, and the human cost of the fight.

Educational and cultural initiatives have also changed, becoming more Ukraine-centric, focused on educating Ukrainians and emphasising the Ukrainian mentality. The role of historical memory has also had an impact on international processes, as interest in the Ukrainian past is also known abroad. To meet this demand, additional publications and research are being carried out, which indirectly affect Ukrainian historical memory as well.

Bibliographic References

- Arel, D. (2018). How Ukraine has become more Ukrainian. *Post-Soviet Affairs*, 34(2-3), 186-189. <https://doi.org/10.1080/1060586x.2018.1445460>
- Averianova, N., & Voropaieva, T. (2020). Transformation of the Collective Identity of Ukrainian Citizens After the Revolution of Dignity (2014–2019). *Kyiv-Mohyla Humanities Journal*, (7), 45-71. <https://doi.org/10.18523/kmhj219654.2020-7.45-71>
- Barrington, L. (2022). A New Look at Region, Language, Ethnicity and Civic National Identity in Ukraine. *Europe-Asia Studies*, 74(3), 360-381. <https://doi.org/10.1080/09668136.2022.2032606>
- Blau, A. (2020). How (not) to use the history of political thought for contemporary purposes. *American Journal of Political Science*, 65(2), 359-372. <https://doi.org/10.1111/ajps.12545>
- Budrytė, D. (2018). Memory, War, and Mnemonical In/Security: A Comparison of Lithuania and Ukraine. In *Crisis and Change in Post-Cold War Global Politics* (pp. 155–177). Springer International Publishing. https://doi.org/10.1007/978-3-319-78589-9_7
- Dreyer, N. (2018). Genocide, Holodomor and Holocaust Discourse as Echo of Historical Injury and as Rhetorical Radicalization in the Russian-Ukrainian Conflict of 2013–18. *Journal of Genocide Research*, 20(4), 545-564. <https://doi.org/10.1080/14623528.2018.1528740>
- Dreyer, N. (2020). Genocide, Holodomor and Holocaust Discourse as Echo of Historical Injury and as Rhetorical Radicalization in the Russian-Ukrainian Conflict of 2013–18. In *The Holocaust/Genocide Template in Eastern Europe* (pp. 63–82). Routledge. <https://doi.org/10.4324/9780429356407-4>
- Gai, L., Hruzevskyi, O., Kahliak, M., Kobyl'nyk, S., & Tarasov, Y. (2024). Strategies to Minimise Allergic Conditions in Wounded Servicemen Using the Latest Methods and Drugs. *Futurity Medicine*, 3(2). <https://doi.org/10.57125/FEM.2024.06.30.06>
- Goshovska, V., Kisiel, I., Lukina, L., Gorulko, O., & Nehulevskyi, I. (2022). Development of democratic values as a basis for the consolidation of modern Ukrainian society. *Amazonia Investiga*, 11(57), 221-231. <https://doi.org/10.34069/ai/2022.57.09.23>
- Halytska-Didukh, T., Salata, S., Nashyvochnikov, O., Leyla, D., & Solovei, H. (2023). Emergence of modern historical policy in the Russian-Ukrainian war context: Assessing transformations in global order paradigms and present challenges. *Amazonia Investiga*, 12(68), 141-150. <https://doi.org/10.34069/ai/2023.68.08.13>
- Haran, O., Yakovlyev, M., & Zolkina, M. (2019). Identity, war, and peace: public attitudes in the Ukraine-controlled Donbas. *Eurasian Geography and Economics*, 60(6), 684-708. <https://doi.org/10.1080/15387216.2019.1667845>
- Himka, J.-P. (2015). The History behind the Regional Conflict in Ukraine. *Kritika: Explorations in Russian and Eurasian History*, 16(1), 129-136. <https://doi.org/10.1353/kri.2015.0008>
- Hruzevskyi, O. (2023). A Systematic Analysis of the Impact of the Military Conflict on the Distance Education System in Ukraine. *E-Learning Innovations Journal*, 1(1), 71-87. <https://doi.org/10.57125/ELIJ.2023.03.25.04>
- Kasianov, G. (2023). *Nationalist Memory Narratives and the Politics of History in Ukraine since the 1990s*. Nationalities Papers, 1-20. <https://doi.org/10.1017/nps.2023.10>
- Klymenko, L. (2022). The Role of Historical Narratives in Ukraine's Policy Toward the EU and Russia. In *Historical Memory and Foreign Policy* (pp. 31–47). Springer International Publishing. https://doi.org/10.1007/978-3-031-15194-1_3
- Krasnodemska, I., & Chechelnytska, H. (2022). Events in eastern and southern Ukraine in retrospect of post-soviet relations. *Cuestiones Políticas*, 40(73), 506-526. <https://doi.org/10.46398/cuestpol.4073.28>
- Kulyk, V. (2016). National Identity in Ukraine: Impact of Euromaidan and the War. *Europe-Asia Studies*, 68(4), 588-608. <https://doi.org/10.1080/09668136.2016.1174980>
- Kuo, R., & Marwick, A. (2021). *Critical disinformation studies: History, power, and politics*. Harvard Kennedy School Misinformation Review. doi: <https://doi.org/10.37016/mr-2020-76>

- Kuzio, T. (2018). Euromaidan revolution, Crimea and Russia–Ukraine war: why it is time for a review of Ukrainian–Russian studies. *Eurasian Geography and Economics*, 59(3-4), 529-553. <https://doi.org/10.1080/15387216.2019.1571428>
- Latysh, Y. (2023). Securitization of historical memory during the Russian-Ukrainian War. Scientific Papers of the Kamianets-Podilskyi National Ivan Ohienko University. *History*, (38), 178-188. <https://doi.org/10.32626/2309-2254.2022-38.178-188>
- Lauer, C. (2017). In praise of forgetting: historical memory and its ironies. *International Affairs*, 93(3), 727-728. <https://doi.org/10.1093/ia/iiv015>
- Mälksoo, M. (2015). ‘Memory must be defended’: Beyond the politics of mnemonical security. *Security Dialogue*, 46(3), 221-237. <https://doi.org/10.1177/0967010614552549>
- Markovych, O. V., & Maraieva, U. M. (2024). The formation of national identity of Ukrainians in the conditions of war. In *Topical Issues of Social Science under Martial Law in Ukraine*. Baltija Publishing. <https://doi.org/10.30525/978-9934-26-428-3-48>
- Marzęda-Młynarska, K. (2023). Many Narratives or a Single Voice? The Role of Historical Policy in EU–Russia Relations. *History and Politics*, (44 (51)), 9-26. <https://doi.org/10.12775/hip.2023.010>
- Mieliekiestsev, K. I. (2022). On the origins of geopolitical and information warfare preparations for the war against Ukraine by the Russian Federation in the pivotal moments of the contemporary Russian-Ukrainian relations. In *The Russian-Ukrainian War (2014–2022): Historical, Political, Cultural-Educational, Religious, Economic, and Legal Aspects* (pp. 604–611). Izdevniecība “Baltija Publishing”. <https://doi.org/10.30525/978-9934-26-223-4-72>
- Nashyvochnikov, O. (2023). Transformation of Views on the Use of the Airborne Assault Troops of the Armed Forces of Ukraine During the Russian-Ukrainian Armed Conflict (2014-2018). *Futurity of Social Sciences*, 1(1), 67-84. <https://doi.org/10.57125/FS.2023.03.20.5>
- Navalpotro, F. R. D., Andriichenko, Y., Popova, N., & Sytdykova, I. (2023). The Russian-Ukrainian War with Historical Approximation. In *Examining Colonial Wars and Their Impact on Contemporary Military History* (pp. 254–268). IGI Global. <https://doi.org/10.4018/978-1-6684-7040-4.ch016>
- Oleksiyenko, A., Terepyshchyi, S., Gomilko, O., & Svyrydenko, D. (2020). ‘What Do You Mean, You Are a Refugee in Your Own Country?’: Displaced Scholars and Identities in Embattled Ukraine. *European Journal of Higher Education*, 11(2), 101-118. <https://doi.org/10.1080/21568235.2020.1777446>
- Pakhomenko, S., Tryma, K., & Francis, J. A. (2018). The Russian–Ukrainian War in Donbas: Historical Memory as an Instrument of Information Warfare. In *The Use of Force against Ukraine and International Law* (pp. 297–312). T.M.C. Asser Press. https://doi.org/10.1007/978-94-6265-222-4_14
- Prayogi, A. (2024). How to Implement the Philosophy of History in Historiography: A Study. *Futurity Philosophy*, 3(1), 64-76. <https://doi.org/10.57125/FP.2024.03.30.04>
- Pyrohovska, V., Rezvorovych, K., Pavlichenko, I., Sushytska, Y., & Ostashova, V. (2024). Human Rights Protection in the Context of Information Technology Development: Problems and Future Prospects. *Futurity Economics&Law*, 4(1), 38-51. <https://doi.org/10.57125/FEL.2024.03.25.03>
- Sasse, G., & Lackner, A. (2018). War and identity: the case of the Donbas in Ukraine. *Post-Soviet Affairs*, 34(2-3), 139-157. <https://doi.org/10.1080/1060586x.2018.1452209>
- Smoor, L. (2017). Understanding the Narratives Explaining the Ukrainian Crisis: Identity Divisions and Complex Diversity in Ukraine. *Acta Universitatis Sapientiae, European and Regional Studies*, 11(1), 63-96. <https://doi.org/10.1515/auseur-2017-0004>
- Törnquist-Plewa, B., & Yurchuk, Y. (2017). Memory politics in contemporary Ukraine: Reflections from the postcolonial perspective. *Memory Studies*, 12(6), 699-720. <https://doi.org/10.1177/1750698017727806>
- Vushko, I. (2017). Historians at War: History, Politics and Memory in Ukraine. *Contemporary European History*, 27(1), 112-124. <https://doi.org/10.1017/s0960777317000431>
- Wood, E. A., Pomeranz, W. E., Merry, E. W., & Trudolyubov, M. (2015). *Roots of Russia's war in Ukraine*. Columbia University Press. <https://doi.org/10.7312/wood70453>
- Wylegała, A. (2017). Managing the difficult past: Ukrainian collective memory and public debates on history. *Nationalities Papers*, 45(5), 780-797. <https://doi.org/10.1080/00905992.2016.1273338>

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Morphology of evaluation: the peculiarities of modeling evaluative meanings through morphological means in the Ukrainian language

Морфологія оцінки: своєрідність моделювання оцінних значень морфологічними засобами української мови

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Abstract


This study examines the morphological means used to express evaluation in Ukrainian, drawing on a corpus of spoken language, literary texts, dictionaries, and internet resources. The analysis focuses on how evaluation is encoded in the morphology of nouns, pronouns, numerals, and adjectives, with particular attention to the use of augmentatives, diminutives, gender, and degrees of comparison. The findings reveal a rich and varied system for expressing subjective evaluation, including the frequent use of diminutive forms to soften negativity and the creative use of comparative and elative forms to express a high degree of intensity. The study also highlights the role of gender in shaping evaluative meanings and the tendency to use occasional and non-normative forms to achieve specific pragmatic effects. The research contributes to a deeper understanding of the relationship between language, culture, and evaluation, and provides insights into the unique ways in which Ukrainian speakers express their attitudes and emotions through morphological choices.

Анотація

В основі дослідження – морфологічні засоби вираження оцінки в українській мові. Наукову розвідку здійснено на основі використання корпусу розмовної мови, художніх текстів, словників та інтернет-ресурсів. Аналіз зосереджено на тому, як оцінка кодується в морфологічних категоріях іменників, займенників, числівників та прикметників; особлива увага сконцентрована на використанні збільшувальних і зменшувальних форм, категорії роду та ступенів порівняння. Результати демонструють багату та різноманітну систему вираження суб'єктивної оцінки, включаючи часте використання зменшувально-пестливих форм для пом'якшення негативу та креативне застосування порівняльного та елятивного ступенювання для вираження високого рівня інтенсивності. У дослідженні, крім того, наголошено на ролі категорії роду у формуванні оцінних значень та виокремлено тенденцію до використання оказіональних і ненормативних форм для досягнення певних прагматичних ефектів. Ця розвідка сприяє глибшому розумінню взаємозв'язку між

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Keywords: linguistics, morphology, national character, evaluation, Ukrainian language.

мовою, культурою та оцінністю, а також дає уявлення про унікальні способи, якими українські мовці виражають своє ставлення до довкілля та емоції через морфологічні засоби.

Ключові слова: Лінгвістика, морфологія, національний характер, оцінка, українська мова.

Introduction

Language, with its lexical-phraseological and grammatical systems, is a living organism that functions according to its unique and distinctive laws peculiar to each individual linguoculture. "While a speaker controls their speech using vocabulary and phraseology, selecting words and set phrases, it is the **grammar that 'controls' the speaker**" (Radevych-Vynnyts'kyj, 2001, p. 86). This is why studies dedicated to various aspects of grammar are among *the pressing issues* in modern linguistics.

The aim of this scholarly investigation is to aspectually demonstrate the features of the morphological means of the Ukrainian language that verbalize the category of evaluation. This is carried out based on the author's observations on modelling the meaning of evaluation within the discursive space of Ukrainian linguoculture (language, speech, discourse) and is manifested in the categories of nominal parts of speech (noun, pronoun, numeral, and adjective). Additionally, the study aims to reveal the relationship between the national character of Ukrainians and the specifics of modelling axiologically marked meanings.

The illustrative material of the study is based on the authors' card index (over 350 contexts), which contains *samples* of (1) *contemporary spoken language* (colloquial style, including the authors' collected recordings of oral speech), (2) *language of literary texts* (literary style), where examples of grammatical evaluative meanings are documented in the works of Ukrainian literary classics and modern writers. The study also utilizes (3) *materials from explanatory dictionaries* and bilingual dictionaries, as well as (4) *internet resources*. The chronological scope of the illustrative material spans from the 19th century to the present, including linguistic facts from the period of the Russo-Ukrainian war (since 2014), thus emphasizing a *diachronic-synchronic approach*.

In the main part of this article, we intend to present the material according to the following scheme: (1) a brief overview of the research history on the issue, taking into account tradition and innovation, problematic and debatable questions, justification of the theoretical and practical significance of the work for specific linguistic fields, as well as an indication of the limitations of research aspects and sources; (2) a review of the expressive-evaluative suffix system of the Ukrainian language (categories of diminutiveness and affectionate diminutives, which are verbalized through a quantitatively extensive system of subjective evaluation suffixes); (3) an analysis of typical connotative forms of nominal parts of speech that present non-equivalent vocabulary of evaluative semantics; (4) a description of grammatical meanings of evaluation, which point to certain mental traits of Ukrainians, particularly the features of their mentality; (5) the emphasis on the sociolinguistic factor for modeling evaluative meanings, including those related to the Russian-Ukrainian war, which are characteristic only of the Ukrainian language; (6) an interpretation of the peculiarities of evaluative ambivalence; (7) a demonstration of the axiological power of compound nouns with negative evaluative meaning, used to denote people; (8) a description of axiological-manipulative capabilities, taking into account the formation of occasional forms or grammatical neologisms based on the actualization of (a) gender and number categories of nominal parts of speech, (b) comparative and (c) relative degrees of adjectives; occasional comparative forms of (d) numerals and (e) pronouns used for modeling evaluation; (9) a summary of the material in the conclusions.

Theoretical Framework

Grammar is significant because it profoundly influences the verbalization of thought. By developing theoretical grammar, Ukrainian scholars are expanding its new branches, including *functional, social, and poetic grammar*, as well as *the grammar of appellatives* and *the grammar of evaluation*. In her exploration of the grammar of evaluation, the scientists emphasize that "evaluative functions are oriented not only towards lexical but also grammatical semantics, and the part-of-speech division of vocabulary with evaluative semantics" (Kosmeda, 2003, p. 51). In light of this, Dariya Riazantseva partially examined the

potential of adjectives for modelling evaluative meanings (Riazantseva, 2013), while Oksana Khaliman focused on studying the morphological means of the Ukrainian language through which the category of evaluation is verbalized overall (Khaliman, 2019a), without considering the stative, service parts of speech, or interjections, nor addressing the distinctiveness of national morphological forms of verbalizing the category of evaluation. Oksana Kovtun conducts research on the grammar of evaluation in the Ukrainian language, highlighting a comparative perspective and partially focusing on the morphology of the English language, considering its potential for verbalizing specifically morphological meanings of the category of evaluation (Kovtun, 2022).

The category of evaluation belongs to universal linguistic categories that manifest at all levels of the language system. Evaluation is a process that operates at every stage of human life and is uniquely verbalized in language and speech. Evaluation encompasses a wide range of multi-level linguistic units, and the axiological orientation contributes to the development of new scientific directions (Kosmeda, 2000). Evaluative activity, by its nature, has both cognitive and pragmatic manifestations. Evaluation is multifaceted: it is socially, economically, politically, spiritually, and ethnoculturally determined, which is why it is studied comprehensively, in a multi-aspect and multi-vector manner, as a category of a high level of abstraction. It belongs to the categories shaped by human society, physical and psychological nature. Axiological principles regulate the behavioural activity of social subjects; they shape ideals and norms of coexistence in society and realize integrative functions in the social context, among others. Therefore, evaluation and its verbalization are closely connected with human mentality and national character.

If *the grammar of evaluation* is a direction in Ukrainian linguistics that is distinguished within the theory of linguoaxiology and is projected onto the study of the arsenal of grammatical means of modelling evaluative meanings, considering their pragmatic characteristics, then *the morphology of evaluation* is, accordingly, projected onto the study of morphological means of expressing axiological meanings (Kosmeda, & Khaliman, 2011; Khaliman, 2019a).

Particular reflections on the peculiarities of verbalizing national mentality are understandably presented in Ukrainian linguistics, for example, in the works of Iryna Holubovs'ka (Holubovs'ka, 2004), Tetyana Kosmeda (Kosmeda, 2016b), Orest Tkachenko (Tkachenko, 2006), and Oleksandr Tsaruk (Tsaruk, 1998). However, in the works of the aforementioned scholars, there is no focus on generalizing the features of modeling grammatical (morphological) meanings as they appear in nominal parts of speech as national specificity.

The study of the features of the verbalization of the category of evaluation extends to other languages, including English. For example, Hanna Prykhodko summarizes her thoughts on the unique semantics and pragmatics of representatives of the category of evaluation, which are verbalized by means of modern English (Prykhodko, 2004; Prykhodko, 2017). This linguist also focuses on more specific issues of grammatical linguo-axiology, primarily on the description of some patterns of suffixal formations during the modeling of evaluative words in modern English (Prykhodko, 2000). However, she does not systematize grammatical meanings of evaluation and does not point out the national specificity of the English language in this regard. Oleksandra Deichakivska studies the category of evaluation through the lens of the features of the functioning of predicative adjectives in the function of expressives, demonstrating the pragmatic load of these grammatical units for modeling communicative strategies of politeness (Deichakivska, 2024). This scholar found that the actualization of politeness strategies through the use of adjective forms depends, accordingly, on the cultural context, emphasizing the need for a deeper understanding of language norms and their variations. Moreover, she demonstrated that in the process of cross-cultural communication, it is not enough to simply have a good command of the language, as it is necessary to understand the cultural differences in the use of linguistic units, particularly axiological forms, which are frequent in speech. The expression of the features of ideological evaluation can be traced in the work of Liudmyla Diachuk, who characterized the main mechanisms of manipulation of people's consciousness, which include evaluative forms; she highlighted the stereotypes of Russian propaganda based on the analysis of Russian media and blogs. As a result of her analysis, she demonstrated how, through the actualization of axiologically marked linguistic units, including euphemisms, emotionally charged vocabulary represented by different parts of speech, slogans, the actualization of hate speech, historical mythologizing, and the verbalization of falsifications, Russian propaganda justifies the war crimes of the Russian occupation army during the Russian-Ukrainian war (Diachuk, 2024). Tetyana Ivanina notes that when rendering 'diminutive-affectionate suffixes of the Ukrainian language with its well-developed system into English, which has an analytical structure, certain difficulties arise due to the lack of means to express the meaning of

diminutiveness, endearment, disdain, etc., while conveying different shades of meaning. After all, the translator must convey the phonetic, lexical, and syntactic means of the work, find not only their lexical equivalents but also take into account their connotative meaning and possible phonetic associations. Through various means, the translator must reproduce the color of colloquialism, folklore, external features, and internal qualities of the characters, which are presented through the prism of deep authorial sympathy' (Ivanina, 2010). One can agree with the idea that 'in translation practice, there can be no standard for rendering diminutives in Ukrainian into English due to the lack of developed corresponding word-formation models in the latter. In such cases, the method of lexical compensation is most often used' (Ivanina, 2010). Indeed, most connotative forms of evaluation verbalization have no equivalents when translated into other languages.

A discussion has emerged in linguistic literature regarding the degree of expressiveness of axiologicality (emotionality, expressiveness, intimacy) in individual languages, with some arguing that the most emotionally expressive and intimacy-oriented languages, where subjective evaluation is vividly verbalized, are the Slavic languages as the youngest ones, including Ukrainian. At the same time, it is believed that Romance-Germanic languages, including English, present emotional-axiological meanings less distinctly, as they are considered more perfected, more ancient, and developed languages (Tkachenko, 2006). We believe that the Ukrainian language differs from, for instance, English by the presence of more expressive grammatical axiological forms, which is evident when comparing linguistic structures. For example, the English language does not have the category of gender, and thus this category in English cannot present evaluative meanings; the number category in English is also limited in modeling evaluative meanings, which can also be said about comparative and superlative forms. As for closely related languages, such as Russian, Ukrainian stands out with specific unique ways of presenting evaluation. For example, the potential of actualizing subjective evaluation suffixes. One of the convincing examples is the following: the Ukrainian lexeme *думка* (*thought*) cannot produce a negative evaluation by attaching subjective evaluation suffixes, whereas its Russian counterpart *мысль* (*thought*) can, e.g., *мыслишка* (*insignificant thought*). In Ukrainian, such meaning cannot be reproduced because the modeling of derogatory-evaluative forms depends on the mentality of the people: for Ukrainians, *думка* (*thought*) is a concept that carries a high degree of positive evaluation, which does not allow for negative perception.

Methodology

This study is grounded in *the methodological postulates* of classical linguistics, particularly those of W. von Humboldt (Humboldt, 2018) and O. O. Potebnia (Potebnia, 1992), regarding the inseparable unity of language and thought, emphasizing the decisive role of language, as it directly influences the cognitive activity of its speakers, shaping their linguistic consciousness, mentality, worldview, and even national character. The methodology of linguoaxiology and the grammar of evaluation (morphology of evaluation) as a new linguistic direction is actualized. The article employs *the descriptive method* combined with *the classificatory approach*, which allows for the identification of a system of morphological categories that present linguistic originality in the verbalization of the category of evaluation. Additionally, *the interpretative method* is employed, which is connected with contextual and discursive analysis, aimed at formulating and characterizing the relevant morphological features and means of verbalizing the category of evaluation. The axiological method and the technique of scaling (actualization of the evaluation scale concerning the comparative and relative) are partially used, as well as the method of contrastive analysis, since linguistic facts from English linguoculture are provided to demonstrate untranslatable vocabulary. The study also utilizes *the method of morphological opposition*, along with *analysis and synthesis*, which pave the way from identifying particularities to generalization and modelling conclusions.

To confirm the theoretical postulates regarding the spread of specific morphological forms for the verbalization of the category of evaluation in the broad discursive-textual space of the Ukrainian language and its usage, we will highlight various types of discursive-textual practice (artistic, journalistic, mass media, advertising samples of speech, internet speech, as well as "live" spoken language) that represent different periods of the functioning of the Ukrainian language from the 19th to the 21st century, along with dictionary definitions.

Results and Discussion

The theoretical significance of the scientific study lies in the fact that its results allow for a deeper understanding of (1) linguoaxiology, as this article groups and systematizes the specific means of the

Ukrainian language for modeling evaluative meaning; (2) the grammar of evaluation: it demonstrates the distinctive morphological models through which the activation of evaluative meaning occurs, a feature not present in all languages; (3) the theory and practice of translation studies, as well as intercultural communication, since it involves considering non-equivalent evaluative meanings; (4) linguistic theory in general, explained by the distinction of the grammatical means of the national verbalization of the linguistic consciousness of Ukrainians, projected onto established traditions and innovations. The results of this research contribute to a deeper understanding of the connection that exists between the Ukrainian language and its linguistic culture, which consists of the presence of specific axiological markers of linguistic culture that reflect different types of evaluation. This postulate is important to consider when teaching Ukrainian as a foreign language, as mastering the specific grammatical forms for modeling evaluative meaning and activating them in the speech process is essential for adequately learning the Ukrainian language.

This study proposes only an aspectual, that is, fragmentary analysis of morphological forms, as it is impossible to present the entire system of specific axiological grammatical means for verbalizing evaluation within the confines of a single article. Therefore, only the most typical markers have been distinguished (characteristic morphemes of parts of speech with evaluative meaning that are distinguished by specific combinatorial features; as well as the categories of gender, number, comparative). This research has significant potential: to demonstrate the features of modeling evaluative meaning through the activation of verbal categories, as well as adverbs, the state category, functional parts of speech, and exclamations. The indicated material needs to be studied in direct comparison with the grammatical axiological potential of other languages, to comprehensively reveal the similarities and differences in the morphological strategies used to express evaluation during communication, as well as to determine the reasons for these similarities and differences.

Thus, we present an attempt to aspectually (based on the material of morphological categories of nominal parts of speech) demonstrate the uniqueness of the Ukrainian language in modeling evaluative meanings and, accordingly, their systemic representation. We emphasize that this phenomenon is connected, in particular, with the features of the national character and linguistic consciousness of Ukrainians. To achieve this, we draw on samples from Ukrainian artistic literature and contemporary journalistic discourse, considering traditional and modern communicative strategies, including the use of occasional forms and neologisms, and pragmatically motivated deviations, which highlight the novelty of this article.

We present an attempt to aspectually (using morphological categories of nominal parts of speech) demonstrate the uniqueness of the Ukrainian language in modelling evaluative meanings through specific morphological means and, accordingly, to systematize them, proving that this phenomenon is linked, among other things, with the peculiarities of the national character and linguistic consciousness of Ukrainians. To this end, we involve samples of Ukrainian literature, taking into account both traditional and contemporary speech, including occasional forms, neologisms, and pragmatically motivated deviations.

The expressive-evaluative suffixal system of the Ukrainian language is quite representative, characterized by the productivity of *subjective evaluative suffixes*, which carry meanings of *positive* or *negative* expressive-evaluative characteristics: it includes *augmentatives* and *diminutives*, which, with the development of emotional-evaluative meanings, evolve into *names of subjective evaluation* (Boyko & Khomych, 2018) and can provide lexemes with a variety of expressive nuances depending on the meaning of the base and contextual conditions: *diminutive-affectionate*, *diminutive-derogatory*, *augmentative-rude*, etc. (Holubov'ska, 2004, p. 53). Scholars note that in the Ukrainian language, "the mentioned formants attach to the bases of **almost all nominative parts of speech**, expressing a rather developed system of creating expressive lexical units" (bold typeface by the authors) (Boyko & Khomych, 2018, p. 37) with evaluative meaning. In particular, the Ukrainian language is characterized by an old yet productive and specific **category of diminutiveness** (smallness, triviality). Although it is characteristic of other Slavic languages as well, its realization differs among them due to functional features that are determined not only by communicative needs but also by expressive possibilities and the uniqueness of mentality: it "directly depends on the peculiarities of the national-psychic composition of the speakers of a given language" (Boyko & Khomych, 2018, p. 39), their perception of the world, and the uniqueness of its evaluation.

Analyzing articles from modern bilingual dictionaries, Ukrainian researchers have noted the quantitative significance of Ukrainian words with diminutive-mejorative suffixes, e.g.: дитина (dytyna) – дитинінка (dytynynka), дитиночка (dytynochka), дити́нонька (dytynon'ka), дитинча (dytyncha), дитинчатко

(*dytynchatko*), *дитиня* (*dytynya*), *дитинятко* (*dytynyatko*), *немовлятко* (*nemovlyatko*), *лялечка* (*lyalechka*); *хлопець* (*khlopets'*) – *хлопійко* (*khloriuko*), *хлопцюга* (*khloptsyuga*), *хлопча* (*khlorcha*), *хлопчак* (*khlorchak*), *хлопчатко* (*khlorchatko*), *хлопчєня* (*khlorchenya*), *хлопчик* (*khlorchuk*), *хлопчина* (*khlorchyna*), *хлопчинка* (*khlorchynka*), *хлопчисько* (*khlorchys'ko*), *хлопчишок* (*khlorchychok*), *хлопчище* (*khlorchyshe*), *хлоп'я* (*khloruya*), *хлоп'яга* (*khloruyaha*), *хлоп'як* (*khloruyak*), *хлоп'ятко* (*khloruyatko*), *хлоп'яточко* (*khloruyatychko*); *баба* (*baba*) – *бабуся* (*babusiya*), *бабусєнка* (*babusen'ka*), *бабусєчка* (*babusechka*), *бабуня* (*babunya*), *бабця* (*babtsya*), *бабонька* (*babon'ka*); *серце* (*sertse*) – *сердєчко* (*serdichko*), *серденько* (*serden'ko*), *сердєня* (*serdenya*), *сердєнятко* (*serdenyatko*) (only for people) (Holubovs'ka, 2004, pp. 54-55). The use of the category of smallness (affectionateness) is not only a characteristic feature of the Ukrainian language but also normative Kosmeda, 2016a; Tkachenko, 2006), which gives rise to new forms in contemporary speech, including occasional forms.

We want to highlight Ukrainian folklore traditions that present *the connotations of corresponding nouns, fixed by national consciousness, and those that do not have equivalents in other Slavic languages*, e.g.: *голубочки* (*holubochky* – about lovers), *квітонька* (*kviton'ka* – about a young girl), *ластів'ята* (*lastiv'yata* – about children), as well as *бідонька* (*bidonka*), *дубище* (*dubyshe*), *вербиченька* (*verbichen'ka*), *коханячко* (*kokhannyachko*), *лишенько* (*lyshen'ko*), *мандрівочка* (*mandrivochka*), *народець* (*narodets'*), and so on. The features of the phenomenon of connotation in a comparative aspect through the lens of English and Ukrainian languages were also noted by S. Talko, H. Minchak, D. Hmyria (Talko, Minchak, & Hmyria, 2022). The presence of such connoted non-equivalent lexicon indicates, on the one hand, the lyricism and sentimentality of Ukrainians and, on the other, the high emotionality of perception, which is clearly seen in the presence of affectionate forms in concepts that cannot be evaluated as positive from either a social or individual perspective (e.g., *вороженьки* (*vorozhen'ky*), *зрадонька* (*zradonka*)), as well as in the "speaker's desire to subjectively soften the harsh, unpleasant impressions of bad things in the surrounding reality" (Holubovs'ka, 2004, p. 57). This can serve as an additional argument in support of recognizing the Ukrainian cordocentricity and unique emotionality, which are associated with Ukraine's tragic fate, expressed by Ukrainians through the verbalization of evaluative sensitivity. For instance, in modern Ukrainian advertising discourse, we observe the modelling of nouns with the activation of both diminutive-affectionate and augmentative-derogatory suffixes simultaneously, modelling particular emotionality and attractiveness in the discourse. Moreover, such nominations are singled out into independent nominative sentences, e.g., *Мемі. Мемчики. Мемаси. Більше мемів! А як же ЗНО? Яке ЗНО??? Та це аж влітку!...* (Edera, 2020). The Ukrainians' aspiration for victory in the current Russo-Ukrainian war is reflected in the frequent use of the diminutive *переможенька* (*peremozhen'ka*) in the discursive space. For example, the title of the website section "*Переможенька*" (*Peremozhen'ka*) (City of the Sun, 2023); Volodymyr Hrebionyuk verbalized his original association by projecting the diminutive noun *переможенька* (*peremozhen'ka*) onto the name of a Ukrainian woman, embodying faith in victory, blessed by God, presenting it in poetic lines with a series of diminutives: *А як звати тебе, Доню, / Донечко маленька? / Нам цікаво дуже-дуже! / – Мене звати – Женька! / – А як звучить повне ім'я, / Яке дав наш Боженька? / – Повне ім'я таке в мене: / Звучить – Переможенька!!!* (Grebionyuk, 2023). Based on the graphical technique of capitalization presented within the word (a type of graphical language play), the website name *ПеремоЖенька* (*PeremoZHEN'ka*) (@elit.writer) was created. However, we also encounter partially ironic uses of the given lexeme, e.g.: *Так усе ж просто: кава не заварилася, а переможенька забарилася* (Last Bastion, 2024); *Зараз буде контрнаступ, який нікого з українців не торкнеться, станеться (звісно сама по собі за божої волі) переможенька, і купа проблем залишиться в минулому* (Glavcom, 2023); *«Це космічна переможенька»: з держбюджету виділять 90 млн гривень для просування України у світі* (New Voice, 2022). We observe evaluative ambivalence.

Orest Tkachenko emphasizes that "the Ukrainian language, especially the folk variety, is very rich in *diminutive-affectionate forms, even possible for infinitives* (e.g., in the language directed at children from the verb *купатися* (*kyuatysya*), forms such as *купці* (*kypuši*), *купці* (*kyptsy*), *купусеньки* (*kypušen'ky*))" (bold and italicized by the authors). (Tkachenko, 2006, p. 14). Diminutive suffixes are also attached to *neutral adjectival and adverbial bases*, creating lexemes with positive or negative evaluative meanings, adding an ironic or derogatory semantic tone, e.g.: *поганенький* (*rohaneen'ky*), *поганесенький* (*rohanesen'ky*), *паскудненький* (*paskudnen'ky*), *примітивенький* (*prutytyvnen'ky*), *ніякогісінький* (*niyakohis'n'ky*), *простісінький* (*prostyšin'ky*), *п'яненийкий* (*p'yaneen'ky*), *підленький* (*pidlen'ky*). Derivative expressive lexemes with augmentative-pejorative suffixes attest to the existence of a developed system of word-formation tools in the Ukrainian language, through which connotative meanings of coarseness, contempt, disdain, etc., are conveyed.

Another specific feature of the Ukrainian language is **the activity of compound nouns with a negative evaluative meaning for naming people, which is formed according to the model "verb of the 2nd person singular of the imperative mood + noun"** (Tsaruk, 1998, p. 247), e.g.: *вертихвіст*, *держиморда*, *зірвиголова*, *скалозуб* (*скализуб*), *урвиголова*, *шибайголова*, *пройдисвіт*, *дерилюд*, *знайди біда*, etc. The above mentioned lexemes have been proven to be active in the field of live folk speech, as well as in fiction texts, e.g.: *Добрий, видно, вертихвіст, та все ж таки втіха матері, є хоч до кого в хаті озватись* (Honchar, 2004); *Не боюсь я царів держилюдів, – Хоч у них є солдати й гармати* (Franko, 2005); *Дай цьому дерилюду синеньку, бо він такий, що здер з живого й мертвого* (Stelmakh, 2005); *А що можна сказати про волоцюг і пройдисвітів, які ганяють по світу вітер...?* (Zahrebelnyi, 1981). The majority of such names have a pronounced negative evaluative marking with a tone of contempt, irony, contempt, etc. **Some of them are characterized by a female correlative (feminine gender), which also presents the national Ukrainian linguistic specificity**, e.g., *вертихвістка*, *крутихвістка*, *пройдисвітка*, *шалапутка*, *шелухвістка*. The examples of a contextual use of the above mentioned lexemes: *От він і вважає нас за ні на що не здатних вертихвісток* (Юрій Шовкопляс); *Пройдисвітка зубаста знала, Чого хвостатий кум бажав* (Hlibov, 2019); *Я була хоч і гарна, але зроду вже вдалась вітрогонка та шелухвістка* (Nechui-Levytskyi, 2008). Separate composites are also of a common gender that presents the same semantics, cf.: *вертиголова*, *крутиголова*, *паливода*.

The main morphological categories of nouns include **gender**, which, accordingly, expresses a national identity in the Ukrainian language: based on the actualization of the category of gender, **original national axiologically marked images are created**, which are revealed when comparing languages since in another language it is difficult to convey such peculiar images-metaphors. A similar phenomenon can be identified in other linguistic cultures, but they still present linguistic uniqueness. For example, the Ukrainian noun *калина* – feminine: a number of symbolic meanings, associations, and connotations are based on this categorial sign, which has an exclusively positive evaluation, but on the condition that the gender meaning coincides, cf.: in traditional folklore *калина – дівчина*. In the Ukrainian linguoculture, in particular, during the period of the Russian-Ukrainian war, *калина* is not only the name of the plant but also a symbolic designation of *Ukraine as the state* (updated taking into account the meaning of the feminine gender of the nouns compared). We trace the spread of the song "Oy u luzi chervona kalyna...", written by Stepan Charnetsky (Charnetsky, 1914) based on the Ukrainian Cossack song "The Steep Banks Spilled out" (the 17th century). Therefore this song received the status of a folk song: it was performed by fighters for the freedom of Ukraine. After the beginning of the Russo-Ukrainian war in February 2022, this song received a second birth and became known all over the world. On the basis of *folklore symbolism* and actualization of *the morphological category of gender*, the national symbol is formulated: *калина – Україна*. But, for example, there is no such image in the English language, so translators mostly use the botanical term in this case: Ukr. *калина* – Eng. *viburnum*, which "levels the idea of a song and devalues the importance of this concept for the Ukrainian people" (Mykytiuk & Ursaki, 2023, p. 67). However, Steve Repa – the author of the first translation of the song – used transliteration «*Ой у лузі червона каліна – In the meadow, a red kalyna*» with the interpretation of the Ukrainian reality of *viburnum* in the comments submitted, e.g., "The kalyna – the high bush cranberry – is a symbol of Ukraine. It blooms white. In the fall it is heavy, bent over (burdened) with red berries" (Repa, 2016).

A characteristic feature of the Ukrainian language is also **an active use of neuter gender forms to verbalize positive evaluative meanings**, which is not characteristic of the majority of Slavic languages. Meanings with positive semantics are modelled by means of metaphorical transference and the creation of a positive modality, which is manifested, in particular, in dialogues between an adult and a child, cf.: *А воно, його щастячко, вже дрібно ступало босоніж курними шляхами на схід, поміж остогидлими дорфами, поміж бункерами* (Honchar, 2004); *Дякую, сонечко, що ти в мене є!* (Tarabarova, 2020). These forms, in addition to the modelling of the evaluative meaning, contribute to the intimization phenomenon of verbalization.

Nouns of masculine and neuter gender with the ending -o are also unique: they nominate negative characteristics of people mostly, e.g.: *агакало*, *базікало*, *доробало*, *дурко*, *зазнайко*, *ледащо*, *мурмило*, *невмійко*, *незнайко*, *немійко*, *хвалько*, *хизько*, *чванько*, and also **with the meaning of masculine and neuter or feminine and neuter in -иц(е)**, e.g.: *такий вовчище і таке вовчище, такий дубище і таке дубище, така ручище і таке ручище, така дівчище і таке дівчище, такий хлопчище і таке хлопчище, така свекручище і таке свекручище*.

Common gender nouns are also a special feature of the Ukrainian language. There is no doubt that these nouns present a negative evaluation of the agent mostly, e.g., *гуляка, забіяка, зайда, злюка, недоріка, недотепа, нетяма, ненажера, плакса, рева, сердеха* та под.

As we know, *the adjective* was formed as part of the language somewhat later than the noun: it has more abstract semantics. Some of its grammatical forms expressing the evaluation category also present national specificity, such as the elative category. **Elative** is a grammeme of the category of manifestation degree of adjectives and adverbs, which is an indicator of an increased intensity of the feature manifestation of an evaluative meaning. Elative is, as is known, a homonymous form to the highest degree of comparison of adjectives, which denotes an extremely high degree of quality. In Ukrainian, the elative is formed with the help of prefixes *як, що-* and superlative forms with a prefix *най-*, c.f.: *щонайменший огріх, щонайкоротший шлях, найвдаліший засіб*, etc. (Zahnitko, 2012, p. 257). The meaning of the elative indicates an extremely high, highest or maximum level of quality intensity, an apparent excess of this level compared to the "norm" of a certain subject. It is believed that the **elative** arose on the basis of emotional tension expressed by the Ukrainians, i.e. it is mostly of an **affective, evaluative nature, and the comparative is of an intellectual nature** (Bartonek, 1995). Andrii Savula notes that "the concept of degree is often accompanied by an evaluative tone, because a high degree can express both a pleasant and unpleasant impression" (Savula, 2015, p. 307).

As the author's observations prove, the Ukrainian colloquial style and fiction are characterized by the presence of a large number of emotional and evaluative *elatives*. The reason for the active creation of such forms consists in the fact that in modern narrow speech, speakers do not find a sufficient number of "strong" and apt words that could fully realize a creative intention, and, accordingly, they resort to the creation of new forms that are able to paint the picture more brightly, c.f.: *Сахно збрала всі сили і кинулася плисти щонайшвидше* (Smolych, 2020); *Я постараюся якнайшвидше переглянути рукопис кожного присланого Вами оповідання* (Kotsiubynskyi, 2023). We support the idea of the Ukrainian linguists that, by creating such grammatical forms, communicators enrich modern speech and demonstrate powerful possibilities of the Ukrainian language, in fact, its axiological potential (Zhyzhoma, 2009, p. 160). According to the author's observations, this is actively manifested in modern advertising discourse. It is common knowledge that the activities of advertising creators are mainly designed to implement a manipulative strategy of positivity. Here are the characteristic phrases extracted from the advertising texts. The superlative is used, in particular, in educational advertising to describe agents (eg: *найкращі викладачі; найкращий друг / наставник, спеціалісти найвищого рівня*) and unliving beings, certain realities (*найважливіші навички; найсучасніші підходи; найпрестижніший факультет; найпрогресивніші методи; найкращі традиції*). Compare the contexts: **Найкращі викладачі для найкращих студентів** (Ukrainian Catholic University, 2022). The word combination is often updated in the names of advertising sites *найкращий вибір*, c.f.: **Найкращий вибір**. Вирішуємо конфлікти (Mur-Mallinos, 2018); **Найкращий вибір** онлайн українською мовою в HD (Uakino Bay, 2024).

In the Ukrainian speech, the possibilities of presenting evaluative meanings are revealed during **the transition of relative adjectives into qualitative ones** when they form occasional (non-normative) forms of degrees of comparison, e.g.: *більш томатна паста; щонайтоматніша паста; більш кавовий напій; найкавовіший напій* etc. Let's compare the fragments of advertisements: «Чумак» – *найтоматніша паста*. «Олейна» – *найoleyніша олія*. «Бухгалтерський облік» (the name of the newspaper) – *Найбухгалтерська газета* (Znannia, 2018); «Всесвіт» – *найдитячіша газета* (Yevseienko, 2019), *Тож, щоб придбати собі гарячу найкавовішу каву необхідно зайти на сайт, або через мобільний додаток WOG, та замовити одразу 10 порцій* (Wog, 2015). The contextual examples: *З шести зразків соусу різних марок наші дегустатори-аматори спробували визначити «найтоматніший» та «найшашличніший»* (Yaskova, 2018); *Найтоматніший салат. Готуємо з чотирьох видів томатів з молодю бронзою...* (Shalom | Lviv, 2023).

We state that not only relative but also possessive adjectives are involved in the process of gradation (Riazantseva, 2011, p. 73-74), although, of course, the forms of the higher and highest degrees of comparison can only have qualitative adjectives, so we trace a relatively **new active process of modelling evaluative meanings to reveal the intensity of evaluation**, which is needed, in particular, for modelling advertising discourse. The Ukrainian researchers also write about this phenomenon, but let's emphasize that **the tendency mentioned above is becoming more active in an active progression**, c.f.: "And in this, we put a considerable percentage of responsibility on the most effective means of manipulating mass, including

linguistic, consciousness – advertising. Probably, everyone has already heard about *найпомідорнішу томатну пасту* та *найтоматніший кетчуп* торгової марки «Чумак». Of course, the lexical units *найпомідорніший* and *найтоматніший* are occasional, but they fulfill the social purpose of advertising: to attract the attention of a potential consumer in any way, without violating the word-forming norms of the Ukrainian language at the same time. We can even say that in these contexts relative adjectives *помідорний* and *томатний* acquire a quality shade of meaning, and the innovations themselves are accepted as situationally justified and do not cause active rejection" (Siuta, 2010).

We will also provide examples of *modelling comparative forms using possessive adjectives*, e.g., «*Україніша* Україна» – вона така: *неймовірно душевна, гармонійна, тиха, негаласлива* (Tilda, 2023). We confirm the scholars' opinion that gradations can "undergo adjectives that represent the meaning of temporal and locative attributiveness, materiality, adjectives of socio-political and scientific spheres" (Riazantseva, 2013, p. 7), c.f.: *Юрка Коха називають «найльвівськішим художником»* (Kriuger, 2014). Oksana Khaliman also emphasizes an active functioning of the following constructions, for example: *найетимологічніший з етимологів; з усіх Андріїв найандрійніший Андрій; найдедлайнний дедлайн; найкінотеатровіші кінотеатр* (Khaliman, 2019b, p. 24).

In the Ukrainian language, **ordinal numerals quite often acquire the meaning of quality and express evaluative meanings** during their functioning: in this case, they become qualitative adjectives and can also form comparative forms. For example, the numeral *перший* fixed the normative meaning 'one that surpasses all others in a certain respect'; 'найбільший', 'найкращий', 'найвидатніший', etc.: e.g.: *перший сорт*; the ordinal number *другий* has the meaning of "a less pronounced positive sign", e.g.: *другий сорт*. In the explanatory dictionaries, the form *найперший* – 'найвищий ступінь до перший', розм. 'найважливіший', 'найголовніший' (Ukrainians, 1971, p. 696), in colloquial speech the form *періший* is used, e.g.: *Концерт, всі стоять попереду, а мій син все-таки «періший»* (Tumik, 2019); *Обидва будуть першими, – заявив я. – Перший заступник першим і другий заступник ще періший першого* (Chornohuz, 2021); *...один Масалов чого вартий – періший хабарник!!!* (Volynsky News, 2016). During the Russo-Ukrainian war, **numeral forms perform the function of euphemisms** in speech, neutralizing the negative, respectively, passing into the category of qualitative adjectives that can be substantivized, cf.: *двохсотий* ('убитий'), *трьохсотий* ('поранений') – *Рідні ... у цей час думали, що він двохсотий. Але вижив, повернувся додому* (Shved, & Omelian, 2023); *Втрати окупантів. Ким був сотисячний «двохсотий»? (Hudymenko, 2022); «Ваш Андрій тяжкий трьохсотий»: хлопець з Рівненщини отримав важке поранення під Енергодаром* (ITV Media Group, 2023); *«30 важких трьохсотих, без рук, без ніг було за день»: як парамедик з Нацгвардії рятував військових на фронті* (Levchenko, 2022)..

The pronouns acquired the ability to create comparative forms, in particular possessive ones: *Жінка твоя. Але я твоїша* (Kostenko, 2023); *Ніка Кічурка видала збірку віршів «Я твоїша»*. Книгу присвятила своєму чоловіку Геннадію, який був оборонцем Маріуполя; Мені «зайшла» фраза «я твоїша». *Це ще більше, ніж просто «я твоя», – пояснила Ніка Кічурка. До збірки увійшли 54 вірші. Це інтимна лірика про ...* (Kaliuzhna, 2023). Many examples of such occasional gradation are illustrated by the pronoun *сам*, cf.: *Краєзнавча година «Саміший з найсаміших» (до 80-річчя від дня народження Бориса Нечерди)* (Andrushivka LibraryTal'veh, 2019); *І я зі своєї сибірської глибинки дивлюся на киян, на москалів, на білорусів як на чужих людей, котрі між собою посварилися й сперечаються – а хто саміший?* (Rudenko, 1998).

There should be also emphasized **functional and pragmatic features of the Ukrainian neuter gender pronoun ВОНО**, which can replace the masculine and feminine pronouns *він* and *вона*. The specified technique serves to model shades of a negative evaluation, in particular contempt, insulting name-calling, and belongs to the invective means of speech, which are evidenced by the artistic texts of the classics of Ukrainian literature and modern discourse of the Ukrainians, e.g., *Воно звинувачує, галасує... Слизняк він і є слизняк...* (Kotovenko, 2009). At the same time, this pronoun can also verbalize a positive evaluation, a friendly and supportive attitude: *Воно* (a child – the authors) *сповитє лежало...* (Shevchenko, 1978). In colloquial speech: *Воно таке розумне, гарне⁴* (about a teacher – the authors).

⁴ The example is taken from the author's card index, where samples of live spoken Ukrainian language are recorded. The recording was made in October 2023.

We agree with the scholars' conclusion that in modern grammar, "there is a need to describe creative interpretations of grammatical units, which will make it possible to supplement the known descriptions of the Ukrainian language grammatical system and, obviously, explaining the laws of interpretation of grammatical units, recording the emergence of new forms and new phenomena, predict their development to a certain extent" (Khaliman, 2019b, p. 22). Indeed, the process of grading adjectives, ordinal numerals, and some classes of pronouns is marked by activity. *Structural elements, constructions, consideration of typical lacunae, symbols, connotations, associations, metaphors, paremic system, grammatical constructions*, in particular, and those that are typical of each specific language, *it is crucial to systematize*, since the selection of the specified means is designed to meet the needs of translation activities, as well as the teaching of the Ukrainian language as a native language and as a foreign language, which is carried out in this research.

Conclusions

The scientific study presents the axiological potential of Ukrainian speech, the peculiarities of creating nationally marked grammatical meanings and senses, which deepens the theory of linguoaxiology and demonstrates the relevance of distinguishing an independent study referred to as the morphology of evaluation. We trace the unique interaction between grammatical semantics and pragmatics.

The evaluation verbalized in the speech of Ukrainians through a system of morphological means characteristic of nominal parts of speech allows for the identification of distinct Ukrainian linguistic models, reflective of the linguistic consciousness of Ukrainians, which represent both the continuity of tradition (established forms) and innovative tendencies (occasional formations). The examined models are not consistently observed in other languages and primarily form non-equivalent forms in the Ukrainian language, encompassing a wide range of grammatical meanings. The theory of linguoaxiology is supplemented with new models based on the special linguistic creativity of Ukrainians, the individualization of their speech, while also adhering to its standardization, indicating the presence of typical formulas of linguistic creativity as well as significant potential for communicative competence. The characterized models are productive and regular, allowing for the tracking of trends in the development of the Ukrainian language and the enrichment of the axiological cognitive and linguistic picture of the world of Ukrainians, which requires documentation in explanatory dictionaries. Some models are motivated by sociolinguistic factors that reflect contemporary Ukrainian reality.

Based on the author's observations on the functioning of *specialized morphological forms* that serve to model the meaning of evaluation, it can be stated that in the system of nominal parts of speech such forms are formed modelled on the actualization of the meanings of (1) *categories of augmentation* (mainly augmentative pejorative or meiorative meanings) / *diminutives* (diminutive pejorative or meiorative meanings); (2) *the noun and pronoun gender categories* (mostly these are the forms of the middle, double, even and common gender nouns: these forms are peculiar national forms of the Ukrainian language): (a) the neuter gender of the noun is projected onto the verbalization of positive and negative evaluative meanings (the fact of manifestation of a peculiar grammatical enantosemy and ambivalence), which can be traced in the forms of the neuter personal pronoun *воно*; (b) paired masculine and neuter nouns ending in -o: they usually denote negative characteristics of people; (c) common nouns also mostly verbalize a negative evaluation; (3) *the comparative category* of the adjective mainly refers to an intellectual evaluation, with the help of which degrees of comparison, which are not typical of normative speech, are formed on the rating scale (higher and the highest): (a) other relative and possessive adjectives, in which comparative forms violate the current norm; (b) ordinal numerals for which the comparative is also not characteristic; (c) possessive and meaningful pronouns that occasionally model these forms; (4) *the category of elative*, which arose on the basis of the verbalization of the tendency of Ukrainians to violent expression of emotions – affectivity, which always expresses a certain degree of manifestation of evaluation, which is recorded on the evaluation scale: low, high, higher, highest or maximum, which may exceed the norm, although the concept of the norm is relative. In order to actualize evaluative values, the Ukrainians realize their linguistic creativity by modelling occasionalisms and neologisms and creating grammatically incorrect morphological forms, which, however, present powerful axiological pragmatics.

It has been observed that in the Ukrainian language, *nouns with evaluative semantics* present a sharper manifestation of axiologicality compared to their root adjectives. Additionally, many complex nouns in Ukrainian carry a strong negative evaluative meaning, particularly those formed using the model 'verb 2nd person singular imperative + noun.'

Ukrainian speakers strive to soften negativity, somewhat neutralize it, and verbalize the category of intimacy. This is why a large number of *affectionate forms* are recorded even in concepts that cannot be positively evaluated due to their inherently negative semantics. This reveals the ironic nature of the language.

The aforementioned models model a wide range of meanings of subjective evaluation, expressing a system of stylistic tonalities, including hybrid types: affectionate, diminutive-affectionate, derogatory, diminutive-derogatory, coarse, augmentative-coarse, disdainful, and so on. We also observe non-equivalent grammatical forms.

Moreover, the arsenal of morphological tools for modelling evaluative meanings **the uniqueness of the national-psychological composition of the Ukrainian language speakers**, who strive to powerfully express emotions and feelings and verbalize the category of intimacy. In grammar, particularly in morphology, **the specificity of the Ukrainian national character is reflected**, characterized by cardio-centrism (sensibility, "heartiness" in speech), heightened emotionality, sentimentality (external impressions affect feelings rather than reason and thoughts), lyricism (elevated emotional experience of events or phenomena), and a tendency toward intimacy (intimating forms of affection). This indicates a significant potential for verbalizing evaluation, which is expressed in the large number of subjective evaluative suffixes that attach to practically all parts of speech, especially nominal ones. This is documented in folklore traditions and actively manifests in the modern discourse of Ukrainian linguistic culture, including during the period of the Russian-Ukrainian war.

We observe the contemporary Ukrainians' aspiration to model creative speech within a nationally colored discursive-textual space, saturated with grammatical forms that express evaluative meaning, particularly at the level of morphology. The current speech reality compels the search for new forms of expressing evaluative meaning, taking into account national uniqueness, as these forms present a more powerful speech pragmatics that stands out against the backdrop of other national languages.

Bibliographic References

- Andrushivka LibraryTal'veh. (2019). *Local History Hour "The Most Unique of the Most Unique" (on the 80th anniversary of Boris Necherda's birth)*. <http://bibliotalveg.blogspot.com/2019/07/80.html>
- Bartonek, A. (1995). K problematice latinkoho superlative na-issimus. *Philological letters*, 78, 1-11. <https://www.jstor.org/stable/23460639>
- Boyko, N. I., & Khomych, T. L. (2018). *Expressive Semantics: Discursive Interpretation*. Nizhyn: NSU named after M. Khogolia. <https://epub.chnpu.edu.ua/jspui/handle/123456789/4563>
- Charnetsky, S. (1914). *There is a red viburnum in the meadow*. Ukrlit.org. Retrieved from http://ukrlit.org/charnetskyi_stepan_mykolaiovych/oi_u_luzi_chervona_kalyna_pokhylylasia
- Chornohuz, O. (2021). The First Deputy. *Village News*, 3(19851). <http://www.silskivisti.kiev.ua/19851/print.php?n=47760>
- City of the Sun (2023). *Peremozhenka*. <https://mistosontsia.com.ua/category/peremojenka/>
- Deichakivska, O. (2024). Predicative adjectives in the composition of expressions as tactics of positive and negative politeness strategies. *Amazonia Investiga*, 13(74), 239-247. <https://doi.org/10.34069/AI/2024.74.02.20>
- Diachuk, L. (2024). Manipulation of lexical choice aspects in the creation of stereotypes and ideas in Russian propaganda. *Amazonia Investiga*, 13(75), 173-184. <https://doi.org/10.34069/AI/2024.75.03.15>
- Edera (2020). *Izi ZNO. English Language*. <https://cutt.ly/HerNetj6>
- Franko, I. (2005). Selected works. In 3 volumes. Drohobych: Kolo. ISBN 966-7996-26-3
- Glavcom (2023). *Mantra about the Counteroffensive: "Simple Solution" for a Weary Country*. <https://acortar.link/UONEYB>
- Grebenyuk, V. (2023). *A Rhymed Life*. Surma. <https://surma.com.ua/915-zarymovane-zhyttia.html>
- Hlibov, L. (2019). *Pike; Fly and Bee; Frog and Ox: Fables. Acrostic poems. Riddles*. Kyiv: Znannia. ISBN 978-617-07-0743-7
- Holubov'ska, I. O. (2004). *Ethnic Features of Linguistic Worldviews*. Kyiv: Lohos. <https://enpuir.npu.edu.ua/bitstream/handle/123456789/3552/holubovska.pdf?sequence=1>
- Honchar, O. T. (2004). *Selected works*. Kyiv: Saksent plus. ISBN 966-8583-02-7
- Hudymenko, Yu. (2022). *Occupiers' losses. Who was the 100,000th 'two hundredth'?*. Glavkom. <https://glavcom.ua/columns/yiriigydumenko/vtrati-okupantiv-kim-buv-stotisjachnij-dvokhsotij-897354.html>

- Humboldt, von. W. (2018). *On the National Character of Languages: Excerpt*. World Cup in Ukraine. <https://acortar.link/7MMzTD>
- ITV Media Group. (2023). *Your Andrii is a severe 'three hundredth': a boy from Rivne region was severely wounded near Enerhodar*. <https://acortar.link/dBpUXL>
- Ivanina, T. (2010). Features of Translating Diminutive Lexis (Based on Ukrainian Literary Works and Their Translations into English). *erNAU – Electronic Institutional Repository of the National Aviation University of Ukraine*. <https://acortar.link/PHBpSc>
- Kaliuzhna, K. (2023). *Nika Kichurka published a book "I am yours." She dedicated it to her beloved Azov fighter while he was in captivity*. Svoi.CITY. <https://svoi.city/articles/273816/nika-kichurka-vidalazbirku-virshiv-ya-tvoisha>
- Khaliman, O. V. (2019a). *Grammar of Evaluation: Morphological Categories of the Ukrainian Language*. Kharkiv: Majdan. <http://dspace.nbuv.gov.ua/handle/123456789/184467>
- Khaliman, O. V. (2019b). Degrees of Comparison of Adjectives from Violation of the Norm to Tradition (Based on the Dictionary Material of A. Nelyuba, E. Redko Word creation of independent Ukraine. 2012–2016). *Ukrainian studies in Poznań, VII*, 21–28. <https://dspace.hnpu.edu.ua/items/abc4dbb6-c711-4f7b-9f62-8d504fb5e259>
- Kosmeda, T. (2000). *The Axiological Aspects of Pragmalinguistics: the Formation and Development of the Category of Evaluation*. L'viv: LNU named after I. Frank. ISBN 966-613-131-5
- Kosmeda, T. A. (2003). To the Question about the Grammatical Expression of the Category of Evaluation. *Linguistic Studies*, 10, 50–55. ISSN 2312-0665
- Kosmeda, T. A. (2016a). The Problem of Interpreting the Uniqueness of the Grammatical Model in the Ukrainian Language. *Grammatical Studies*, 2, 12–16. <https://jgrst.donnu.edu.ua/index.php/grst/article/view/3012>
- Kosmeda, T. (2016b). Once Again on the Character of the People and the Character of the Language: Myth or Reality. *Ukrainian Linguistics*, 1(46), 66–77. http://nbuv.gov.ua/UJRN/Um_2016_1_7
- Kosmeda, T. A., & Khaliman, O. V. (2011). "The Grammar of Evaluation" as a Relevant Issue in Contemporary Linguistics. *Linguistic Studies*, 22, 17–23. http://nbuv.gov.ua/UJRN/lingst_2011_22_5
- Kostenko, L. (2023). *Three hundred poems*. Kyiv: A-BA-BA-HA-LA-MA-HA. ISBN 978-617-585-035-0
- Kotoenko, I. (2009). *The thirteenth month*. Chitvo electronic library. Retrieved from https://chtyvo.org.ua/authors/Kotoenko_Ivan/Trynadsiatyi_misiats/
- Kotsiubynskyi, M. (2023). *Selected works*. Kyiv: Prometheus. ISBN 978-617-95311-9-4
- Kovtun, O. (2022). Actual problems of contrastive grammar in the focus of pragmalinguistics. *Studia Rossica Posnaniensia*, 47(2), 181–196. <https://doi.org/10.14746/strp.2022.47.2.13>
- Kriuger, V. (2014). *Yurko Koh: "Halychany are mentally craftier than Hutsuls"*. Litakcent - the world of modern literature. <https://litakcent.online/2014/06/02/jurko-koh-halychany-mentalno-hytrishi-vidhuculiv/>
- Last Bastion (2024). *Our Blood on Their "Green" Hands*. <https://acortar.link/zKGPGv>
- Levchenko, T. (2022). *"30 heavy three hundredths, without arms, without legs in one day": how a paramedic from the National Guard saved soldiers at the front*. Radio Svoboda. <https://www.radiosvoboda.org/a/yak-paramedik-ryatuvav-natsgvardiytsiv/32043403.html>
- Mur-Mallinos, J. (2018). *The Best Choice. Resolving Conflicts*. Kyiv: Kangaroo. ISBN: 9786170942425
- Mykytiuk, I., & Ursaki, I. (2023). Translation Transformations in the Process of Rendering Ukrainian Patriotic Songs into English. *Young Researcher*, 2(114), 66–70. <https://doi.org/10.32839/2304-5809/2023-2-114-13>
- Nechui-Levytskyi, I. (2008). *Selected works*. Volume 1. Kyiv: Saksent Plus. ISBN 978-966-8583-28-5
- New Voice (2022). Institute. <https://nv.ua/ukr/tags/institut.html>
- Potebnia, O. (1992). *Language. Nationality. Denationalization: Articles and Fragments*. New York: Ukrainian Free Academy of Sciences in the USA. <https://diasporiana.org.ua/wp-content/uploads/books/2300/file.pdf>
- Prykhodko, A. I. (2004). *Semantics and Pragmatics of Evaluation in Modern English*: Monograph. Zaporizhzhia: Zaporizhzhia State University. ISBN 966-599-135-3
- Prykhodko, H. I. (2017). Semantic-Pragmatic Aspect of Studying Evaluation. *Among Languages and Cultures: Methodological Eclecticism and Interdisciplinarity of Modern Linguistics*. Pereiaslav-Khmelnyskyi, Kremenchuk: O. V. Shcherbatykh Publishing House, 38–44. <https://journals.indexcopernicus.com/api/file/viewByFileId/709338>
- Prykhodko, H. I. (2000). Some Patterns of Suffixal Formation of Evaluative Words in Modern English. *Visnyk of Zaporizhzhia State University*, 1, 156–167. <https://acortar.link/D3DbX2>
- Radevych-Vynnyts'kyj, Ya. (2001). *Etiquette and Culture of Communication*. L'viv: Published by "Splom". <https://acortar.link/zwkbi6>



- Repa, S. (2016). *In the meadow, a red kalyna*. Lyrics Translate. Retrieved from <https://bit.ly/3HL2QVH>
- Riazantseva, D. (2011). Violation of the Norm when Grading Adjectives. *Word Culture*, 74, 73-74. <http://dspace.nbuv.gov.ua/handle/123456789/37146>
- Riazantseva, D. V. (2013). *Adjective of the Modern Ukrainian Language in the Dimensions of Grammar of Evaluation*. (PhD Thesis Abstract). Kharkiv National Pedagogical University named after H. S. Skovoroda, Kharkiv. <https://uacademic.info.ua/document/0413U006369>
- Rudenko, L. (1998). *Is a Ukrainian Communist Party Possible under the Russian Tsar?*. Ukrainian Press Group. <https://m.day.kyiv.ua/article/panorama-dnya/chy-mozhlyva-ukrayinska-kompartiya-pryrosiyskomu-tsari>
- Savula, A. M. (2015). Boundary Elative. *Scientific Notes of the National University "Ostroh Academy": Series: Philological*, 51, 305-308. <https://eprints.oa.edu.ua/id/eprint/4695/1/117.pdf>
- Shalom | Lviv. (2023). *The most tomato salad*. <https://expz.menu/d84c5c20-d9b0-4240-a9c7-9b3d42d24553/menu?menuId=2493>
- Shevchenko, T. (1978). *Selected works*. Kyiv: Dnipro. <http://kobzar.ua/item/show/532>
- Shved, O., & Omelian, T. (2023). *Relatives thought he was 'the 200th': a wounded soldier from Cherkasy region needs help*. Suspilne Cherkasy. <https://acortar.link/iO9j0A>
- Siuta, H. (2010). *I am Smart, You are Smarter, He is the Smartest (How not to Make Mistakes When Grading Adjectives)*. Language Culture. Retrieved from <http://kulturamovy.univ.kiev.ua/KM/pdfs/Magazine70-40.pdf> (Accessed 1 May 2024).
- Smolych, Yu. (2020). *Dr. Halvanescu's Household*. Kyiv: Center of educational literature. ISBN 978-617-673-861-9
- Stelmakh, M. (2005). *Selected works*. Kyiv: Saktsept plus. ISBN 966-8583-15-9
- Talko, S., Minchak, H., & Hmyria, L. (2022). The phenomenon of connotation in the comparative aspect (on the material of English and Ukrainian languages): problems of modern research. *Amazonia Investiga*, 11(50), 122-129. <https://doi.org/10.34069/AI/2022.50.02.12>
- Tarabarova. (2020). *Little Sun*. Facebook. <https://www.facebook.com/TARABAROVAofficial/videos/2073651476103076/>
- Tilda (2023). *By Lesya's Paths. Literary and local history routes "Countrymen"*. <http://tsikavahadiachyna.tilda.ws/>
- Tkachenko, O. (2006). *Language and National Mentality*. Kyiv: Hramota. <https://irbis-nbuv.gov.ua/publ/REF-0000091786>
- Tsarak, O. (1998). *The Ukrainian Language Among Other Slavic Languages: Ethnological and Grammatical Parameters*. Dnipropetrovsk: Science and Education. <https://elibrary.kdpu.edu.ua/handle/0564/897>
- Tumik, A. (2019). *"You need to believe in yourself," – Yaroslav Karpuk about Dzidzio and the show "The Voice. Kids"*. Old Survival. <https://acortar.link/lcW1s0>
- Uakino Bay (2024). *The best choice online in Ukrainian in HD*. <https://uakino-bay.net/19499-najkraschij-vibir.html>
- Ukrainians (1971). *Dictionary of the Modern Ukrainian Language in 11 Volumes*, Vol. 2. Kyiv: Nauk. dumka. http://ukrlit.org/slovyk/slovyk_ukrainskoi_movy_v_11_tomakh
- Ukrainian Catholic University (2022). The best teachers for the best students. Video [Youtube] <https://www.youtube.com/playlist?list=PLJnVThbVI0uOHcMLReAHRJ8OOtosKq1wQ>
- Volynsky News (2016). *Lenient lustration of the prosecutor's office: only 402 people were dismissed out of 20 thousand*. <https://www.volynnews.com/news/society/poblazhlyva-liustratsiia-v-orhanakh-prokuratury-zvilnyly-lyshe-402-osoby/>
- Wog (2015). *The most coffee-like coffee from WOG*. https://wog.ua/ua/news-detail/naykavovisha_kava_vid_wog_teper_sche_vigidnishe/
- Yaskova, S. (2018). *Tasting room: Which ketchup tastes best with shashlik?*. ye.ua. [https://ye.ua/gurman/35564_Degustaciyna_zala_yakiy_ketchup_naykrasche_smakuye_do_shashliku_\(video\).html](https://ye.ua/gurman/35564_Degustaciyna_zala_yakiy_ketchup_naykrasche_smakuye_do_shashliku_(video).html)
- Yevseienko, N. V. (2019). *Lesson of the Ukrainian Language: "Generalization on the Topic 'Adjective'"*. Naurok. <https://naurok.com.ua/urok-ukra-nsko-umovi-uzagalnennya-z-temi-prikmetnik-104111.html>
- Zahnitko, A. (2012). *Dictionary of Modern Linguistics: Concepts and Terms in 4 Volumes*. Vol. 1. Donetsk: DonNU. <https://acortar.link/5zQPz9>
- Zahrebelnyi, P. A. (1981). *Whisper*. Kyiv: Molod. ISBN 966-03-2017-5
- Zhyzhoma, O. (2009). The Role of Occasional Adjectives in Forming Poetic Discourse. *Linguistic Studies*, 18, 156-161 <https://acortar.link/ZovCW8>
- Znannia. (2018). *Find errors in submitted ads*. <https://znaniya.com/task/28146011>

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Adaptation of Ukrainians to forced migration: a study of psychosocial models and factors

АДАПТАЦІЯ УКРАЇНЦІВ ДО ВИМУШЕНОЇ МІГРАЦІЇ: ДОСЛІДЖЕННЯ ПСИХОСОЦІАЛЬНИХ МОДЕЛЕЙ ТА ФАКТОРІВ

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Abstract

The issue of adaptation to migration is particularly relevant due to the large number of Ukrainians who have been temporarily or permanently displaced since the outbreak of war in Ukraine. This article analyzes empirical results to identify the peculiarities of social and psychological adaptation of Ukrainians to forced migration. Two models of socio-psychological adaptation are identified: a passive model for those forced to migrate due to the war, and an active model for those who migrated consciously. The study finds that the process of socio-psychological adaptation of forced Ukrainian migrants is based on the conflict between the desire to integrate into a new socio-cultural environment and the desire to return to their homeland, resulting in a pronounced affective component. This passive adaptation relies on external control and resources. In contrast, the active model of adaptation of voluntary migrants reveals internal psychological resilience and a focus on self-realization and integration. The article concludes by highlighting the need for psychological interventions aimed at developing subjectivity and problem-solving strategies to optimize the adaptation process for forced Ukrainian migrants.

Keywords: adaptability, social and psychological adaptation, migration, forced migration, psychological well-being.

Анотація

Питання адаптації до міграції є особливо актуальним у зв'язку з великою кількістю українців, які мігрували тимчасово або постійно через початок війни в Україні. У статті аналізуються емпіричні результати щодо виявлення особливостей соціально-психологічної адаптації українців до вимушеної міграції. Визначено дві моделі соціально-психологічної адаптації: пасивну модель для тих, хто вимушено мігрував через війну, і активну модель для тих, хто мігрував свідомо. У дослідженні встановлено, що в основі процесу соціально-психологічної адаптації вимушених українських мігрантів лежить конфлікт між бажанням інтегруватися в нове соціокультурне середовище та прагненням повернутися на батьківщину, внаслідок чого виражений афективний компонент соціально-психологічної адаптації. Ця пасивна адаптація спирається на зовнішній контроль і ресурси. Навпаки, активна модель адаптації добровільних мігрантів виявляє внутрішню психологічну стійкість і спрямованість на самореалізацію та інтеграцію. На завершення статті наголошується на необхідності психологічного втручання, спрямованого на розвиток суб'єктивності та стратегії вирішення проблем для оптимізації процесу адаптації вимушених українських мігрантів.

Ключові слова: адаптивність, соціально-психологічна адаптація, міграція, вимушена міграція, психологічне благополуччя.

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Introduction

Due to the outbreak of war in Ukraine in February 2022, a large number of Ukrainians, including women with children, were forced to migrate to other countries. Among European countries, Poland has received the largest flow of Ukrainian forced migrants - about 3.5 million - and other neighboring countries (Romania, Hungary, Moldova, Slovakia, etc.) have received about 2.3 million.

According to the United Nations High Commissioner for Refugees (UNHCR), as of 15.07.2024, 6.5 million Ukrainian refugees were registered across Europe. There are another 558.3 thousand migrants outside Europe (UNHCR, 2024).

Countries are very active in helping Ukrainians integrate into their social and psychological environment: they provide material and physical assistance, help with housing, language learning, and job search, and even have programs to help Ukrainians overcome the trauma of war and migrant trauma.

However, it should be noted that the aspect of external support is only one aspect of the problem of adaptation of forced migrants. Another aspect is internal: motivational, value, affective, and cognitive phenomena that determine the process of social and psychological adaptation of forced migrants in a different socio-cultural system. Our study is dedicated to identifying the psychological mechanisms that ensure this process in a sample of Ukrainians.

The article begins with a literature review that highlights the main theoretical aspects of migration psychology and gaps in socio-psychological models of migrant adaptation. It then discusses the methodology of the empirical study of the psychosocial adaptation of Ukrainians to forced migration, and in the next section the results of this study are presented. Potential limitations of the research methodology are also identified. The paper also discusses the controversies and debates in the field, including methodological issues and the balance between theoretical and empirical evidence. The article concludes with a summary of key findings, practical implications, and suggestions for future research in migration psychology.

Literature Review

The main focus of psychological research on the socio-psychological adaptation of migrants is aimed at analyzing and studying the mechanisms of socio-psychological adaptation, the process of acculturation is actively studied (Afanasyeva, et al., 2021; Oberg, 1960; Triandis, 2000), the social and psychological problems of migrants, their mental health (Zandt, 2023; Javanbakht, 2022; Martsyniak-Dorosh, 2022, etc.), factors and causes of migration (Berry, 1997; 2015), psychological problems of ethnic interaction and the impact of intercultural differences on psychosocial adaptation (Berry, 1997; 2015; Cohen, 2011; Ho & Chiang, 2015; Zhylin et al, 2023; etc.) are investigated.

Having analyzed numerous definitions of the concept of migration, we believe that migration is a multi-stage, time-deployed process that contains many psychological aspects that are different at each stage - a migrant constantly has to solve problems and respond to new psychological challenges.

In addition, any migration is accompanied by the transformation of the entire system of social and psychological relations, including interpersonal, family, parental, and labor relations, and leads to a significant strain on psychological defense mechanisms (Slyusarevskyi & Blynova, 2013), and psychological readiness for migration or migration readiness is of great importance). But in the current circumstances, Ukrainian migration is spontaneous and forced, which affects its quality and content. Therefore, the root of the main socio-psychological deviations in the process of adaptation of Ukrainians who have been forced to migrate is psychological unpreparedness, as well as physical and material unpreparedness. In addition, when studying the peculiarities of socio-psychological adaptation to forced migration, it is also necessary to take into account the shock and collective trauma that Ukrainians receive because of the war.

In general, forced migration is a source of high stress at all levels, both social and psychological (Blynova, 2010). This is due to a sharp change in the usual way of life, which leads to a high level of anxiety affecting identity, self-concept, mental organization, value system, and self-esteem. It is in these social and

psychological conditions that the process of social and psychological adaptation of Ukrainians to forced migration takes place.

It is also necessary to give meaning to the phenomenon of socio-psychological adaptation, since it is the object of our study. Based on the analysis of scientific sources, we conclude that socio-psychological adaptation is the process of establishing the optimal correspondence between the subject and the environment in the course of carrying out activities inherent in a person and allows him or her to meet current needs and realize life goals that ensure the compliance of activities and behavior with the requirements of the environment (Blynova, 2016).

Researchers call the internal criterion of effective adaptation of migrants a sense of satisfaction and fullness of life, and the external criterion is the inclusion of an individual in the social and cultural life of the new group (Slyusarevskiy & Blynova, 2013). We believe that the general name for the first one is psychological well-being, which includes high adaptation, autonomy, satisfaction with relationships, etc., and the second is the integration of a migrant into the social and psychological field of the host country.

It is important to take into account that the social and psychological adaptation of either voluntary or forced migrants is accompanied by the experience of culture shock and a number of migrant traumas (Oberg, 1960; Triandis, 2000; El-Awad et al, 2017; Bilan, 2017). Other specific problems arise: research confirms that Ukrainian migrants are characterized by signs of PTSD and anxiety disorders, acute loss of loved ones, and general disorientation (Javanbakht, 2022; Martsyniak-Dorosh, 2022). These are the so-called war traumas that forced migrants have received and continue to receive for the third year in a row. After all, leaving the war zone does not mean returning to peaceful life. Ukrainians continue to experience war even in migration. And this fact also affects the entire process of their adaptation to migration.

If we consider the process of social and psychological adaptation of migrants from the point of view of social psychology, it should be noted that this process is not straightforward, but rather heterochronic, and its course depends on many subjective and objective factors, among which there are two main groups: external (environmental features) and internal (personal qualities, properties, processes). Sensitive and critical periods can be traced in its dynamics. The first ones are associated with the equilibrium state in the relationship between the subjects - the migrant and the socio-psychological space in which he/she is located. Critical periods involve transformations in the socio-psychological environment, which leads to disorganization of the intrasubjective socio-psychological space, and therefore causes a state of maladjustment.

Despite the numerous theoretical and empirical studies on this issue, the question of how Ukrainians are adapting to forced migration, which emerged before the international psychological community more than two years ago, remains relevant. A fundamental range of problems is still unresolved—specifically, the characteristics of the socio-psychological adaptation of forced migrants who are affected by the trauma of war, along with all the psychological phenomena and factors related to it, which influence their adaptation. Additionally, the issue of optimizing the process of socio-psychological adaptation and the methods of psychological intervention aimed at its success is still not well-researched.

Therefore, we have conducted an empirical study of the peculiarities of social and psychological adaptation of Ukrainians to forced migration and the purpose of this article is to present the results of this study.

Methodology

Participants

The study involved 419 respondents - Ukrainians who are currently in migration in different countries of the world. The geography of migration of the Ukrainians we surveyed includes the Czech Republic, Germany, Bulgaria, Spain, Portugal, Poland, Italy, France, Slovenia, the United States, Israel, Holland, and Austria. Also, a small part of the sample (7%) is made up of internal migrants.

We have identified two samples of the study to identify the peculiarities of forced migration of Ukrainians, as opposed to voluntary migration. The first sample of participants in our experiment consisted of adult Ukrainians, mostly women, who have been in forced migration since the beginning of the war in Ukraine,

i.e. up to two years ($n=248$). The second sample consisted of Ukrainian voluntary migrants who have been in migration for 3 to 5 years ($n=171$).

The age of Ukrainians participating in the survey covers the main age categories: under 30 (12.4%), 30 to 40 (29.2%), 40 to 50 (33.7%), and 50 years and older (29.2%).

The social status of the sample varies: 56.2% of respondents are employed, 12.4% are unemployed, 9% are entrepreneurs, 9% are housewives, and 12.4% are students. This distribution of the sample will allow us to identify factors and interrelationships of intrapersonal qualities and phenomena related to social and psychological adaptation to forced migration during the war.

Ethical considerations

The survey was conducted using a Google form. Participation was voluntary. To ensure the confidentiality of the results and to identify the respondents, only their email addresses were used, without any other personal data. The pilot questionnaire included data on gender, age, social status, period and country of migration, as well as consent to use the results for scientific purposes. The Google form also included questions from psychological questionnaires, which are described below. There were no potential risks for the study participants, as the Google form allows the survey results to be processed and used exclusively by the research team without being shared online, as the participants were informed in the information letter.

Instrumentations

The level and peculiarities of social and psychological adaptation of Ukrainians to forced migration were studied using two main methods - a questionnaire Rogers-Diamond's "Social and Psychological Adaptation" and the Semantic Differential Method.

A number of standardized psychological questionnaires were used to study the psychological factors that can influence the process of socio-psychological adaptation, in particular: "Psychological Wellbeing Scale" by Rieff (Schmutte & Ryff, 1997), Questionnaire of Psychological Resourcefulness of Personality (Shtepa, 2018), "Scale of Intolerance to Uncertainty" by Carleton (IUS-12) (Carleton et al., 2007), Questionnaire of Subjectivity.

Analysis

The data from the questionnaires were processed using the keys provided by the authors to determine the level of actualization of a particular quality under study. The sample results are presented in statistical units (percentages).

Pearson's correlation analysis was used to obtain data on the relationships between the indicators of qualities and factors, and Student's t-criteria was used to determine the level of significance of differences in the indicators of psychological qualities in two independent samples.

A pilot questionnaire was used to identify semantic units for the semantic differential method, which allows to identify the peculiarities of migrants' perception and attitude towards the migration situation. Next, the discriminators were identified, which at the main stage of the study were evaluated by respondents on a Likert scale from 1 to 5. Next, a factor analysis of the results was conducted using SPSS Statistics 23.0 and a number of factors characterizing the perception and attitude towards the situation of migration, both forced and voluntary, for the control and experimental groups of respondents were identified.

Results

The level and dynamics of adaptability among forced and voluntary Ukrainian migrants depending on the duration of their migration Diagnostics of the level of social and psychological adaptation of Ukrainians to migration using the Rogers-Diamond methodology revealed its dynamism and heterochronicity. Figure 1 shows the revealed dynamics.

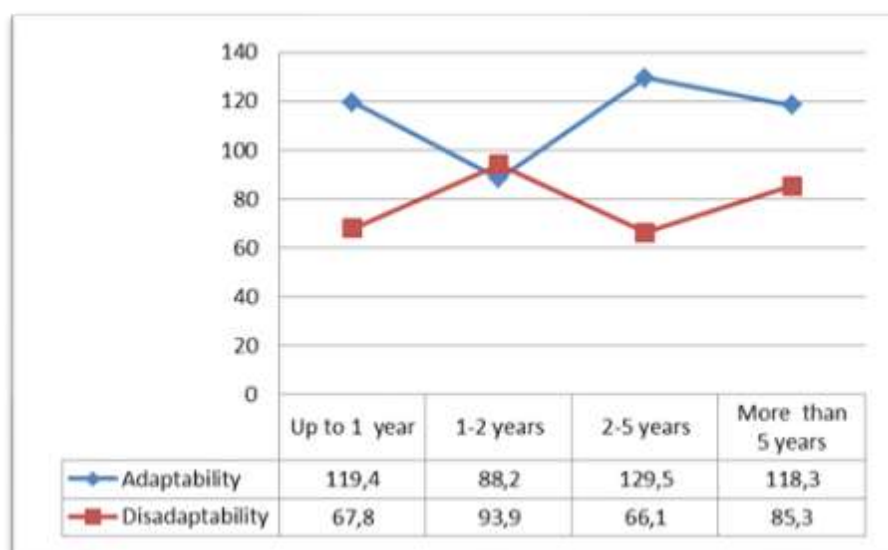


Figure 1. Dynamics of indicators of socio-psychological adaptability-disadaptability of Ukrainians depending on the duration of their migration.

Source: prepared by the authors (2024).

We found that the beginning of migration is marked by the beginning of a long process of adaptation to it. Ukrainians who were part of the experimental group and had been in migration for up to 2 years have lower levels of SPA and its integral indicators compared to the control sample of Ukrainians (with a period of migration from 3 to 5 years and more). Thus, the overall adaptation index in the experimental group is 72.3, and in the control group - 89.7.

A comparison of the indicators of social and psychological adaptation of Ukrainians who migrated during the war in Ukraine (experimental group) and before it began (control group) revealed that this process reflects a dynamic, which is confirmed by the stages of adaptation identified by foreign researchers (Oberg, 1960).

During the first year of migration, Ukrainian forced migrants initially experience a stage of emotional uplift, comfort, and adaptability that is close to a high level, with a fairly high level of self-acceptance of themselves and others, internalization, and aspiration for dominance. At the same time, indicators of maladjustment and emotional discomfort are low. In foreign research, this period is called the "honeymoon" (Berry, 1997).

The first crisis of migrants occurs when they have been in migration for up to six months. Due to the fact that the Ukrainians we interviewed are forced migrants, which intensifies the dynamics of adaptation, and at the same time they were forced to migrate because of the war in Ukraine, which may, on the contrary, smooth out some indicators, we believe that this crisis manifests itself in our sample during the second year of their migration. This is confirmed by the indicators of internalizing and adaptability, which decrease sharply during this period (from 119.4 in the first year to 88.2 in the second), while the indicators of externality and maladaptivity increase (from 67.8 to 93.9).

The indicators of emotional comfort remain within the normal range. And the escapism rate is increasing. In other words, this period of migration is made crisis-like by the sociocultural environment, which no longer seems "safe" to Ukrainians and "ideal," which affects adaptability and emotional comfort. At the same time, there is a tendency to avoid problem solving and external control.

At the next stage of migration, the crises that occurred at the previous stage are resolved and it is characterized by foreign researchers as a recovery stage (Berry, 1997). The dynamics we have identified confirm the increase in the SPA indicators of Ukrainians who have been in migration for 2 to 5 years. Thus, Ukrainians with a migration duration of 1 to 2 years have an adaptability index of 88.2 and a maladaptability index of 93.9, while Ukrainians who have been in migration for 2 to 5 years have an adaptability index of 129.5 and a maladaptability index of 66.1. The indicator of emotional comfort during this period is high

(32.4), as is the indicator of internal control (58.1). That is, this is a rather calm, crisis free period of social and psychological adaptation and acculturation, which ends with a high level of adaptation of the migrant to the customs, traditions, social environment of another country, acceptance of the socio-cultural environment and themselves in it.

But in addition, our research has shown that Ukrainians who have been migrating for more than 5 years tend to repeat the cycle described above. At this stage, a crisis occurs, which reduces overall adaptability and increases maladaptability, although within the normal range. The adaptability index of migrants who have been in migration for 2 to 5 years is 129.5 points, while for Ukrainians who have been in migration for more than five years it is 118.3 points. The indicator of maladjustment has the opposite dynamics - an increase from 66.1 to 85.3 (for Ukrainians who have been in migration for more than five years). The indicators of emotional comfort (from 32.4 to 22.5), internal control (from 58.1 to 51.9), self-acceptance (from 54.3 to 46.5), and acceptance of others (from 27.8 to 23.1) are also decreasing.

It can be concluded that, first, the dynamics of the stages of socio-psychological adaptation of Ukrainians in forced and voluntary migration is repetitive with a tendency to increase integral indicators. And secondly, there are certain qualitative changes in the personal and social spaces of the process of social and psychological adaptation of migrants, which cause a crisis that triggers a new round of adaptation dynamics. To address this issue, we used the method of semantic differential, and its results were processed by factor analysis through the identification of structural components of the semantic space of migrants.

The results of applying the semantic differential method

Table 1.
Results of factor analysis of Ukrainian forced migrants

Explained variance (abbreviated)						
Component	Initial eigenvalues			Rotation of the sum of squared loads		
	Total	% of variance	%	Total	% of variance	Total%
1	13,937	21,777	21,777	9,905	15,477	15,477
2	6,673	10,427	32,203	8,032	12,549	28,026
3	4,025	6,289	38,493	6,406	10,010	38,036
4	3,383	5,286	43,779	3,676	5,743	43,779
5	2,942	4,597	48,376	2,942	4,597	48,376
6	2,528	3,950	52,327			
The method of factor selection: principal components method.						

Source: prepared by the authors (2024).

Factor analysis identified 18 components in total regarding attitudes toward migration and adaptation to it in the semantic space of Ukrainians who migrated to other countries during the war, but as can be seen from Table 1, five factors were the most loaded.

The first factor covers 21.78% of the total variance and includes the following discriminators: "The best country for life and development, I just need to make an effort" (.653), "The attitude of the country's residents towards migrants is good here" (.578), "I have a goal to learn the language of the new country" (.651), "I have a goal to adapt in the new country" (.581), "I like that people here respect each other" (.553), "I like that people here follow the laws" (.642) and others. Thus, the first factor includes discriminators that reflect the desire of Ukrainians who migrated during the war to adapt, integrate into a new socio-cultural environment, learn the language, and develop in it. These discriminators also reflect the respectful attitude of Ukrainians towards this environment and the tolerant attitude of the socio-cultural environment towards Ukrainians. That is why we called this factor "intention to integrate under conditions of tolerance".

The second factor, which covers 10.42% of the total variance, includes the following discriminators: "I don't know any other country where you have to work as hard as here" (.510), "I don't like the bureaucracy here" (.529), "I don't like the high taxes" (.537), "I don't like the prices here" (.681), "I don't like my moral and psychological state in this country" (.577), and others. That is, the second factor includes semantic units that reflect criticism and hostility. Therefore, we called this factor "negativism and rejection".

It should be noted that according to K. Oberg's stage-by-stage process of migrants' adaptation to life in a new country, the first stage of the "honeymoon period" is followed by the second stage, characterized by migrants' aggressive and hostile attitude towards the new environment, its criticism, in which even the attitude of the country's indigenous people seems indifferent and hostile to migrants. Therefore, it can be concluded that most of the respondents who participated in our study are already at this second stage of adaptation to migration and are experiencing a crisis related to further rejection or acceptance of the new socio-cultural environment.

The third factor covers 6.29% of the total variance and includes the following discriminants: "I miss Ukraine" (.567), "I still compare this country with Ukraine" (.745), "I dream of returning to Ukraine" (.745), "I feel anxious for my relatives who remain in Ukraine" (.558), and others. Thus, the third factor reflects the active national identity of Ukrainians who were forced to migrate to other countries because of the war, as well as their long-term intention to return to Ukraine. A preliminary analysis of the three identified factors shows that Ukrainians - forced migrants are experiencing a crisis due to the fact that they are already living in a new country and have to adapt to a new life and environment, but have a strong desire to return, which greatly complicates the process of adaptation and causes a certain degree of rejection of the new socio-cultural environment as "alien", not identical to the Ukrainian mentality and individual national identity of migrants. That is why we called this factor "national identity and the intention to return".

The fourth factor covers 5.29% of the total variance and includes the following semantic units: "I have difficulties learning the language" (.614), "Everything here needs to be started from scratch" (.468), "I like that I have insurance and/or financial assistance as a migrant" (.447), and others. The semantic units included in the fourth factor reflect the difficulties of Ukrainians who were forced to migrate to other countries because of the war. The discriminators also reflect the negative and pessimistic attitudes of Ukrainians toward the migration situation itself. That is why we called this factor the "tension factor".

The fifth factor, which covers 4.59% of the total variance, includes the following discriminators: "I like that people here are polite" (.536), "I like the different approach to education" (.416), "I like that there are locals who help" (.447), "This country loves innovation and it is good for starting your own business" (.411), and others. The fifth factor includes semantic units that reflect the positive attitudes of Ukrainian forced migrants toward the new socio-cultural environment, the search for new goals, new supports, and the desire to find new meanings and tasks in it. That is why we named this factor "acceptance and positive attitude".

Thus, we can see that the main structural units of migrants' perception and attitude towards the migration situation are the focus on integration in a new country that is tolerant of Ukrainian migrants, negativism and rejection, national identity and the desire to return to Ukraine, emotional stress, acceptance and positive attitude.

The factor analysis of the semantic space assessments of Ukrainians who migrated not during the war but for more than two years and have been in migration for 2 to 5 years or more, identified 11 factors in total, of which five were the most loaded.

Table 2.

Results of the analysis of the selection of factors among Ukrainians - voluntary migrants

Variance explained (abbreviated)						
Component	Initial eigenvalues			Rotation of the sum of squared loads		
	Total	% of variance	Cumulative %	Total	% of dispersions	Cumulative%
1	18,149	28,358	28,358	10,998	17,184	17,184
2	8,030	12,547	40,905	10,206	15,948	33,132
3	6,690	10,454	51,359	8,488	13,263	46,395
4	5,587	8,730	60,088	7,120	11,125	57,519
5	4,451	6,955	67,043	6,095	9,524	67,043
6	3,553	5,551	72,594			
7	3,232	5,049	77,644			
8	2,374	3,709	81,353			
Factor extraction method: principal component method.						

Source: prepared by the authors (2024).

The first factor, which covers 28.36% of the total variance, includes the following discriminators: "This is the best country for life and development, you just need to make an effort" (.786), "Here I have the opportunity for self-realization and self-improvement" (.718), "Here I know what I am working for" (.832), "In this country I have found many new opportunities for myself" (.607) and others. These semantic units reflect the humanistic macro-social basis of self-realization and personal and material development of Ukrainian migrants in the new socio-cultural environment. That is why we named this the factor "a human-centered state is a condition for sustainable development and self realization of migrants".

The second factor, which covers 12.54% of the total variance, includes the following discriminators: "Here, everything has to be started from scratch" (.684), "I don't know any other country where you have to work as hard as here" (.833), "I don't like my moral and psychological state in this country" (.749), and others. The discriminators included in the second factor emphasize the psychological tension of Ukrainians regarding the material support of themselves and their families in the new conditions. This professional and personal tension is associated with intensive work and expenses in the conditions offered by the new socio-cultural space. Therefore, we have named this factor "Intensive work as a factor of material security".

The third factor covers 10.45% of the total variance and includes the following semantic units: "I have a goal to adapt in a new country" (.758), "I have a goal to find a job in my profession in a new country" (.523), "My family is better off here" (.604), "How happy and successful you will be here depends on us" (.520), and others. Thus, the third factor characterizes Ukrainians' motivational attitudes toward integration and assimilation in the new socio-cultural environment. While the first factor reflects the general (macro-environmental) conditions for personal development and self-realization of the migrant, this factor emphasizes the focus on the well-being of the micro-environment, children, and family, for which Ukrainians seek to adapt and achieve well-being in the new country of residence. That is, "my self-realization ensures the well-being of my family and children." We believe that this is how migrant subjectivity manifests itself. That is why we named this factor "subjectivity as a condition for integration and family well-being".

The fourth factor, which emerged as a result of factorization of semantic unit scores in the control group of respondents, covers 8.73% of the total variance and includes the following discriminators: "There are huge Ukrainian communities here, where it is easier to adapt and then start to learn other places to live and work" (.881), "I like that I have insurance and/or financial assistance as a migrant" (.470), "The attitude of the country's residents towards migrants is good here" (.489). Thus, the fourth factor characterizes the socio-cultural environment that provides primary support and assistance, which is a condition and starting point for self-determination and adaptation of Ukrainians in a new country. These are external resources that a migrant can rely on, such as attitudes toward migrants, psychological and material support. That is why we named this factor "Primary supportive environment as a condition for adaptation and self-realization".

The fifth factor covers 6.96% of the total variance and includes the following discriminators: "I miss Ukraine" (.703), "Over time, I hope to feel comfort and peace here" (.649), "I still compare this country to Ukraine" (.813), and others. That is, these are the semantic singletons that emphasize the factor of homesickness, experiences related to the war in Ukraine, and for loved ones who remained behind. Also, the discriminators that make up the fifth factor emphasize the national identity of Ukrainian migrants. Therefore, we named this factor "national identity and nostalgia."

Thus, the semantic space of attitudes and perceptions of the migration situation among Ukrainian voluntary migrants includes the following components: sustainable development and self-realization in a human-centered state, material security through work, subjectivity, external socio-cultural resources that provide primary support to migrants in adaptation, national identity, and nostalgia.

Discussion

We have searched for the content of models of socio-psychological adaptation of Ukrainians to forced migration based on empirical data. As a result, qualitative differences in the process of socio-psychological adaptation were noted and two empirical models of Ukrainians' adaptation to migration were identified. These results are summarized in the table below.

Table 3.
Empirical models of Ukrainians' adaptation to migration

	Ukrainians are forced migrants	Ukrainians are voluntary migrants
Factor 1	Focus on integration in a new country country, tolerant to Ukrainian migrants	Sustainable development and self realization in the context of human-centered states
Factor 2	Negativism and rejection	Material provision by labor
Factor 3	National identity and aspirations to return to Ukraine	Subjectivity
Factor 4	Emotional stress	External socio-cultural resources, providing primary support to migrants in adaptation
Factor 5	Acceptance and positive attitude	National identity, nostalgia

Source: prepared by the authors (2024).

The use of factorization of the structural units of the semantic space of attitudes towards migration of Ukrainian migrants allowed us to determine that voluntary Ukrainian migrants who have been in migration for 3 years or more (control group respondents) show a more stable model of adaptation to migration. They consider the opportunities provided by migration and the new socio-cultural environment in which they find themselves to be a resource for self-realization and personal development. External socio-cultural resources are one of the least saturated factors in their semantic space, while the focus on self-realization and development, subjectivity and active engagement - as components of the semantic space related to migration - are much more saturated. This suggests that Ukrainians who are voluntary migrants have an active position and orientation towards integration into the new socio-cultural environment of the host country, relying on their own capabilities and resources, and actively solve problems related to migration and ensuring their own comfort.

Thus, the components of the semantic space of voluntary migrants are complex and well-established, with a significant motivational and value component: development, self realization, material security, family well-being, and internal control (internalization). The emotional component of the semantic space regarding migration, such as homesickness, is among the least burdensome factors, so it can be concluded that Ukrainians are relatively emotionally well off in the context of voluntary migration.

This is due to the fact that voluntary migrants do not make decisions about relocation suddenly. Throughout the decision-making process, their psychological readiness for migration develops, along with stable migration motivations. The migration itself is planned, and only then does migration behavior emerge, which ultimately implements the actual relocation.

Unlike Ukrainians who were voluntary migrants, Ukrainians who were forced to migrate because of the war in Ukraine did not have the opportunity to develop motivational, financial, and psychological readiness, as several hours to several days passed between their decision to move and the actual move.

The events that forced them to make this decision also have a great impact on the emotional state of Ukrainians who are forced migrants. The beginning of the full-scale invasion was shocking for many Ukrainians, causing panic, stress, and a sense that their world was falling apart.

A number of foreign studies indicate that the majority of Ukrainians who are forced migrants exhibit signs of PTSD, depression, and anxiety disorders (Javanbakht, 2022; Martsyniak-Dorosh, 2022). This, in our opinion, explains the structural components of the social and psychological adaptation of the experimental group respondents obtained as a result of factorization.

It has been determined that Ukrainians - forced migrants reveal less established and simpler structural elements of the semantic space regarding migration. The main ones are: macro-social factors favorable for life, tolerance of the host country's residents and the opportunities and resources they provide to Ukrainian migrants. The affective component is the most vividly expressed in the semantic space of forced migrants; three of the five identified factors: negativism and rejection, emotional stress, positive attitude and acceptance are based on emotions.

Another characteristic feature of the model of adaptation of Ukrainians - forced migrants is the focus on the fact that as soon as they are able, they will return to Ukraine. This, in our opinion, complicates the

process of integration into the new socio-cultural environment and gives rise to its rejection and rejection of the very idea of staying.

Thus, we have identified a difference in the two models of adaptation - while the attitudes of Ukrainian respondents who are voluntary migrants are based on the motivation to migrate, the desire for assimilation, acculturation and integration, and those of Ukrainians who are forced migrants are based on affect, reliance on external resources and the desire to return to their homeland.

In order to determine the internal factors that ensure the implementation of the two identified models of socio-psychological adaptation of Ukrainians to forced migration, we have diagnosed such psychological phenomena as psychological resourcefulness, intolerance to uncertainty, intersubjectivity, subjectivity, and psychological well-being.

Table 4.

Significance of differences in the indicators of socio-psychological adaptation of Ukrainians (Student's t-test)

Variable	Ukrainians - forced migrants	Ukrainians - voluntary migrants	t-criteria	p
Intolerance to uncertainty	34,05	47,22	-,360	,723
Psychological resourcefulness	83,71	75,71	3,264	,001
Intersubjectivity	70,86	56,46	2,201	,040
Activity	6,49	5,02	2,891	,017
Self-awareness	6,22	5,17	2,963	,026
Freedom of choice and responsibility for it	6,17	5,21	2,381	,037
Understanding and acceptance of others	5,58	5,62	1,898	,086
Self-development	5,91	4,79	2,925	,019
Psychological well-being	291,81	218,90	3,103	,002

Source: prepared by the authors (2024).

Comparison of the obtained results revealed that the active model of adaptation inherent in Ukrainians - voluntary migrants is provided by such psychological properties as psychological resourcefulness, subjectivity, psychological well-being and the ability to intersubjective interaction. The passive model of adaptation, which is characteristic of Ukrainians who are forced migrants due to the war in Ukraine, is characterized by a low expression of the above factors. Due to their low tolerance for uncertainty, these Ukrainians are prone to depression, spontaneous aggression, and are characterized by a higher than average level of emotional lability. In other words, the expressed factors of their inherent passive model of adaptation are insufficient emotional self-regulation, insufficient ability to identify and manage their own psychological resources, and passivity.

The core of the identified models of social and psychological adaptation, as our research has shown, is the subjectivity of the migrant's personality. What does this mean in practical and scientific terms?

To answer this question, let's define the concept of personality subjectivity. Subjectivity is a number of qualities that each scientist defines independently, noting only one common quality of the subject - to influence and transform socio-psychological reality. It also includes a number of personal characteristics that correspond to a person's ability to influence his or her psychological, mental, and physical state and a general conscious, reflective, proactive, responsible, and actively transformative attitude toward reality and oneself. It is this attitude, in our opinion, that determines the process of effective adaptation of Ukrainians in forced migration during the war.

This relationship has not yet been identified and studied by scholars, but it seems to us to be crucial for the research problem at hand. Of course, our study was focused on a Ukrainian sample, so this empirical position requires other, more extensive research. Subjectivity is a psychological phenomenon that has proven its relevance in all spheres of human life and, at the same time, can be developed and shaped. Thus,

the conclusions of the presented study, firstly, reveal a new broad layer of research in the field of migration psychology and, at the same time, provide a clear direction for this research.

Conclusions

Our empirical research allowed us to identify the main models and components of the social and psychological adaptation of Ukrainians who were forced to migrate because of the war in Ukraine and those who migrated consciously.

It has been concluded that the process of socio-psychological adaptation of Ukrainians - forced migrants is based on the conflict between the desire to integrate into a new socio-cultural environment and the wish to return to their homeland, which results in a pronounced affective component. We call this model the model of passive adaptation, because it relies on external control (externality) and external resources - good attitude towards migrants by the host country and its residents, material support, benefits, humanitarian aid, etc.

Meanwhile, the model of adaptation of Ukrainians who left voluntarily and earlier can be called "active" because it is characterized by a strong motivation to integrate, reliance on their own resources, and a subjective position.

The theoretical value of the study is the proven connection between the socio-psychological adaptation of migrants and the level of their subjectivity, which reveals a wide field of opportunities and challenges for further research, as well as the development of models of psychological support for the socio-psychological adaptation of forced migrants.

Recommendations

Psychological intervention in overcoming the social and psychological maladjustment of forced migrants and supporting the adaptation process should be aimed, in fact, at the development of subjectivity, and the main tasks of such targeted formation will be: activation of awareness, actualization and development of skills to take responsibility for one's life, development of focus on self-development and self-realization.

We believe that this model of psychological intervention is universal for many categories of migrants, not only forced but also voluntary, and not only Ukrainians. However, this statement requires numerous studies, development of psychological programs and determination of their effectiveness by empirical methods.

We have developed and tested one of these programs, and it has proven to be effective in a sample of Ukrainian forced migrants. We will present it to the scientific community in further research papers, as this article is intended to present empirical results.

Limitations

The obtained results are valid only for the sample of Ukrainians who were forced or voluntarily migrated due to Russia's full-scale invasion. To confirm the findings with a different sample of respondents, a new study is needed, taking into account psychological, ethnic, linguistic, demographic, and other factors. Although our results confirm the existence of certain models of socio-psychological adaptation of migrants, another sample may reveal more of them and they will be qualitatively different, i.e., they can contain completely different socio-psychological phenomena, structural components and features.

Conflict of interest

Absent.

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Absent.

Bibliographic References

- Afanasieva, L., Bukricieva, I., Glyns'ka, L., Hlebova, N., & Oleksenko, R. (2021). Sociocultural integration of meskhetian turks in the context of inter-ethnic cooperation. *Amazonia Investiga*, 10(38), 234-244. <https://doi.org/10.34069/AI/2021.38.02.23>
- Berry, J. W. (1997). Immigration, acculturation and adaptation. *Applied psychology: An international review*, 46(1), 5-34. <https://doi.org/10.1111/j.1464-0597.1997.tb01087.x>
- Berry, J.W. (2015). Global psychology: implications for cross-cultural research and management. *Cross Cultural Management*, 22(3), 342-355. <https://acortar.link/2Lez24>
- Bilan, Y. (2017). *Migration of the Ukrainian population: Economic, institutional and sociocultural factors*. London: Ubiquity Press.
- Blynova, O. (2016). Social and psychological adaptation of forced migrants: approaches and problems of studying the phenomenon of acculturation. *Scientific Bulletin of Kherson State University*, 3(1), 111-117. <https://pj.journal.kspu.edu/index.php/pj/article/view/676>
- Blynova, O. (2010). Psychological factors of stress in the acculturation of migrants. *Science and education*, 3, 12-16. <https://dspace.pdpu.edu.ua/jspui/handle/123456789/12795>
- Cohen, E.H. (2011). Impact of the Group of Co-migrants on Strategies of Acculturation: Towards an Expansion of the Berry Model. *International Migration*, 49(4), 1-22.
- Carleton, R. N., Norton, P. J., & Asmundson, J.G. (2007). Fearing the unknown: A short version of the Intolerance of Uncertainty Scale. *Journal of Anxiety Disorders*, 21(1), <https://doi.org/10.1016/j.janxdis.2006.03.014>
- El-Awad, U., Fathi, A., Petermann, F., & Reinelt, T. (2017). Promoting Mental Health in Unaccompanied Refugee Minors: Recommendations for Primary Support Programs. *Brain Sciences*, 7(11), 146. <https://doi.org/10.3390/brainsci7110146>
- Ho, K.H.M., & Chiang, V.C.L. (2015). A meta-ethnography of the acculturation and socialization experiences of migrant care workers. *Journal of Advanced Nursing*, 71(2), 237-254. <https://doi.org/10.1111/jan.12506>
- Javanbakht, A. (2022). Addressing war trauma in Ukrainian refugees before it is too late. *European Journal of Psychotraumatology*, 13(2), URL: <https://acortar.link/5kv1a5>
- Martsyniak-Dorosh, O. (2022). *The Heavy Psychological Toll of the War in Ukraine - Mental health support is the need of the hour*. Medpagetoday. <https://www.medpagetoday.com/opinion/second-opinions/101119>
- Oberg, K. (1960). Culture shock: Adjustment to new cultural environments. *Practical Anthropology*, (4), 177-182
- Schmutte, P. S., & Ryff, C. D. (1997). Personality and well-being: Reexamining methods and meanings. *Journal of Personality and Social Psychology*, 73(3), 549-559.
- Shtepa, O. (2018). Questionnaire of psychological resourcefulness of a personality: results of development and testing of the author's methodology. *Problems of modern psychology*, 39, 380-399. <https://acortar.link/DJg28L>
- Slyusarevskiy, M., & Blynova, O. (2013). *Psychology of Migration*. Kirovohrad. «Imeks LTD». https://ispp.org.ua/wp-content/uploads/2020/05/migration-psych_slusar-blinova.pdf
- Triandis, H.C. (2000). Culture and Conflict. *International Journal of Psychology*, 35(2), 145-152.
- UNHCR. (2024). *Ukraine Refugee Situation*. <https://data.unhcr.org/en/situations/ukraine>
- Zandt, F. (2023). *6.8 million Seeking Refuge from Russian Invasion*. Statista. Access mode: <https://www.statista.com/chart/26960/number-of-ukrainian-refugees-by-target-country/>
- Zhylin, M., Mendelo, V., Cherusheva, G., Romanova, I., & Borysenko, K. (2023). Analysis of the role of emotional intelligence in the formation of identity in different European cultures. *Amazonia Investiga*, 12(62), 319-326. <https://doi.org/10.34069/AI/2023.62.02.32>

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Effect of storage time on antioxidant content in seeds of agricultural plants

Вплив тривалості зберігання на вміст антиоксидантів у насінні сільськогосподарських рослин

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Abstract

This study investigated the impact of storage time on the prooxidant-antioxidant balance (PAB) in seed tissues of 12 agricultural plant species, including both monocots and dicots. We measured superoxide generation, TBA-active products, and the activity of enzymatic antioxidants (superoxide dismutase, catalase, and cytochrome oxidase) and non-enzymatic antioxidants (ascorbic acid and glutathione). Biochemical parameters were recorded monthly for one year.

Our results demonstrated that the activity of enzymatic antioxidants and the content of non-enzymatic antioxidants decreased with increased seed storage time. Conversely, both the generation of reactive oxygen species and the level of free radical damage to biomolecules increased. The percentage change in free radical peroxidation and

Анотація

У цьому дослідженні вивчався вплив терміну зберігання на прооксидантно-антиоксидантний баланс (ПАБ) у тканинах насіння 12 видів однодольних та дводольних сільськогосподарських рослин. Визначали рівень генерації супероксиду, вміст ТБК-активних продуктів, активність ферментативних (супероксиддисмутази, каталази, цитохромоксидази) та низькомолекулярних антиоксидантів (аскорбінової кислоти та глутатіону). Біохімічні показники реєстрували щомісяця протягом року.

У результатах наших досліджень показано, що активність ферментативних антиоксидантів і вміст низькомолекулярних антиоксидантів знижувалися зі збільшенням терміну

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antioxidant protection depended on the initial PAB status of the seeds. Monocots exhibited a greater overall increase in prooxidant activity during storage, while dicots showed a less pronounced decrease in antioxidant content. A notable surge in prooxidant activity and a corresponding decline in antioxidant activity occurred at 9-10 months of storage for dicots and 6-7 months for monocots. These findings highlight the importance of considering storage time and species-specific differences to optimize planting strategies and seed care, as well as the use of appropriate plant foods.

Keywords: prooxidants, antioxidants, ascorbic acid, catalase.

зберігання насіння. Тоді ж як утворення активних форм Оксигену та вільнорадикальне пошкодження біомолекул зросли. Відсоткова зміна вільнорадикального перекисного окислення та антиоксидантного захисту залежала від початкового ПАБ-статусу насіння. Дослідні однодольні рослини показали більше загальне збільшення прооксидантної активності під час зберігання, тоді як дводольні продемонстрували менш виражене зниження вмісту антиоксидантів. Помітний стрибок прооксидантної активності та відповідне зниження антиоксидантного захисту спостерігався на 9-10 місяці зберігання для дводольних та на 6-7 місяці для однодольних. Ці висновки підкреслюють важливість урахування часу зберігання та видоспецифічних відмінностей для оптимізації стратегії посадки та догляду за насінням, а також вживання відповідних рослинних продуктів харчування.

Ключові слова: прооксиданти, антиоксиданти, аскорбінова кислота, каталаза.

Introduction

Antioxidants (AOs) are biologically active natural protectors of our body that promote adaptation to stressful conditions and changing environment, accompany normal growth and development processes, inhibit aging processes, promote regeneration and recovery from diseases and disorders, help to get out of the prodromal period into the state of homeostasis, and are natural antimutational agents (Marrocco et al., 2017; Kohen & Nyska, 2002; Halliwell, 2006). Our body synthesises its own AOs and replenishes their reserves from plant and animal origin products, and the content of AOs even in the healthiest food significantly depends on the conditions and duration of the storage (Xu et al., 2017; Song et al., 2010; Shao et al., 2008). A decrease in the content of AOs in the body leads to an increase in the amount of prooxidants (POs), represented by reactive Oxygen species (ROS), other free radicals and their transformation products (Pacheco et al., 2018). According to numerous scientific studies, the primary cause of diseases at the molecular level is damage to biopolymers. For example, ROS cause the formation of free radicals that trigger chain reactions of protein damage, the creation of interstrand cross-links, which makes DNA incapable of transcription and replication, and, in turn, makes normal cell division and protein biosynthesis impossible (Scandalios, 2002; Van Breusegem & Dat, 2006). Damage to the integrity of cell organelle membranes and plasma membrane is the first cytological indicator of most diseases (Dickinson, 2003). Free radicals cause peroxidation of membrane lipids, creation of intermolecular cross-links of fatty acid fragments, which changes the balance of membrane viscosity and fluidity and disrupts its transport properties. An increase in the content of free radicals leads to the destruction of biologically active substances synthesised by our body and obtained from food, which leads to a decrease in the nutritional value of food, its metabolic capacity, and therefore its benefits (Rampon et al., 2018; Rhoads et al., 2006; Apel & Hirt, 2004; Foyer & Noctor, 2009; Janků et al., 2019; Mittler, 2017). The imbalance of the prooxidant-antioxidant system (PAS) in seed tissues leads to a decrease in germination, which in turn leads to unnecessary costs for seed procurement, irrational use of sown areas and extensive farming (Bartoli et al., 2013; Oracz & Karpinski, 2016; Kumar et al., 2011) to take into account the storage time of plant products when planning a diet. For example, our previous studies have shown that soaking seeds leads to the initiation of germination processes and an increase in the level of AOs, but plant products that have been stored for a long time may contain very low baseline levels of AOs or not contain them at all. This devalues the benefits of whole grain products and so-called "live cereals", in the preparation of which pre-soaking and minimal heat treatment is recommended in order to preserve the maximum amount of biologically active substances in food. All of the above-mentioned enhances the relevance of the research topic and its significant practical importance for a wide range of readers and consumers.

The objective is to identify patterns of changes in the prooxidant-antioxidant balance in tissues depending on the storage time of plant products.

To achieve the objective, we identified the following tasks:

- 1) To study the change in the content of enzymatic AOs in plant tissues, depending on the storage period;
- 2) To determine the change in the content of low molecular weight AOs in plant tissues, depending on the storage period;
- 3) To experimentally confirm the change in the content of POs in plant tissues, depending on the storage period;
- 4) To determine the change in the content of free radical peroxidation products (FRP) of membranes in plant tissues, depending on the storage period;
- 5) To investigate changes in the activity of membrane markers of free radical peroxidation in plant tissues, depending on the storage period;
- 6) To trace the change in the balance of PAS links depending on the storage period of plant products;
- 7) To determine the species-specific features of the PAS state of experimental plants.

The article consists of the review of the literature, which provides an analysis of the works of advanced scientists in this direction, and highlights the components that require further research and systematization. In the methodology section, the principles of constructing the research scheme are given, the expediency of the choice of methods of analysis of each component of the state of the pro-oxidant-antioxidant system is substantiated, the conditions and repetition of the experiment are indicated. The analysis and generalization of the research results is maximally illustrated by graphs that reflect the dynamics of changes in the value of research indicators every month during the year, which is convenient for perception, visualizes the interspecies difference, and serves as a basis for conclusions, practical recommendations and prospects for further scientific research.

Literature Review

A number of leading scientists have studied the importance of POs and AOs (Halliwell, 2006; Shao et al., 2008; Pacheco et al., 2018; Scandalios, 2002; Apel & Hirt, 2004; Foyer & Noctor, 2009; Janků et al., 2019; Mittler, 2017). One of the top largest biochemical schools that regularly works in this area is the school of Nicholas Smirnov (Smirnov, 2005, 2019). Numerous achievements in PAS biochemistry in Ukraine are made by O.P. Dmytriiev, Z.M. Kravchuk, Y.E. Kolupaev, Y.V. Karpets, (Dmytriiev & Kravchuk, 2005; Kolupaev et al., 2019). Most scientists agree that the main enzymatic AOs are superoxide dismutase (SOD) (Berwal & Ram, 2019) and catalase, and low-molecular weight ascorbic acid (AA) and glutathione (GSH). The AOs properties of SOD are described in the works of Baiano A., del Nobile M.A., Berwal M.K., & Ram C. (Baiano & Nobile, 2016; Berwal & Ram, 2019), and catalase in the works of Nandi, A., Yan, L. J., Jana, C. K., & Das. (Nandi et al., 2019). The protective role of AA was investigated by Rietjens I.M., Boersma M.G., Haanm Ld., Spenkelink B., Awad H.M., Cnubben N.H., Padayatty S.J., Katz A., Wang Y., Eck P., Kwon O., Lee J.H., Chen S., Corpe C., Levine M., Dutta A., Paciolla S.; Fortunato, S.; Dipierro, N.; Paradiso, A.; De Leonardis S. (Rietjens et al., 2002; Padayatty et al., 2003; Paciolla et al., 2019).

Szalai G, Kellos T, Galiba G, Kocsy G, Hasanuzzaman M, Nahar K, Anee T.I., Fujita M., experimentally confirmed the role of GSH as AOs (Szalai et al., 2009; Hasanuzzaman et al., 2017, 2019). According to Gautam V., Kaur R., Kohli S.K., Verma V., Kaur P., Singh R., Saini P., Arora S., Thukral A.K., Karpets Yu, Bhardwaj R. the first PO that occurs in a plant cell as a by-product of photosynthesis is singlet oxygen, which is converted to superoxide anion radical ($\bullet\text{O}_2^-$) (Gautam et al., 2017). The target of $\bullet\text{O}_2^-$ is cell membranes, which as a result of FRPO, form malondialdehyde (MDA) and other TBA-active products (Morales and Munné-Bosch, 2019). A marker of membrane damage is the change in cytochrome oxidase activity, the significance of which is described by Wikström (Wikström et al., 2018). The balance between the formation and POs, and protective effect of AOs is PAS, which at the molecular level responds to the impact of any factors on the body's homeostasis (Dat et al., 2000; Dickinson, 2003; Gill and Tuteja, 2010; Huang & Guo, 2005).

The role of antioxidant in seed quality is described in Mahalingam Govindaraj's work (Govindaraj et al., 2017), antioxidant activity and phenolic content of selected fruit seeds is described by Yean-Yean Soong and Philip J Barlow (Soong & Barlow, 2004). Identification and quantification of polyphenols in hull, bran and endosperm of common buckwheat is shown in Zhang's article (Zhang et al., 2017). Pang and his

colleagues investigated the bound phenolic compounds and antioxidant properties of whole grain and bran of white, red and black rice (Pang et al., 2018). Comparison of phenolic profiles and antioxidant properties of European *Fagopyrum esculentum* cultivars is shown in Kiproviski's article (Kiproviski et al., 2015). There is no systematic material describing the effect of storage duration on the content of antioxidants in the seeds of agricultural plants, which increases the relevance of our research.

Methodology

Seed tissues of the following plants were the object of experimental studies: *Glycine max* L., *Helianthus annuus* L., *Fagopyrum esculentum* L., *Linum usitatissimum* L., *Sinapis alba* L., *Chenopodium quinoa* L., *Panicum miliaceum* L., *Oryza sativa* L., *Avena sativa* L., *Zea mays* L., *Hordeum vulgare* L., *Triticum durum* Desf. The choice of plant species is due to the popularity of their use in the daily diet and the recommendation of nutritionists regarding a healthy diet.

To create the research scheme, we were guided by the fact that the first and main pro-oxidant, which is formed in the cells of all living beings in response to stressors, is the superoxide anion radical. A marker of the strengthening of the pro-oxidant link is its effect on lipid membranes with their subsequent peroxidation and the formation of TBA-active products. The main enzymatic antioxidants of cells are superoxide dismutase and catalase, and low-molecular ones - ascorbic acid and glutathione. The effectiveness of maintaining the pro-oxidant-antioxidant balance is assessed by the activity of cytochrome oxidase. So, by experimentally investigating the changes in the above indicators, it is possible to draw a conclusion about the state of the pro-oxidant-antioxidant system, and in our case to draw conclusions about the degree of benefit of the selected food products.

To quantify the change in the value of PAS indicators, we used generally accepted classical methods described in detail in our previous works (Bobrova et al., 2020, 2021, 2022). Thus, the baseline level of $\bullet\text{O}_2^-$ generation was determined using the spectrophotometric nitroblue tetrazolium recovery test (NBT test), the advantage of which is high accuracy and the possibility of determining both the basic level of superoxide generation and its sources, namely mitochondrial, microsomal or cytoplasmic. The chosen method for determining TBA-active products includes pre-incubation of the homogenate in a pro-oxidant ferrum-ascorbinate buffer with longer photometry, which allows not only to determine the content of malondialdehyde, but also to draw a conclusion about the general degree of free radical damage to membrane lipids. To assess the change in SOD activity, the percentage of inhibition of the oxidation of $\bullet\text{O}_2^-$ adrenaline into adrenochrome was determined, and catalase was determined by titration with potassium permanganate solution, which are classical generally accepted biochemical techniques. The content of AA was determined according to Tillmans titrimetry, and the concentration of GSH was determined by the Elman method, which do not require lengthy sample preparation, combine accuracy and ease of execution, allow selective determination of experimental components with maximum preservation of their nativeness. Cytochrome oxidase activity was determined spectrophotometrically. The peculiarity of the technique is extremely strict observance of the conditions for the preservation of cytochrome to prevent its oxidation. Biochemical parameters were measured monthly for 1 year. All experiments were carried out under standard conditions (air temperature 20 degrees Celsius and absolute pressure 760 mmHg, air humidity 50%). Each control and experimental group included 10 samples when determining each indicated indicator.

Results and Discussion

The results of the study were statistically calculated according to generally accepted methods, the reliability was confirmed at $p < 0.05$. The repetition of samples for each indicator given in the table is 10. The laboratory analysis of all mentioned indicators was carried out in strict accordance with the order and conditions of conducting the experiment specified in the methods. All experiments were conducted under standard conditions (air temperature 20 degrees Celsius and absolute pressure 760 mmHg, air humidity 50%). The seeds were stored under standard conditions and without access to light. This minimizes potential sources of error and enables the generalization of the results.

For ease of calculation and better clarity of the digital data, we present the baseline level of POs and AOs in the tissues (**Tables 1 and 2**). In our previous work, we investigated the effect of germination initiation on the pro-oxidant-antioxidant balance and determined the baseline values of PAS state indicators that are species-specific. Using these results, we set up two experimental lines in parallel: the first involved the

initiation of the seed germination process, which is reflected in our 2022 publication (Bobrova et al., 2022). The second direction, the results of which this article is devoted to, included a change in the values of all starting indicators depending on the duration of seed storage, which we fixed every month during the year. The common point of intersection of these two directions of scientific research is the starting level of indicators of the state of PAS, so we consider it appropriate to present in this publication the results of laboratory studies of the basic level of PAS established by us earlier. This need is also justified by the fact that we calculated the results of monthly changes in the values of PAS status indicators as a percentage of the base level, which is the most convenient way to summarize the results on one graph for indicators with different measurement units.

Table 1.

Results of identification of prooxidant activity and the level of FRPO in the inactive seed tissues

Experimental plants	Indicators of prooxidant activity		The level of FRPO damage
	NBT test (base level), nmol•O ₂ ⁻ /grams•second	ΔTBA _{ap} , %	Cytochrome oxidase activity, OD
<i>Glycine max L.</i>	0,072 ± 0,011	66,15 ± 5,01	0,314 ± 0,019
<i>Helianthus annuus L.</i>	1,134 ± 0,042	42,23 ± 1,06	0,204 ± 0,003
<i>Fagopyrum esculentum L.</i>	0,287 ± 0,019	99,22 ± 4,11	0,183 ± 0,005
<i>Linum usitatissimum L.</i>	1,006 ± 0,011	29,88 ± 1,44	0,262 ± 0,009
<i>Sinapis alba L.</i>	0,778 ± 0,021	35,18 ± 1,22	0,240 ± 0,004
<i>Chenopodium quinoa L.</i>	0,122 ± 0,014	85,14 ± 3,67	0,436 ± 0,011
<i>Panicum miliaceum L.</i>	1,086 ± 0,011	136,49 ± 6,22	0,118 ± 0,006
<i>Oryza sativa L.</i>	0,437 ± 0,010	21,63 ± 1,10	0,398 ± 0,006
<i>Avena sativa L.</i>	0,036 ± 0,004	11,27 ± 2,01	0,418 ± 0,009
<i>Zea mays L.</i>	1,273 ± 0,015	111,83 ± 5,19	0,159 ± 0,008
<i>Hordeum vulgare L.</i>	0,091 ± 0,009	128,45 ± 18,35	0,276 ± 0,005
<i>Triticum durum Desf.</i>	0,090 ± 0,009	27,86 ± 4,11	0,346 ± 0,001

Source: compiled by the authors based on a previous publication (Bobrova, et al., 2022).

Table 2.

Results of identification of antioxidant activity in the inactive seed tissues

Experimental plants	Enzyme antioxidants		Low molecular weight antioxidants	
	Catalase activity, $\frac{\text{micromol}}{\text{kg} \cdot \text{min}}$	SOD Activity, OD	AA concentration, $\frac{\text{mmol}}{\text{kg}}$	GSH concentration, $\frac{\text{mmol}}{\text{kg}}$
<i>Glycine max L.</i>	0,48 ± 0,02	0,53 ± 0,02	0,293 ± 0,03	59,32 ± 0,95
<i>Helianthus annuus L.</i>	0,19 ± 0,01	0,28 ± 0,01	0,096 ± 0,01	39,11 ± 0,72
<i>Fagopyrum esculentum L.</i>	0,31 ± 0,02	0,28 ± 0,02	0,141 ± 0,02	43,22 ± 0,96
<i>Linum usitatissimum L.</i>	0,11 ± 0,01	0,30 ± 0,01	0,135 ± 0,02	46,79 ± 0,48
<i>Sinapis alba L.</i>	0,25 ± 0,01	0,36 ± 0,03	0,110 ± 0,01	41,01 ± 0,63
<i>Chenopodium quinoa L.</i>	0,36 ± 0,01	0,44 ± 0,02	0,120 ± 0,02	51,67 ± 0,11
<i>Avena sativa L.</i>	0,39 ± 0,03	0,46 ± 0,02	0,111 ± 0,03	54,19 ± 0,34
<i>Oryza sativa L.</i>	0,31 ± 0,01	0,42 ± 0,01	0,092 ± 0,01	45,18 ± 0,78
<i>Hordeum vulgare L.</i>	0,23 ± 0,02	0,29 ± 0,01	0,076 ± 0,01	48,05 ± 0,10
<i>Triticum durum Desf.</i>	0,09 ± 0,02	0,22 ± 0,01	0,057 ± 0,01	40,79 ± 0,25
<i>Zea mays L.</i>	0,09 ± 0,01	0,19 ± 0,01	0,085 ± 0,02	37,16 ± 0,99
<i>Panicum miliaceum L.</i>	0,07 ± 0,01	0,16 ± 0,01	0,037 ± 0,01	43,14 ± 0,67

Source: compiled by the authors based on a previous publication (Bobrova, et al., 2022).

Analysing the results obtained, it can be stated that soybean seeds have the lowest baseline level of PO activity, the highest content of both enzymatic and low-molecular weight AOs, therefore the lowest percentage of increase in •O₂⁻ and the lowest percentage of decrease in the content of SOD and catalase (Fig. 1). The relatively stable level of GSH is noteworthy.

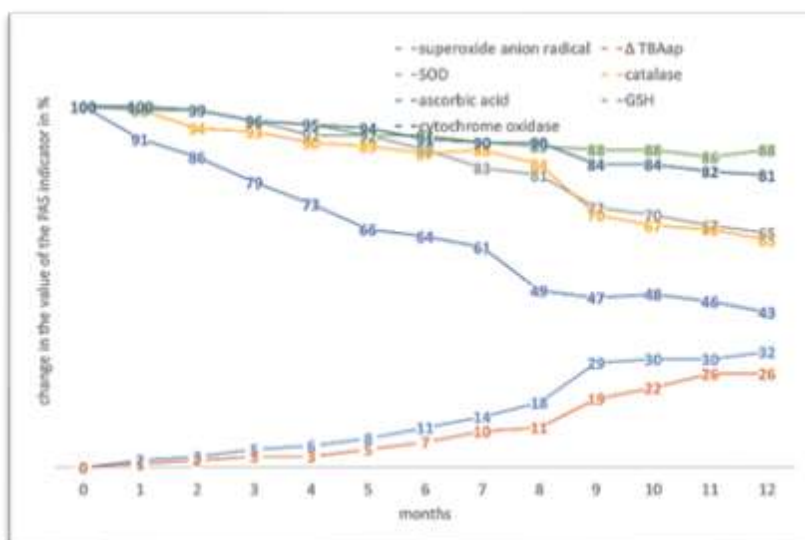


Figure 1. The effect of storage time on the change in the value of the PAS indicators in the tissues of *Glycine max L* seeds.

A similar pattern was found in the tissues of quinoa seeds (**Fig. 2**):

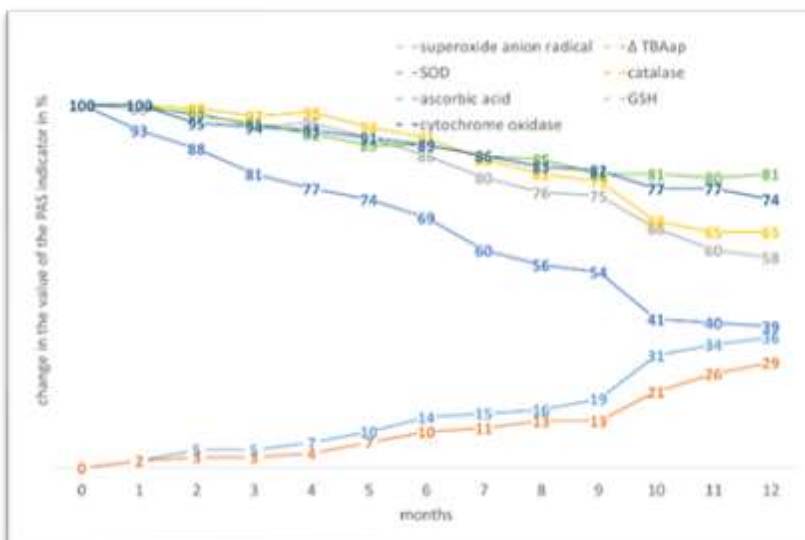


Figure 2. The effect of storage time on the change in the value of the PAS indicators in *Chenopodium quinoa L.* seed tissues.

A characteristic feature of buckwheat was a relatively stable level of AA, the smallest increase in Δ TBA_{ap} and the smallest decrease in cytochrome oxidase, a possible explanation for this is the high content of essential amino acids, potassium, magnesium and iron, which is part of cytochrome (**Fig. 3**).

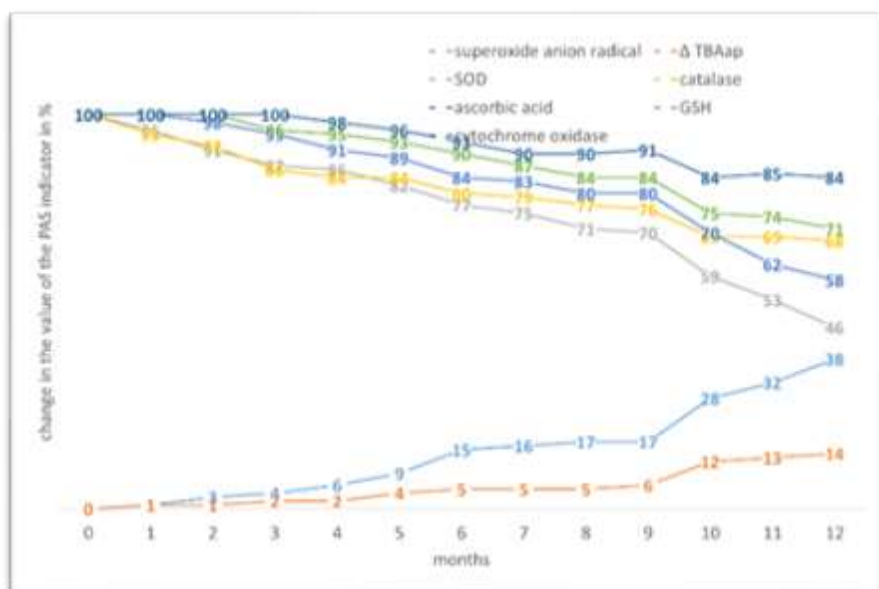


Figure 3. The effect of storage time on the change in the value of the PAS indicators in the tissues of *Fagopyrum esculentum* L. seeds.

A characteristic feature of flax was one of the lowest increases in $\Delta\text{TBA}_{\text{ap}}$ with a fairly high increase in $\bullet\text{O}_2^-$, which may be explained by the presence of polyunsaturated fatty acids (PUFA) (**Fig. 4**).

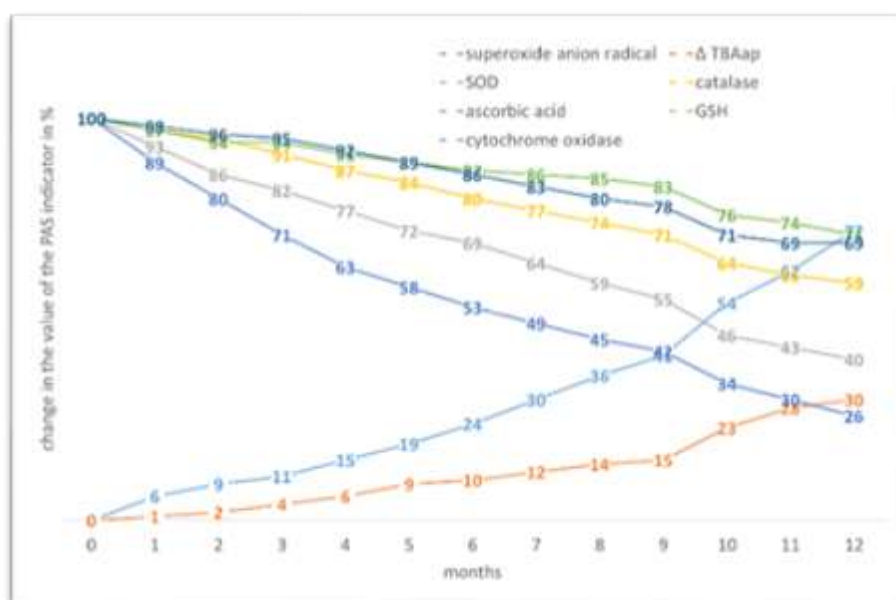


Figure 4. The effect of storage time on the change in the value of the PAS indicators in *Linum usitatissimum* L. seed tissues.

Among dicotyledons, sunflower has the highest percentage of increase in PO activity with increasing storage time, which is explained by a rather high initial level of $\bullet\text{O}_2^-$ generation (**Fig. 5**). The decrease in the content of enzymatic and low molecular weight AOs is also the largest, since their initial level was the lowest among all the experimental samples of dicotyledonous seed tissues.

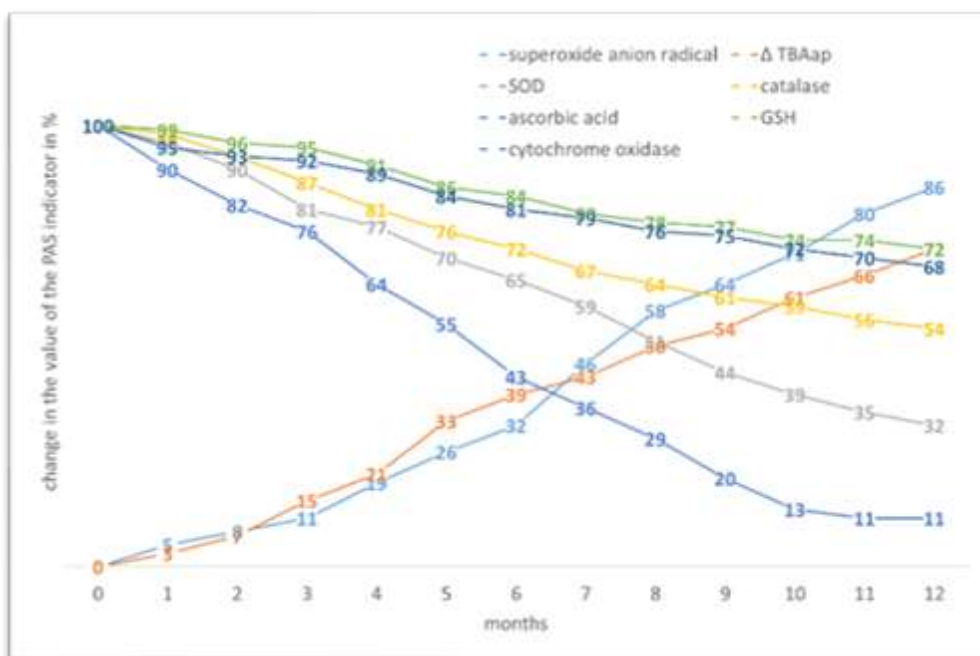


Figure 5. The effect of storage time on the change in the value of the PAS indicators in the tissues of *Helianthus annuus* L. seeds.

In the tissues of buckwheat, mustard (**Fig. 6**) and flax, we observe intermediate values of the increase in PO activity and a decrease in the content of AOs with an increase in storage time.

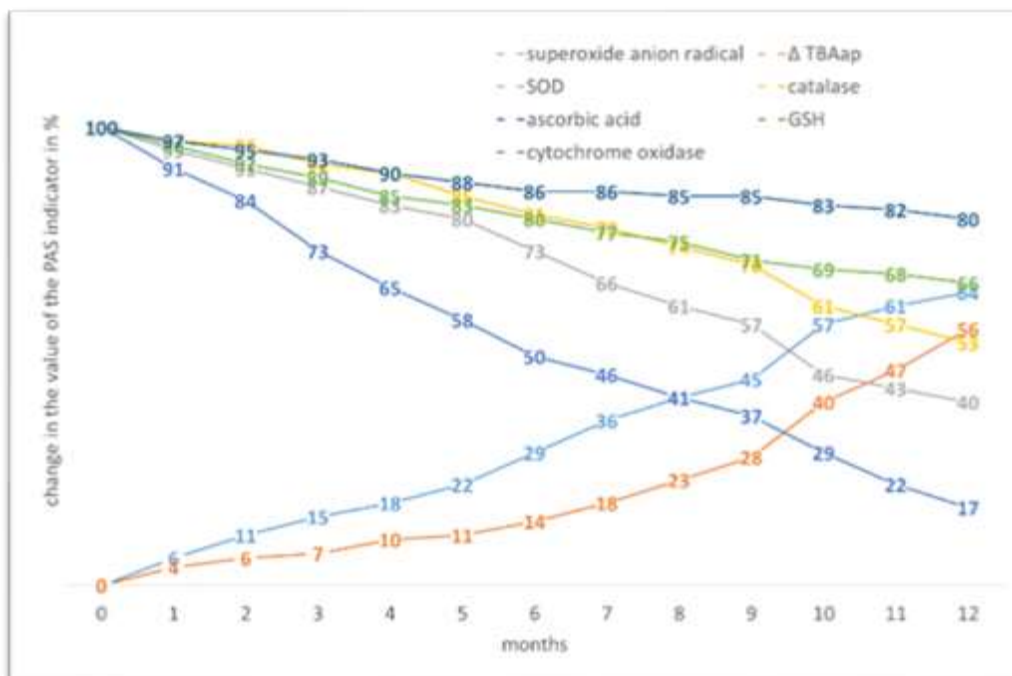


Figure 6. The effect of storage time on the change in the value of the PAS indicators in *Sinapis alba* L. seed tissues.

Thus, we obtain a tendency of dependence of the percentage of increase in the level of FRPO and decrease in AO protection with an increase in the storage time of tissues on the value of the initial level of PAS indicators.

Among monocotyledons, oats have the highest rates of preservation of AO properties with increasing seed storage time (**Fig. 7**). It also has the lowest increase of $\bullet\text{O}_2^-$ and $\Delta\text{TBA}_{\text{ap}}$.

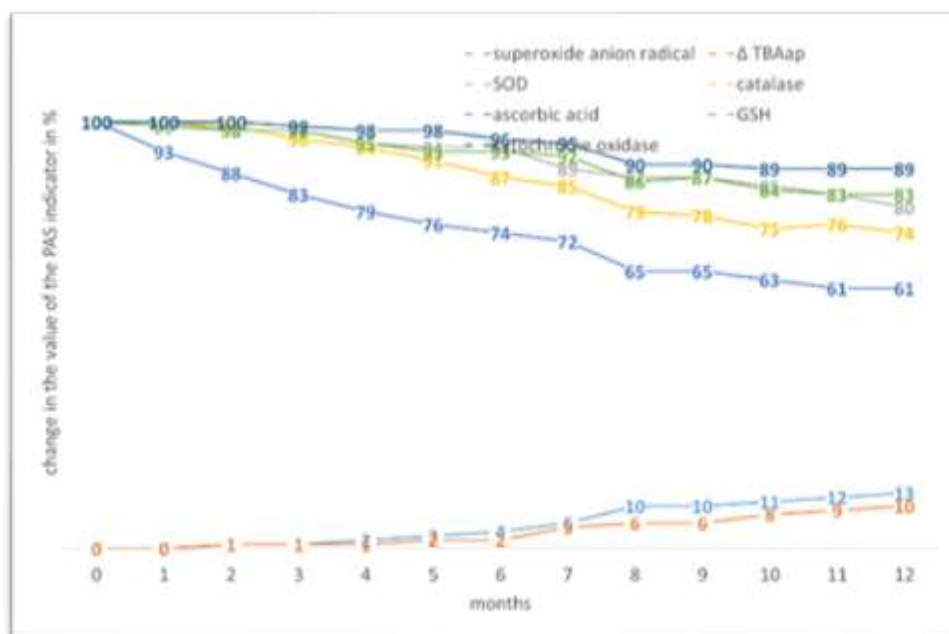


Figure 7. The effect of storage time on the change in the value of the PAS indicators in *Avena sativa* L. seed tissues.

The worst results are observed for maize. However, it is interesting that with the greatest increase in $\bullet\text{O}_2^-$ and $\Delta\text{TBA}_{\text{ap}}$, the greatest decrease in AO, the cytochrome oxidase activity is quite high, possibly due to the involvement of β -carotenes in stabilisation (**Fig. 8**).

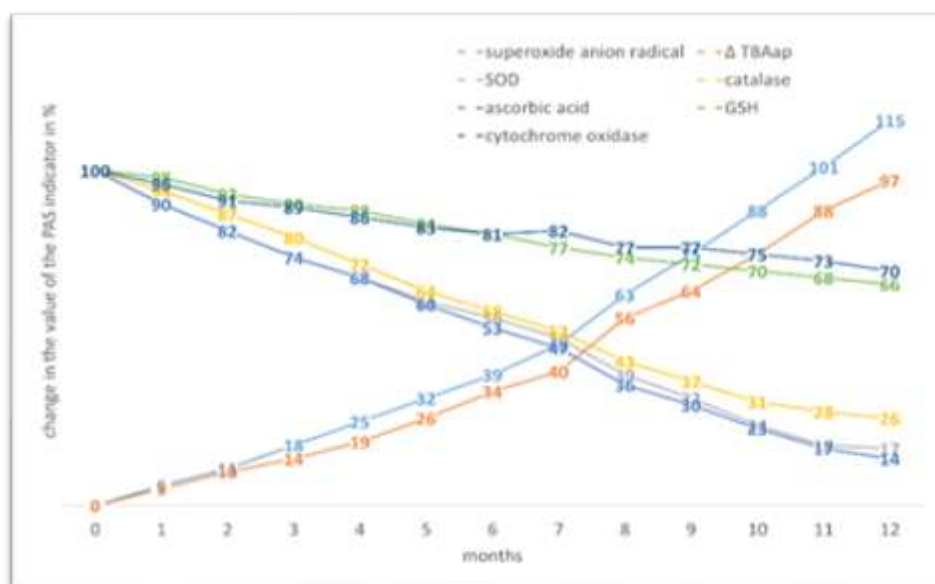


Figure 8. The effect of storage time on the change in the value of the PAS indicators in *Zea mays* L. seed tissues.

Millet has similar changes in the values of indicators to maize. However, the decline in non-enzymatic AOs is not as intense, however, taking into account their initial low level. The stability of GSH stands out against this background. Millet is also characterised by the largest decrease in cytochrome oxidase activity (**Fig. 9**).

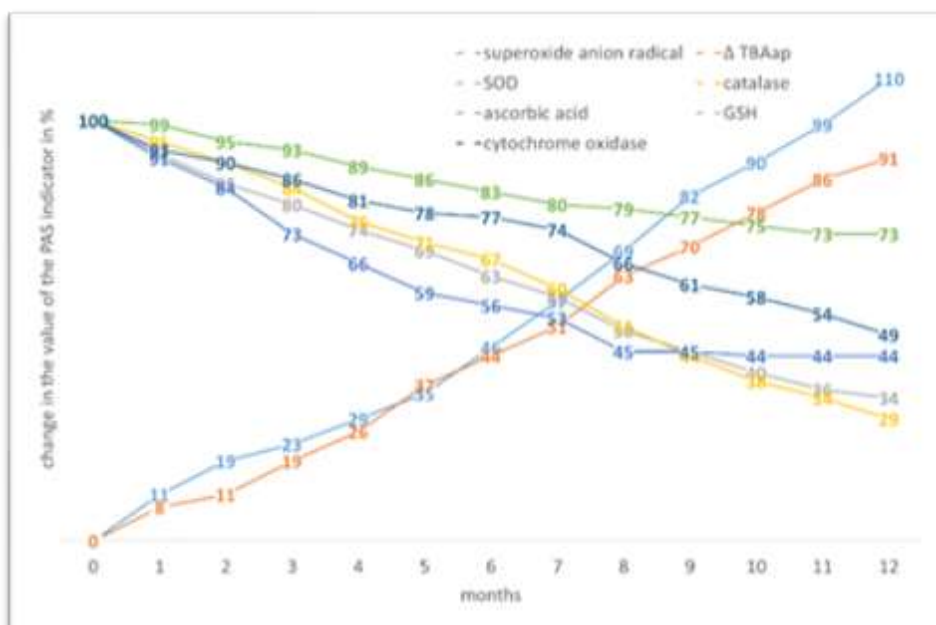


Figure 9. The effect of storage time on the change in the value of the PAS indicators in the tissues of *Panicum miliaceum L.* seeds.

A characteristic feature of rice is a significant decrease in the intensity of the decline in the level of AOs after 6-7 months of storage. Stable decrease of GSH and intermediate indicators of PO activity between the previously described monocots (**Fig. 10**).

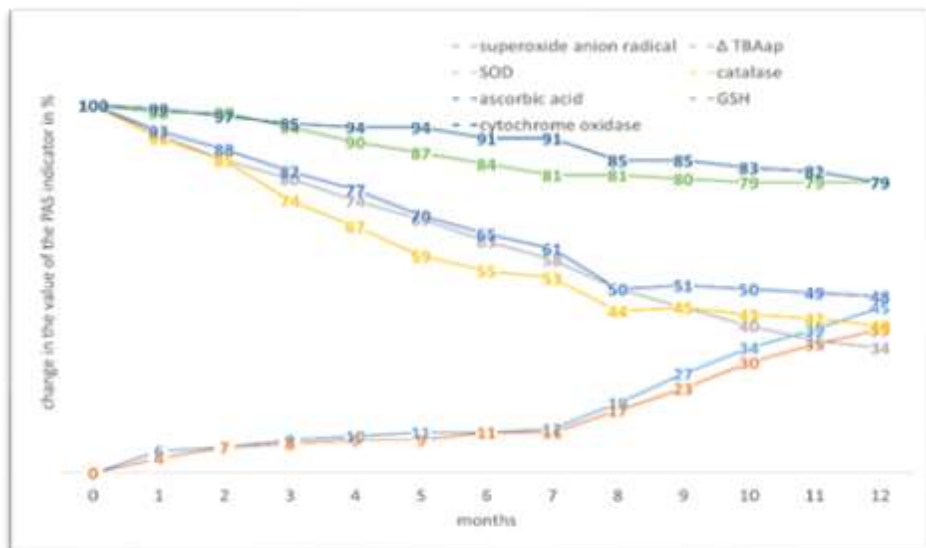


Figure 10. The effect of storage period on the change in the value of the PAS indicators in *Oryza sativa L.* seed tissues.

Indicators of wheat and barley show similarities in the change of PAS values (**Fig. 11**, **Fig. 12**, respectively).

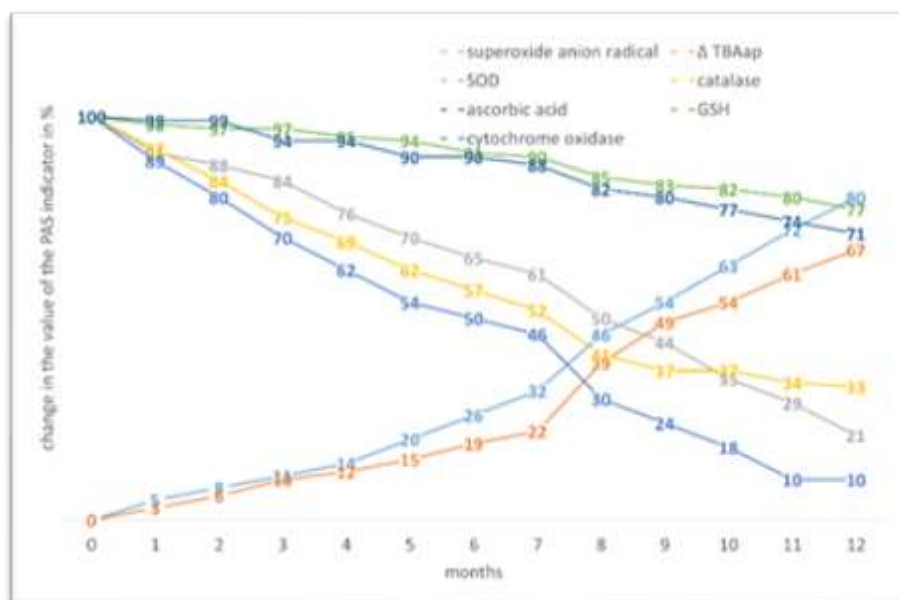


Figure 11. The effect of storage time on the change in the value of the PAS indicators in *Triticum durum* Desf.

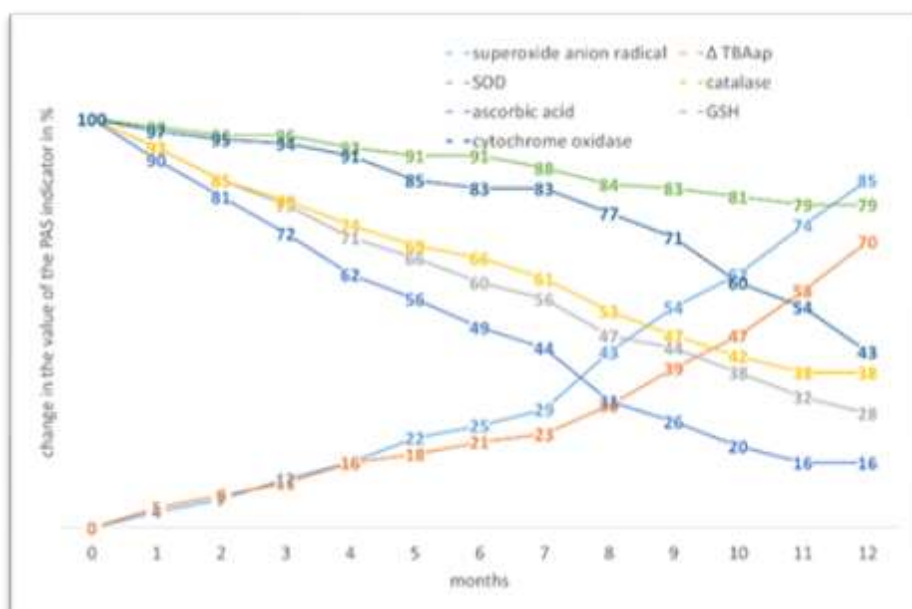


Figure 12. The effect of storage time on the change in the value of the PAS indicators in *Hordeum vulgare* L. seed tissues.

Summing up all the above, we have identified a pattern according to which an uprise in the growth of PO activity and a corresponding decrease in AO activity, which occurs at 9-10 months of storage, is characteristic of the seed tissues of all dicotyledonous experimental samples, while for monocotyledons this uprise occurs at 6-7 months, which indicates an increased sensitivity of seeds to changes in environmental factors and the effects of stress factors. This must be taken into account to ensure the optimal time for planting and caring for seeds.

GSH does not follow this pattern, it has a stable decrease in content, but in no case does it decrease below 60 %, which may indicate its leading role.

It was observed that the overall increase in PO activity with increasing storage time is higher in monocots, and the decrease in AO content is lower in dicots. This may be explained by the quantitative and qualitative

composition of cellular inclusions, which perform not only reserve, trophic, but also protective functions. For example, PUFAs in flax, mustard and sunflower tissues are free radical protectors, and the increased content of protein inclusions in soybean and quinoa tissues is a source of amino acids in the synthesis of enzymatic AOs. The valuable biochemical composition of buckwheat, with its high content of arginine, lysine, cystine, histidine, phosphoric acid, potassium, magnesium and iron, promotes the synthesis of both enzymatic and low-molecular weight AOs.

Conclusion

- 1) The activity of enzymatic antioxidants decreases with increasing storage time. The average value for catalase is 50.15% (60.3% for dicotyledons, 40% for monocots), for SOD – 41.25% (46.8% for dicotyledons, 35.7% for monocots) of the initial level. According to the preservation of catalase activity with the increase of seed storage time, the experimental plants form the following series: *Avena sativa* L., *Fagopyrum esculentum* L., *Chenopodium quinoa* L., *Glycine max* L., *Linum usitatissimum* L., *Helianthus annuus* L., *Sinapis alba* L., *Oryza sativa* L., *Hordeum vulgare* L., *Triticum durum* Desf. *Panicum miliaceum* L., *Zea mays* L. The sequence of plants by preservation of SOD activity is as follows: *Avena sativa* L., *Glycine max* L., *Chenopodium quinoa* L., *Fagopyrum esculentum* L., *Sinapis alba* L., *Linum usitatissimum* L., *Oryza sativa* L., *Panicum miliaceum* L., *Helianthus annuus* L., *Hordeum vulgare* L., *Triticum durum* Desf. *Zea mays* L.
- 2) The concentration of low-molecular-weight antioxidants decreases with increasing storage time. The average value for AA is 32.15% (32.3% for dicotyledons, 32.2% for monocots), for GSH - 75.6% (75% for dicotyledons, 76.2% for monocots) of the initial level. According to the preservation of ascorbic acid concentration with the increase of seed storage time, the experimental plants form the following series: *Avena sativa* L., *Fagopyrum esculentum* L., *Oryza sativa* L., *Panicum miliaceum* L., *Glycine max* L., *Chenopodium quinoa* L., *Linum usitatissimum* L., *Sinapis alba* L., *Hordeum vulgare* L., *Zea mays* L., *Helianthus annuus* L., *Triticum durum* Desf. The sequence of plants by preservation of GSH content is as follows: *Glycine max* L., *Avena sativa* L., *Chenopodium quinoa* L., *Oryza sativa* L., *Hordeum vulgare* L., *Triticum durum* Desf., *Panicum miliaceum* L., *Linum usitatissimum* L., *Helianthus annuus* L., *Fagopyrum esculentum* L., *Sinapis alba* L., *Zea mays* L.
- 3) The increase in the content of superoxide radical in the seed tissues of the experimental plants with an increase in the storage period to 12 months is 64.7% on average (54.7% for dicotyledons, 74.7% for monocots). According to the increase of superoxide concentration with the increase of seed storage time, the experimental plants form the following row: *Avena sativa* L., *Glycine max* L., *Chenopodium quinoa* L., *Fagopyrum esculentum* L., *Oryza sativa* L., *Sinapis alba* L., *Linum usitatissimum* L., *Triticum durum* Desf. *Hordeum vulgare* L., *Helianthus annuus* L., *Panicum miliaceum* L., *Zea mays* L.
- 4) The concentration of TBA-active tropoids in the seed tissues of the experimental plants increased by an average of 50.15% over 12 months of storage (37.8% for dicotyledons, 62.3% for monocots). According to the increase in the content of TBA-active tropoids with the increase in the storage time of seeds, the experimental plants form the following series: *Avena sativa* L., *Fagopyrum esculentum* L., *Glycine max* L., *Chenopodium quinoa* L., *Linum usitatissimum* L., *Oryza sativa* L., *Sinapis alba* L., *Triticum durum* Desf. *Hordeum vulgare* L., *Helianthus annuus* L., *Panicum miliaceum* L., *Zea mays* L.
- 5) Cytochrome oxidase activity decreased by 71.4% on average during the experiment (76% for dicotyledons, 66.8% for monocots). The sequence of plants according to the preservation of cytochrome oxidase activity in seed tissues during one-year storage is as follows: *Avena sativa* L., *Fagopyrum esculentum* L., *Glycine max* L., *Sinapis alba* L., *Oryza sativa* L., *Chenopodium quinoa* L., *Triticum durum* Desf., *Zea mays* L., *Linum usitatissimum* L., *Helianthus annuus* L., *Panicum miliaceum* L., *Hordeum vulgare* L.
- 6) The percentage of increase in the level of RPE and decrease in the FRPO of protection with an increase in the storage time of tissues depends on the value of the starting level of the PAS indicators.
- 7) The overall increase in PO activity with increasing storage period is higher in monocots, and the decrease in AO content is lower in dicots.
- 8) The seed tissues of all dicotyledonous experimental samples are characterised by an uprise in the growth of PO activity and a corresponding decrease in AO activity, which occurs at 9-10 months of storage, while for monocotyledons this uprise occurs at 6-7 months, indicating an increased sensitivity of seeds to changes in environmental factors and the effects of stress factors, which should be taken into account to ensure the optimal time for planting and caring for seeds.

The prospect of further scientific research is the study of changes in the content of antioxidants, free radicals and their transformation products in the edible parts of fruits and vegetables, as well as the search for ways

to preserve their antioxidant activity. It is of great practical importance in nutrition, food hygiene and increased relevance among supporters of a healthy lifestyle.

Bibliographic References

- Apel, K., & Hirt, H. (2004). Reactive oxygen species: metabolism, oxidative stress, and signal transduction. *Annual Review of Plant Biology*, 55(1), 373-399. <https://doi.org/10.1146/annurev.arplant.55.031903.141701>
- Baiano, A., & Del Nobile, M. A. (2016). Antioxidant Compounds from Vegetable Matrices: Biosynthesis, Occurrence, and Extraction Systems. *Critical Reviews in Food Science and Nutrition*, 56(12), 2053-2068. <https://doi.org/10.1080/10408398.2013.812059>
- Bartoli, C. G., Casalongue, C. A., Simontacchia, M., Marquez-Garciac, B., & Foyer, C. H. (2013). Interactions between a hormone and redox signaling pathways in the control of growth and cross-tolerance to stress. *Environmental and Experimental Botany*, 94, 73-88. <http://dx.doi.org/10.1016/j.envexpbot.2012.05.003>
- Berwal, M.K., & Ram, C. (2019). *Superoxide Dismutase: A stable biochemical marker for abiotic stress tolerance in higher plants*. Open access peer-reviewed chapter. DOI: <https://doi.org/10.5772/intechopen.82079>
- Bobrova, M., Holodaieva, O., Koval, S., Kucher, O., & Tsviakh, O. (2021). The effect of hypothermia on the state of the prooxidant-antioxidant system of plants. *Revista de la Universidad del Zulia*, 12(33), 82-101. <https://doi.org/10.46925/rdluz.33.07>
- Bobrova, M., Holodaieva, O., Arkushyna, H., Larycheva, O., & Tsviakh, O. (2020). The value of the prooxidant-antioxidant system in ensuring the immunity of plants. *Revista de la Universidad del Zulia*, 11(30), 237-266. <https://doi.org/10.46925/rdluz.30.17>
- Bobrova, M., Holodaieva, O., Koval, S., Kucher, O., & Tsviakh, O. (2022) Features of changes in prooxidant- antioxidant balance of tissues during activation of seed germination. *Journal of the University of Zulia*, 13(37), 362-382. <https://doi.org/10.46925/rdluz.37.23>
- Dat, J., Vandenabeele, S., Vranova, E. V. M. M., Van Montagu, M., Inzé, D., & Van Breusegem, F. (2000). Dual action of the active oxygen species during plant stress responses. *Cellular and Molecular Life Sciences CMLS*, 57, 779-795.
- Dickinson M. (2003). *Molecular plant pathology*. London, New York: BIOS Scientific Publishers, 273 p. <https://doi.org/10.4324/9780203503300>
- Dmytriiev O.P., & Kravchuk, Z.M. (2005). Active forms of oxygen and immunity of plants. *Cytology and genetics*, 39(4), 64-75. <http://dspace.nbuv.gov.ua/handle/123456789/126766>
- Foyer C. H., & Noctor G. (2009). Redox regulation in photosynthetic organisms: signaling, acclimation, and practical implications. *Antioxidants & redox signaling*, 11(4), 861-905. <https://doi.org/10.1089/ars.2008.2177>
- Gautam, V., Kaur, R., Kohli, S.K., Verma, V., Kaur, P., Singh, R., Saini, P., Arora, S., Thukral, A.K., Karpets, Yu.V., Kolupaev, Yu.E., & Bhardwaj, R. (2017). *ROS compartmentalization in plant cells under abiotic stress condition. Reactive Oxygen Species and Antioxidant Systems in Plants: Role and Regulation under Abiotic Stress*. Singapore: Springer, pp. 89-114.
- Gill, S. S., & Tuteja, N. (2010). Reactive oxygen species and antioxidant machinery in abiotic stress tolerance in crop plants. *Plant Physiology and Biochemistry*, 48, 909-930. <https://doi.org/10.1016/j.plaphy.2010.08.016>
- Govindaraj, M., & Poomaruthai, M., & Albert, A. (2017). Role of antioxidant in seed quality-a review. *Agricultural Reviews*, 38, 180-190. DOI: 10.18805/ag.v38i03.8977
- Halliwell, B. (2006). Reactive species and antioxidants. Redox biology is a fundamental theme of aerobic life. *Plant physiology*, 141(2), 312-322. <https://doi.org/10.1104/pp.106.077073>
- Hasanuzzaman, M., Nahar, K., Anee, T.I., & Fujita, M. (2017). Glutathione in plants: Biosynthesis and physiological role in environmental stress tolerance. *Physiology and molecular biology of plants*, 23, 249-268. <https://doi.org/10.1007/s12298-017-0422-2>
- Hasanuzzaman, M., Bhuyan, M. B., Anee, T. I., Parvin, K., Nahar, K., Mahmud, J. A., & Fujita, M. (2019). Regulation of ascorbate-glutathione pathway in mitigating oxidative damage in plants under abiotic stress. *Antioxidants*, 8(9), 384. <https://doi.org/10.3390/antiox8090384>
- Huang, M., & Guo, Z. (2005). Responses of antioxidant system to chilling stress in two rice cultivars differing in sensitivity. *Biologia plantarum*, 49, 81-84. <https://doi.org/10.1007/s00000-005-1084-3>
- Janků, M., Luhová, L., & Petřivalský, M. (2019). On the Origin and Fate of Reactive Oxygen Species in Plant Cell Compartments. *Antioxidants*, 8(4), 105. <https://doi.org/10.3390/antiox8040105>

- Kiprovski, B., Mikulic-Petkovsek, M., Slatnar, A., Veberic, R., Stampar, F., Malencic, D., & Latkovic, D. (2015). Comparison of phenolic profiles and antioxidant properties of European *Fagopyrum esculentum* cultivars. *Food Chem*, 185, 41-47. <https://doi.org/10.1016/j.foodchem.2015.03.137>
- Kohen, R., & Nyska, A. (2002) Oxidation of biological systems: oxidative stress phenomena, antioxidants, redox reactions, and methods for their quantification. *Toxicologic Pathology*, 30(6), 620-650. <https://doi.org/10.1080/01926230290166724>
- Kolupaev, Yu.E., Karpets, Yu.V., & Kabashnikova, L.F. (2019) Antioxidative system of plants: cellular compartmentalization, protective and signaling functions, mechanisms of regulation. *Applied Biochemistry and Microbiology*, 55(5), 441-459. <https://doi.org/10.1134/S0003683819050089>
- Kumar S., Malik J., Thakur P., Kaistha S., Sharma K.D., Upadhyaya H.D. ... & Nayyar, H (2011) Growth and metabolic responses of contrasting chickpea (*Cicer arietinum* L.) genotypes to chilling stress at reproductive phase. *Acta physiologiae plantarum*, 33, 779-787. <https://doi.org/10.1007/s11738-010-0602y>
- Marrocco, I., Altieri, F., & Peluso, I. (2017). Measurement and Clinical Significance of Biomarkers of Oxidative Stress in Humans. *Oxidative medicine and cellular longevity*, 2017(1), 6501046. <https://doi.org/10.1155/2017/6501046>
- Mittler, R. (2017). ROS Are Good. *Trends in plant science*, 22(1), 11-19. <https://doi.org/10.1016/j.tplants.2016.08.002>
- Morales, M., & Munné-Bosch, S. (2019). Malondialdehyde: Facts and Artifacts. *Plant physiology*, 180(3), 1246-1250. <https://doi.org/10.1104/pp.19.00405>
- Nandi, A., Yan, L. J., Jana, C. K., & Das, N. (2019). Role of catalase in oxidative stress-and age-associated degenerative diseases. *Oxidative medicine and cellular longevity*, 2019(1), 9613090. <https://doi.org/10.1155/2019/9613090>
- Oracz, K., & Karpinski, S. (2016). Phytohormones Signaling Pathways and ROS Involvement in Seed Germination. *Frontiers in Plant Science*, 7, 864. <https://doi.org/10.3389/fpls.2016.00864>
- Pacheco, J. H. L., Carballo, M. A., & Gonshebbat, M. E. (2018). "Antioxidants against environmental factor-induced oxidative stress," in *Nutritional Antioxidant Therapies: Treatments and Perspectives*, K. H. Al-Gubory, Ed., vol. 8, pp. 189-215. Cham, Switzerland: Springer. <https://doi.org/10.1007/978-3-319-67625-8>
- Paciolla, C., Fortunato, S., Dipierro, N., Paradiso, A., & De Leonardis, S. (2019). Vitamin C in Plants: From Functions to Biofortification. *Antioxidants*, 8(11), 519. <https://doi.org/10.3390/antiox8110519>
- Padayatty, S. J., Katz, A., Wang, Y., Eck, P., Kwon, O., Lee, J. H., ... Levine, M. (2003). Vitamin C as an Antioxidant: Evaluation of Its Role in Disease Prevention. *Journal of the American College of Nutrition*, 22(1), 18-35. <https://doi.org/10.1080/07315724.2003.10719272>
- Rampon, C., Volovitch, M., Joliot, A., & Vríz, S. (2018) Hydrogen Peroxide and Redox Regulation of Developments. *Antioxidants*, 7(11), 159. <https://doi.org/10.3390/antiox7110159>
- Pang, Y., Ahmed, S., Xu, Y., Beta, T., Zhu, Z., Shao, Y., & Bao, J. (2018). Bound phenolic compounds and antioxidant properties of whole grain and bran of white, red and black rice. *Food Chem*, 240, 212-221. <https://doi.org/10.1016/j.foodchem.2017.07.095>
- Rhoads, D. M., Umbach, A. L., Subbaiah, C. C., & Siedow, J. N. (2006). Mitochondrial reactive oxygen species. Contribution to oxidative stress and interorganellar signaling. *Plant physiology*, 141(2), 357-366. <https://doi.org/10.1104/pp.106.079129>
- Rietjens, I. M., Boersma, M. G., de Haan, L., Spenkelink, B., Awad, H. M., Cnubben, N. H., ... & Koeman, J. H. (2002) The pro-oxidant chemistry of the natural antioxidants vitamin C, vitamin E, carotenoids and flavonoids. *Environmental toxicology and pharmacology*, 11(3-4), 321-333. [https://doi.org/10.1016/s1382-6689\(02\)00003-0](https://doi.org/10.1016/s1382-6689(02)00003-0)
- Scandalios, J.G. (2002). The rise of ROS. *Trends in biochemical sciences*, 27(9), 483-486. [https://doi.org/10.1016/S0968-0004\(02\)02170-9](https://doi.org/10.1016/S0968-0004(02)02170-9)
- Shao, H. B., Chu, L. Y., Shao, M. A., Jaleel, C. A., & Hong-mei, M. (2008). Higher plant antioxidants and redox signaling under environmental stresses. *Comptes rendus. Biologies*, 331(6), 433-441. <https://doi.org/10.1016/j.crv.2008.03.011>
- Smirnoff, N. (2005) *Antioxidants and reactive oxygen species in plants* (pp. 169-177). Oxford: Blackwell.
- Smirnoff, N., & Arnaud, D. (2019) Hydrogen peroxide metabolism and functions in plants. *New phytologist*, 221(3), 1197-1214. <https://doi.org/10.1111/nph.15488>
- Song, W., Derito, C.M., Liu, M.K., He, X., Dong, M., & Liu, R.H. (2010) Cellular antioxidant activity of common vegetables. *Journal of Agricultural and Food Chemistry*, 58(11), 6621-6629. <https://doi.org/10.1021/jf9035832>

- Szalai, G., Kellos, T., Galiba, G., & Kocsy, G. (2009) Glutathione as an antioxidant and regulatory molecule in plants under abiotic stress conditions. *Journal of Plant Growth Regulation*, 28, 66-80. <https://link.springer.com/article/10.1007/s00344-008-9075-2>
- Van Breusegem, F., & Dat, J. (2006) Reactive oxygen species in plant cell death. *Plant physiology*, 141(2), 384-390. <https://dx.doi.org/10.1104%2Fpp.106.078295>
- Wikström, M., Krab, K., & Sharma, V. (2018). Oxygen activation and energy conservation by cytochrome c oxidase. *Chemical reviews*, 118(5), 2469-2490. <https://doi.org/10.1021/acs.chemrev.7b00664>
- Xu, D. P., Li, Y., Meng, X., Zhou, T., Zhou, Y., Zheng, J., ... & Li, H. B. (2017). Natural antioxidants in foods and medicinal plants: Extraction, assessment and resources. *International journal of molecular sciences*, 18(1), 96. <https://doi.org/10.3390/ijms18010096>
- Yean-Yean, S., & Barlow, P.J. (2004) Antioxidant activity and phenolic content of selected fruit seeds. *Food Chemistry*, 88(3), 411-417. <https://doi.org/10.1016/j.foodchem.2004.02.003>
- Zhang, W., Zhu, Y., Liu, Q., Bao, J., & Liu, Q. (2017). Identification and quantification of polyphenols in hull, bran and endosperm of common buckwheat (*Fagopyrum esculentum*) seeds. *Journal of Functional Foods*, 38, 363-369. <https://doi.org/10.1016/j.jff.2017.09.024>



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Legal foundations as pillars of the anti-corruption fight: an analysis of the activities of judicial and law enforcement agencies

Правові засади як основи боротьби з корупцією: аналіз діяльності судових та правоохоронних органів

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Abstract


This article examines the activities of law enforcement and judicial bodies as a component of anti-corruption mechanisms from the standpoint of the regulatory framework for its functionality. This study offers a new perspective on the fight against corruption by analyzing in detail the role of legal foundations in the activities of law enforcement and judicial bodies. The research establishes that the mechanism for preventing corruption is a means of achieving the goal of ensuring a specific result in the field of anti-corruption. This mechanism consists of the following elements: the goal and task of preventing corruption; objects of corruption prevention; actors preventing corruption; methods of preventing corruption. It is determined that the primary scientific interest is the anti-corruption


Анотація


У статті досліджується діяльність правоохоронних та судових органів як складової антикорупційних механізмів з позиції нормативно-правової бази їх функціонування. Ця робота пропонує новий погляд на боротьбу з корупцією шляхом детального аналізу ролі правових засад діяльності правоохоронних та судових органів. Встановлено, що механізм запобігання корупції є засобом досягнення цілей забезпечення конкретного результату у сфері протидії корупції. Цей механізм складається з таких елементів: мета і завдання запобігання корупції; об'єкти запобігання корупції; суб'єкти запобігання корупції; методи запобігання корупції. Визначено, що першочерговий науковий інтерес становлять

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principles on the basis of which this mechanism is established and operates, as well as anti-corruption standards. The main anti-corruption principles in the activities of domestic law enforcement and judicial bodies are considered in detail, the observance of which creates the basis for an effective and fair fight against corruption, contributes to the strengthening of the rule of law and increases the trust of citizens in law enforcement and judicial bodies.

Regarding anti-corruption standards, they are established at the global, regional, and national levels. It is concluded that anti-corruption standards at the regional level are developed and implemented to fulfill global obligations enshrined in international conventions and agreements. It is proven that the activities of law enforcement and judicial bodies are a key component of anti-corruption mechanisms.

Keywords: corruption, prevention, principles, standards, law enforcement, judicial authorities.

антикорупційні принципи, на основі яких створено та діє цей механізм, а також антикорупційні стандарти. Детально розглянуто основні антикорупційні принципи в діяльності вітчизняних правоохоронних та судових органів, дотримання яких створює підґрунтя для ефективної та справедливої боротьби з корупцією, сприяє зміцненню верховенства права та підвищує довіру громадян до правоохоронних і судових органів.

Що стосується антикорупційних стандартів, то вони встановлюються на глобальному, регіональному та національному рівнях. Зроблено висновок, що антикорупційні стандарти на регіональному рівні розробляються та впроваджуються для виконання глобальних зобов'язань, закріплених у міжнародних конвенціях та угодах. Доведено, що діяльність правоохоронних та судових органів є ключовою складовою антикорупційних механізмів.

Ключові слова: корупція, протидія, принципи, стандарти, правоохоронна діяльність, правоохоронні органи, судові органи.

Introduction

Corruption is for good reason called one of the most dangerous occurrence. Bondarenko et al. (2021) believe that it is a negative social and economic phenomenon, which in various amounts is inherent to all countries of the world. Its existence undermines trust in State institutions, hinders economic development and is a manifestation of the violation of the principle of justice, especially in the context of access to various benefits.

The problem of combating corruption is not new, but it has become particularly acute at the current stage of the state's development. This is due to the need to eliminate the disorganization of public administration system, because the consequences of corruption are already evident even in the mechanisms ensuring the country's defense capability in the face of armed aggression. Such a tendency has always been observed, but it was especially clearly manifested at the present time, causing condemnation in society, a negative reaction among ordinary citizens and concern among foreign partners, which negates efforts to bring order to the country, enhance the prestige of the state on in the international arena.

The creation of effective anti-corruption mechanisms is the key to overcoming its destructive influence. Such mechanisms, which are a system of legal means, integrated and organized in such a way that empowered persons are encouraged to consistently implement actions to combat and prevent corruption, provide a pathway to justice and holding perpetrators accountable for their actions.

The activity of law enforcement and judicial bodies in anti-corruption mechanisms promotes the rule of law and serves as a powerful deterrent against corruption. It is important to emphasize that these agencies play a central role in detecting, investigating and ceasing corruption cases. Their activities are directed not only on detecting violations, but also on systematic preliminary work aimed at preventing similar phenomena.

Therefore, the purpose of the article is to study the activities of law enforcement and judicial agencies as a component of anti-corruption mechanisms.

The Article consists of introduction, presenting the relevance of the chosen topic; methodology, describing the methods used to obtain appropriate results; literature review, examining the works by the scholars, who studied the problem under consideration; results and discussion section, revealing the role of law enforcement and judicial bodies in anti-corruption mechanism, the essence of the latter, its structural elements, the categories of corruption prevention entities, the main anti-corruption principles in the activities of domestic law enforcement and judicial bodies; conclusions section, summarizing that the legal framework for the law enforcement and judicial bodies activities in the mechanisms of combating corruption is of dual legal nature.

Methodology

The development of scientific knowledge is characterized not only by expanding the range of solved theoretical and practical tasks, but also increasing attention to the methods and methodology of scientific activity. Obtaining the required result directly depends on the original theoretical position, on the principled approach to posing the problem and determining the path of the research. Research methods play a key role in preparing the Article, as they help to systematize and analyze information, as well as form reasonable conclusions based on the data obtained. Empirical and theoretical methods of scientific knowledge were chosen taking into account the scientific problem and the subject matter of the study.

In particular, with the help of the phenomenological method, the phenomenon of corruption, its social danger and negative impact were investigated. The application of this approach does not deal with other phenomena mentioned in the Article.

Dialectical method was used for examining the concepts of corruption, corruption-related offences and corruption preventing mechanism. The limitation of this method lies in the finite number of definitions used in the work.

Analytical method was useful when analyzing the works by foreign and domestic scientists, who studied the role of judiciary and law enforcement in combating and preventing corruption. The limitation of this method lies in the restricted number of the examined papers by foreign and domestic scientists, who elaborated this problem.

Legal and dogmatic method was helpful when studying legal instruments, enshrining main anti-corruption principles in the activities of domestic law enforcement and judicial bodies, as well as anti-corruption standards established on the basis of and to meet global standard at the regional level. The limitation of this method lies in the restricted number of legal acts analyzed within the Article.

System and structural method made it possible to highlight the system of anti-corruption foundations in the activities of domestic law enforcement and judicial bodies. This method was also applied for identifying the elements of corruption prevention mechanism. The limitation of this method is that this system is created by the Authors of the Article, consequently it has a subjective aspect.

Generalization and abstraction methods were used when examining anti-corruption standards, which are established both at the global and at the regional and national levels and provide for the measures aimed at preventing, detecting and fighting corruption in all its forms. The limitation of this method lies in the personal experience of the Authors, who highlighted these standards.

Summarization method helped in drawing up the relevant conclusions to the research, which are limited by the data presented in the Article.

The purpose of limitations in the study is the accuracy and reliability of the results. With their help, a clear algorithm of actions is developed, the qualitative characteristics of the material are increased, goals and tasks are optimally specified, and the effectiveness of the results is enhanced. Each method has its own characteristics and limitations, which determine the direction of their application. The place of each method is determined according to the stage of the research and factual material in a specific sequence. Limitations that influenced the choice of research methods are: limited reliable data; constrained previous research on this topic; bias of the research sample; confined approach to data collection.

Literature Review

The fight against corruption has become one of the most urgent problems for many countries in the modern world. These negative phenomenon undermines legality and trust in state institutions, violates public order. In this context, the role of law enforcement agencies becomes particularly important, as they are key participants in ensuring legality, combating corruption and ensuring public safety. That is why, this issue is widely reported in various sources.

Doig et al. (2012) stress that corruption prevention is one of the main functions exercised by anti-corruption agencies (prosecution authorities, the police, independent bodies with specific preventive mandates, national coordination structures that are not independent legal institutions) around the world.

According to Chêne and Hodess (2009), effective law enforcement is essential to ensure the credibility of anti-corruption efforts and break the cycle of impunity. However, a set of conditions should be fulfilled for their productive activity in this direction: strong government commitment against corruption, supportive legal and institutional framework, sufficient state capacity and stability.

Kusumawati et al. (2020) state that qualified professional law enforcement officers is key element for fighting corruption. Law enforcement efforts against corruption will succeed if law enforcement officers play an active role in the efforts of prevention and dealing with corruption cases objectively. The authors highlight internal and external problems faced by law enforcement agencies in eradicating corruption, in particular: detention problems, failing to meet the community expectations, lack of qualified human resources, weak technical abilities, budget limitations (internal problems); legal professional organization factors, coordination with other institutions is not optimal, complexity of corruption cases, tolerance of corruption in society, low level of public legal awareness.

The same is opinion by Vasylevych et al. (2021), who believe that the fight against corruption in Ukraine is one of the main tasks of law enforcement agencies. The National Police of Ukraine is an executive body whose main tasks are the protection of human rights and freedoms, the fight against crime, the maintenance of public safety and order. To perform these and a number of other functions, police officers must act lawfully, transparently and impartially.

Kurbatova (2019) analyzed the state of counteracting corruption in Ukraine and the role of prosecutors in organizing counteraction to these manifestations. It is emphasized that today the state of counteraction to corruption is rather low in comparison with the developed European countries, which hinders the full realization of the rights and freedoms guaranteed by the Constitution of the citizens, the comprehensive development of civil society creates a negative image of the Ukrainian state in the international arena. Considerable attention is paid to Ukraine's cooperation with the European institutions in combating corruption.

Zagorodnyuk et al. (2022) considered the role of law enforcement and judicial authorities ensuring law and order. The authors came to the conclusion that it is expedient to standardize the role of each law enforcement and judicial body in ensuring legality and law and order; the development of handbooks, namely, dictionaries as a catalog of appeals based on the facts of specific provision and renewal of the rights and freedoms of an individual and a citizen. Scientific interpretation of legislation under modern conditions in the sphere of compliance with legality and law and order cannot be considered complete, as it requires clarification of the scope of powers of representatives of state authorities in accordance with modern requirements of the society development.

Maistrenko et al. (2024) analyzed the importance and effectiveness of law enforcement agencies in combating corruption. The authors investigated the current situation with corruption, noted the threats it poses to society, and determined the need for an effective response by law enforcement agencies. Various aspects, such as the strengthening of anti-corruption legislation, the promotion of transparency and openness in the activities of power structures, as well as the development of cooperation with the public and international partners were identified and substantiated. An analysis of current trends and suggestions for further steps in improving governance and fighting corruption were proposed.

In recent years, new vectors for the implementation of anti-corruption policy related to the reforms of the judiciary, public authorities and civil service, anti-corruption bodies with special status, ensuring the

inevitability of legal liability for the commission of corruption offenses, have been launched in our country. In addition to the formation of new bodies engaged in combating this phenomenon, the corresponding legal framework ensuring their activities was created. At the same time, the existing regulatory framework governing the work of agencies that "traditionally" fight corruption in Ukraine, was amended. All this requires new approaches in the study of their powers and legal bases of their activities.

Results and Discussion

Ukraine's path of joining the European community contributed to the launch of the mechanism of building anti-corruption policy institutions in Ukraine after the Revolution of Dignity (Kotukov et al., 2023). Our State, based on the experience of other countries, has gradually come to understanding the need to divide the powers to combat corruption between different entities, as well as to "take" such authority from entities that were not involved in such activities. As a result, the National Police of Ukraine with a new philosophy of law enforcement service was established, and the Higher Anti-Corruption Court, whose task is to administer justice to protect individuals, society and the State from corruption and corruption-related offenses and exercise judicial control over pre-trial investigation of these criminal offenses, was founded in the Ukrainian justice system.

Before revealing the role of law enforcement and judicial bodies in anti-corruption mechanism, it is appropriate to define its essence.

In general, the mechanism is one of the most interesting and at the same time controversial categories of administrative law. This is due to the dynamic development of social relations, the construction of a legal, democratic and European state, where an individual, his/her life and health, inviolability and security are recognized as the highest social value (Dzhafarova, 2018, p. 42). The concepts "mechanism of rights", "mechanism of provision", "mechanism of activity", "mechanism of implementation" are reflected in the works of scientists. Undoubtedly, there are the limits of a certain essential aspect of the phenomenon under investigation, but the interdisciplinary nature of the category, as well as the variation of conceptual combinations of other processes or phenomena united with the mechanism by a common task, entails a comprehensiveness of its content (Prikhodko, 2020).

Alferov (2011, p. 23), having characterized the administrative and legal mechanism of combating corruption, understands it as a system of legal means that are integrated and organized in such a way that they help certain persons to consistently implement actions to combat corruption with the help of measures of an organizational and legal nature and measures of administrative coercion.

According to Hladun (2000, p. 5), the administrative and legal mechanism for combating corruption includes the provisions preventing corruption violations and the introduction of measures of administrative and legal responsibility in case of their commission, identifying the list of law enforcement agencies combating corruption and their powers. The fight against corruption should be formed through a symbiosis of prevention, law enforcement and liability. At the same time, the main goal of the anti-corruption state strategy is the formation of a high-quality prevention system.

In general, the corruption prevention mechanism is a means of achieving the goal, ensuring a specific result in the field of anti-corruption. This mechanism consists of the following elements:

- Goals and objectives of corruption prevention;
- Objects of corruption prevention;
- Subjects of corruption prevention;
- Methods of preventing corruption.

The general goals of preventing corruption are to protect the interests of individuals, society, the state, and business from corruption offenses; to ensure transparent and effective state administration and business; to reduce the level of corruption to the socially acceptable limit.

Applied objectives of corruption prevention, which are aimed at solving specific problems in various spheres of social life, are defined in the Anti-corruption Strategy, the purpose of which is to achieve significant progress in corruption preventing and countering, as well as ensuring coherence and systematic anti-corruption activities of all state authorities and local self-government bodies, was adopted. In this Anti-

corruption Strategy, corruption is considered as a key obstacle to stable economic growth and the building of effective and inclusive democratic institutions, while the previous one was focused on priorities related to the creation of a system of modern anti-corruption tools (legal institutions) and the development of a system of anti-corruption bodies that were supposed to ensure effective implementation of these tools (National Agency on Corruption Prevention, 2022).

The results of the analysis of the state of corruption in Ukraine, the effectiveness of the anti-corruption policy of previous periods, international standards and the best global practices in the field of corruption prevention and counteraction enabled to formulate the following basic principles of the anti-corruption policy for 2021 – 2025:

- 1) Optimization of state and local self-government functions,
- 2) Digital transformation of the exercise of powers by state authorities and local self-government bodies, transparency of activities and data disclosure as a basis for minimizing corruption risks in their activities;
- 3) Creating more convenient and legal means of meeting the needs of natural and legal persons to counter existing corrupt practices in contrast to existing corrupt practices;
- 4) Ensuring the inevitability of legal liability for corruption and corruption-related offenses, which creates an additional deterrent effect for all actors of legal relations;
- 5) Formation of public intolerance to corruption, promotion of a culture of virtue and respect for the rule of law.

Corruption prevention entities can be divided into four categories:

- a) Entities with general powers in the field of anti-corruption (the Verkhovna Rada of Ukraine, the President of Ukraine, the Cabinet of Ministers of Ukraine);
- b) Actors with special powers in the anti-corruption area (National Anti-Corruption Bureau of Ukraine (NABU), National Agency on Corruption Prevention (NACP), Specialized Anti-Corruption Prosecutor's Office of the General Prosecutor's Office of Ukraine (SAPO);
- c) Entities combating corruption within the framework of the main functions (the National Police of Ukraine, the Security Service of Ukraine, the State Bureau of Investigation, the Ministry of Justice of Ukraine, the Prosecutor's Office, National Agency of Ukraine for Finding, Tracing and Management of Assets Derived from Corruption and Other Crimes (Asset Recovery and Management Agency or ARMA), the State Financial Monitoring Service);
- d) Entities participating in the implementation of measures to prevent and combat corruption (the Council of the Business Ombudsman, international organizations and their representations in Ukraine, the public, as well as individuals working on the implementation of programs (projects) and standards in the field of anti-corruption policy).

Methods of preventing corruption are ways and means of protecting the interests of individuals, society, and business from corruption, reducing the level of corruption in the country. The following are the methods of corruption prevention: the method of requirements, restrictions and prohibitions; electronic declaration; the method of openness and transparency of the activities of state authorities and local self-government; encouraging good behavior by officials; checking the integrity of business partners when concluding agreements; control over compliance with the requirements of anti-corruption legislation; public influence; corruption manifestations exposure; special confiscation; search and recovery of assets; prosecution for committing corruption and corruption-related offenses (Holovkin, 2018).

However, there is certain set of elements within each mechanism that are connected and closely interact with each other to solve common tasks and achieve the overall goal of the entire mechanism existence. Therefore, the mechanism is a system of processes, techniques and methods that become an important tool for achieving both short- and long-term goals through making correct and timely decisions (Prikhodko, 2020).

In the context of studying the anti-corruption mechanism, anti-corruption principles on the basis of which it is formed and operated, as well as anti-corruption standards, are of primary scientific interest.

The main anti-corruption principles in the activities of domestic law enforcement and judicial bodies are:

1. The principle of respect for human rights, according to which all measures aimed at combating corruption must be carried out with respect for human rights and freedoms. It provides for the protection of the interests of both victims of corruption and those who are suspected or accused of corruption, with the additional observance of the principle of justice. The specified principle is fundamental one and enshrined in the Basic Law of Ukraine, which states that “human rights and freedoms and their guarantees determine the essence and orientation of the activity of the State”, and “to affirm and ensure human rights and freedoms is the main duty of the State” (Law No. 254k/96-VR, 1996).
2. The principle of legality, which obliges the authorized bodies to comply with the rules of current legislation in their activities. Adherence to this principle ensures fairness, predictability and transparency in the fight against corruption, which are the necessary conditions for building confidence in the State institutions. The specified principle is enshrined in the acts regulating the activities of law enforcement agencies (for example, this is Clause 2, Part 1, Article 3 of the Law of Ukraine "On the State Bureau of Investigation" (“The State Bureau of Investigation is organized and operates on the basis of legality”) (Law No. 794-VIII, 2015); Article 8 of the Law of Ukraine "On the National Police" “The police act exclusively on the basis, within the limits of authority and in the manner determined by the Constitution and laws of Ukraine” (Law No. 580-VIII, 2015). If we talk about judicial bodies, the principle of legality has a somewhat different connotation in the legal instruments regulating their activities and sounds like “the principle of equality of all before the law”. For example, this principle is enshrined in Clause 7, Part 2, Art. 2 of the Code of Administrative Procedure of Ukraine (“in cases of appeal against decisions, actions or omissions of the subjects of authority, administrative courts check whether they are adopted in accordance with the principle of equality before the law, preventing all forms of discrimination”) (Law No. 2747-IV, 2005).
3. The principle of transparency and accountability is also important in the activities of law enforcement and judicial bodies, which should be open to public scrutiny. Ensuring access to information about their activities, reporting on the work performed, and involving the public in the decision-making process minimizes opportunities for corruption and increases the level of citizens’ trust. For example, Part 2, Art. 11 of the Law of Ukraine “On the Judiciary and the Status of Judges” states that “information about the court hearing the case, the parties to the dispute and the subject of the claim, the date of receipt of the statement of claim, appeal, cassation appeal, application for review of the court decision, stages of the case consideration, place, date and time of the hearing, transfer of the case from one court to another shall be open and must be promptly published on the official web portal of the judiciary of Ukraine, except as otherwise provided by law” (Law No. 1402-VIII, 2016). At the same time, the Law of Ukraine “On the State Bureau of Investigation” stipulates a clear requirement to organize and act on the basis of “openness and transparency for society and democratic civil control, accountability and controllability to the State bodies defined by law” (Law No. 794-VIII, 2015).
4. Principle of impartiality and objectivity, which obliges to act without the influence of personal interests, political or other external influences, ensuring that the investigation and trial is fair and all participants in the process have equal rights and opportunities to protect their interests. Thus, the political neutrality of all law enforcement and judicial bodies, as well as the prohibition of participation in political parties and organizations by their employees is enshrined at the legislative level. For example, Part 4, Art. 10 of the Law of Ukraine "On the National Police" states that police officers are prohibited from expressing a personal attitude to the activities of political parties while performing official duties, as well as using official duties for political purposes” (Law No. 580-VIII, 2015). A similar prohibition can be found in the Law of Ukraine "On Corruption Prevention", according to which "the use of the National Agency on Corruption Prevention for party, group or private interests shall not be allowed. Activities of political parties at the National Agency shall be prohibited” (Law of Ukraine No. 1700-VII, 2014).
5. The principle of punishment inevitability. In order to effectively combat corruption, it is important that guilty persons do not avoid responsibility. This means that every case of corruption must be properly investigated and the guilty persons punished according to the law. The inevitability of punishment acts as a deterrent against potential offenders. This principle is enshrined in both criminal and administrative legislation.
6. The principle of professionalism, which assumes that effective anti-corruption activity requires a high level of professionalism from law enforcement and judicial bodies. This requires sufficient skilled staff, regular upgrading of their qualifications, as well as the use of modern methods and technologies in the fight against corruption. For example, the requirement regarding the professional level is mandatory for the candidacy for the position of the Head of the National Agency on Corruption Prevention. In

turn, the State guarantees that the employees of the apparatus of the Agency and its territorial bodies regularly, but at least once every two years, undergo mandatory training".

7. The principle of international cooperation. This principle is extremely important in combating corruption, because, as mentioned above, corruption is a global problem, therefore cooperation with international organizations and law enforcement agencies of other countries is key to effectively combating its manifestations. This principle provides for the exchange of information, joint investigations, as well as the coordination of legal norms and standards for combating corruption. For example, the National Agency on Corruption Prevention and the Basel Institute of Management (Switzerland) recorded their relationship in a Memorandum of cooperation and began joint work in the direction of combating corruption. The document was signed on June 21, 2024 by the Head of the National Agency on Corruption Prevention Viktor Pavluschyk and the President of the Basel Institute Peter Maurer during the International Anti-Corruption Conference (IACC) in Vilnius (Lithuania). It provides for the strengthening of the direction of corruption prevention, in particular with the use of new digital tools and the training of employees of the Agency, participating in the conduct of lifestyle monitoring and acquisition of unwarranted assets verification, as well as the analysis of corruption risks. Ukrainian specialists will now be able to use the assets and tools of the Basel Institute (National Agency on Corruption Prevention, 2024).

Thus, compliance with these principles creates the basis for an effective and fair fight against corruption, contributes to the strengthening of the rule of law and increasing the trust of citizens in law enforcement and judicial bodies.

As for the anti-corruption standards, they are established both at the global and at the regional and national levels. At the global level, an example of an act, in which such standards are enshrined, is the United Nations Convention against Corruption (UNCAC) (United Nations Office on Drugs and Crime, 2004). It provides for a number of measures aimed at preventing, detecting and fighting corruption in all its forms. The UNCAC covers a wide range of standards that must be implemented by Member States to create effective anti-corruption mechanisms.

In particular, the Convention provides for: 1) the creation of agencies responsible for corruption prevention, as well as the implementation of codes of conduct for civil servants; 2) criminalization of corruption acts in the law (bribery, illegal enrichment, money laundering, etc.), as well as the introduction of effective law enforcement mechanisms to bring perpetrators to justice; 3) provision of legal assistance, extradition, exchange of information and joint investigations aimed at countering transnational corruption; 4) the obligation of States to establish at the national level provisions for the return of illicitly acquired assets to their countries of origin, which is an important element of restoring justice and fighting corruption at the global level.

Thus, the United Nations Convention against Corruption serves as a universal standard that the States can rely on to improve their national anti-corruption policies and ensure an effective fight against corruption at the international level.

The next global standard is enshrined in the Sustainable Development Agenda for the period up to 2030, adopted by all UN member states in 2015 (United Nations, 2015). It contains Goal 17 of sustainable development, which provide for an obligation to significantly reduce corruption and bribery in all forms.

At the regional level, anti-corruption standards are established on the basis of and to meet global standards. Thus, the Council of Europe developed a set of anti-corruption legal standards and entrusted its specialized body – the Group of States against Corruption (GRECO), to supervise their implementation through a dynamic process of mutual evaluation and peer pressure aimed at identifying shortcomings in national anti-corruption policies and accelerating the necessary legislative, institutional and practical reforms. The most important instruments are the Criminal Law Convention on Corruption (along with the Additional Protocol of 2003) (Council of Europe, 2003) and the Civil Law Convention on Corruption (Council of Europe, 1999).

These conventions are supplemented by other legal instruments establishing anti-corruption standards, including the Twenty Guiding Principles Against Corruption enshrined in Resolution (97)24 (Committee of Ministers, 1997), among which are the following: taking measures on corruption prevention; criminalization of national and international corruption; investigation, prosecution and adjudication of

corruption offenses; ensuring appropriate auditing procedures; transparent procedures for public procurement; freedom of the media; research on corruption; international cooperation, etc..

The relevant standards of the Council of Europe also include documents adopted by the Parliamentary Assembly to strengthen the fight against corruption and restore confidence in the efficiency and effectiveness of democratic institutions, such as Resolution 2170 (2017) promoting integrity in governance to tackle political corruption (Parliamentary Assembly, 2017a) (which recognizes that corruption represents a serious threat to the basic principles and values of the Council of Europe and stresses on the importance of the Twenty Guiding Principles for the Fight against Corruption), as well as Resolution 2192 (2017) "Youth against corruption" (Parliamentary Assembly, 2017b) (designed to raise young people's awareness and understanding of corruption). The EU Committee of Ministers has also adopted useful anti-corruption standards, namely Recommendation CM/Rec(2014)7 on the protection of whistleblowers (Committee of Ministers, 2014), as whistleblower protection is not just a matter of legislation; it is also necessary to change society's attitude towards disclosure of information, which often prevents people from reporting important information due to fears of possible negative consequences.

At the regional level, anti-corruption standards are developed and implemented to fulfill global obligations established by international conventions and agreements. The Council of Europe plays a key role in establishing those standards, creating legal instruments and mechanisms to fight corruption that ensure coordination of efforts between Member States and contribute to the improvement of national anti-corruption policies. This organization created a set of rules and recommendations regulating both criminal and civil liability for corruption offenses, and developed principles aimed at strengthening integrity in public administration and restoring confidence in democratic institutions. The implementation of these standards is monitored by the specialized body of the Council of Europe – GRECO, which ensures oversight, exchange of experience and promotes reforms in the participating countries.

In the context of the national level, an example of the adoption of a national standard harmonized with European and international ones by the method of translation is DSTU ISO 37001:2018 (ISO 37001:2016, IDT) "Management systems for combating corruption. Requirements and guidelines for application" (Order No. 507, 2018), which reflects international good practice and contains guidelines for the establishment, implementation, maintenance, review and improvement of the anti-corruption management system. This standard applies only to bribery. It establishes requirements and provides guidance on a management system designed to help an organization to prevent, detect and respond to bribery, comply with anti-corruption laws and voluntary commitments that may be applied to its activities. This standard does not specifically address fraud, cartels and other offenses related to antitrust and competition law, money laundering and other activities related to corruption, although an organization the organization may choose to extend the scope of the management system by involving the activities in question. The requirements of this standard are general and are intended for use by all organizations (or part of the organization), regardless of the type, size and nature of the activity, as well as in the public, private or non-profit sectors of the economy.

The study may be influenced by the perspectives and experiences of the authors, and that this could have affected the selection of sources and the interpretation of the results. Subjective factors may also have a significant impact on setting and solving problems; first of all, these are the researchers' scientific interests and their practical experience, originality of thinking, scientific integrity, relevance of the research topic. The results of the study may not be generalizable to other contexts, as it focuses on the specific case of Ukraine; to push the boundaries of exploration, the experience of foreign States on this issue should be examined. Limitations of the methods described in the Methodology section, are used as well.

Conclusion

The legal basis for the activity of law enforcement and judicial bodies in the mechanisms of combating corruption is of dual legal nature. On the one hand, it ensures the effectiveness of these mechanisms by establishing a clear legal framework for the implementation of their powers, determining the procedures for their implementation, and setting legal consequences for failure or violation of established standards. This enables to maintain the stable and transparent work of law enforcement and judicial bodies, creating effective tools for combating corruption.

On the other one, they are the guarantee that their activities are directed towards ensuring rule of law, protecting the rights of citizens and strengthening public trust in state institutions, requiring them to identify and investigate corruption offenses, fair prosecution of perpetrators, which ensures the inevitability of punishment. This creates a deterrent effect and plays an important role in the formation of an anti-corruption culture in society.

The prospects for the further research are the developments on refining the current legal framework for the law enforcement and judicial bodies' activities in the mechanisms of combating corruption by examining the regulations of foreign States on this issue with an aim of further implementation of the best practices in our legislation.

Bibliographic References

- Alferov, S. M. (2011). *Administrative and legal mechanism of corruption counteraction in the Internal Affairs Bodies*. (PhD Dissertation Abstract). Kharkiv National University of Internal Affairs. <https://acortar.link/dQxH82>
- Bondarenko, O., Utkina, M., Dumchikov, M., Prokofieva-Yanchylenko, D., & Yanishevskaya, K. (2021). Review of the state anti-corruption institutions effectiveness in Ukraine. *Amazonia Investiga*, 10(38), 219-233. <https://doi.org/10.34069/AI/2021.38.02.22>
- Chêne, M., & Hodess, R. (2009). *The Impact of Law Enforcement Interventions on Corruption*. U4 Anti-Corruption Resource Centre. <https://www.u4.no/publications/impact-of-law-enforcement-interventions-on-corruption.pdf>
- Committee of Ministers (1997). *Resolution (97) 24 On the twenty guiding principles for the fight against corruption*. <https://rm.coe.int/16806cc17c>
- Committee of Ministers (2014). *Protection of Whistleblowers. Recommendation CM/Rec(2014)7 adopted by the Committee of Ministers of the Council of Europe on 30 April 2014 and explanatory memorandum*. <https://rm.coe.int/16807096c7>
- Council of Europe (1999). *Civil Law Convention on Corruption. European Treaty Series - No. 174 of November 04, 1999*. <https://rm.coe.int/168007f3f6>
- Council of Europe (2003). *Additional Protocol to the Criminal Law Convention on Corruption. European Treaty Series - No. 191 of May 15, 2003*. <https://rm.coe.int/168008370e>
- Doig, A., Williams, R., & Sakr Ashour, A. (2012). *Anti-corruption agencies reflections on international standards and experiences and considerations for Arab countries*. Arab States: UNDP's Regional Project on Anti-Corruption and Integrity in Arab Countries. <http://www.undp-aciac.org/publications/ac/2012/Studies/Final%202.pdf>
- Dzhafarova, O. (2018). Study of public administration bodies in the system of subjects of licensing activity in Ukraine. *Law forum*, 1, 42-49. <http://doi.org/10.5281/zenodo.1214407>. <https://acortar.link/3sfT8A>
- Hladun, Z.S. (2000). *Modern problems of administrative law of Ukraine and the ways to solve them. Problem lecture for the master's students and students of the Law Institute of the Ternopil Academy of National Economy*. Ternopil: Ternopil Academy of National Economy. ISBN 966-654-023-1
- Holovkin, B. (2018). Corruption prevention mechanism. *Journal of the Kyiv University of Law*, 2018/4, 254-260. <https://acortar.link/b82aeV>
- Kotukov, O., Kotukova, T., Kozlov, K., Makarenko, O., & Odyntsova, O. (2023). The effectiveness of the national anti-corruption policy of Ukraine. *Amazonia Investiga*, 12(66), 304-313. <https://doi.org/10.34069/AI/2023.66.06.28>
- Kurbatova, I. (2019). Role of prosecutor bodies in the system of prevention and anti-corruption. *Legal Bulletin*, 2019/4, 66-71. http://yurvisnyk.in.ua/v4_2019/11.pdf
- Kusumawati, I., Atmadja, I., Hasanah, E., & Cahyati, S. (2020). The Role of Law Enforcement Agencies in the Effort of Corruption Prevention and Eradication in the Perspective of Progressive Law in Indonesia. *International Journal of Psychosocial Rehabilitation*, 24(3), 2494-2501. <https://acortar.link/qkiY6C>
- Law No. 1402-VIII. On the judiciary and the status of judges. *The Verkhovna Rada of Ukraine*, 2016. Retrieved from <https://zakon.rada.gov.ua/laws/show/1402-19#Text>
- Law No. 254k/96-VR. Constitution of Ukraine. *The Verkhovna Rada of Ukraine*, 1996. Retrieved from <https://zakon.rada.gov.ua/laws/show/254%D0%BA/96-%D0%B2%D1%80#Text>
- Law No. 2747-IV. The Code of Administrative Proceedings of Ukraine. *The Verkhovna Rada of Ukraine*, 2005. Retrieved from <https://zakon.rada.gov.ua/laws/show/2747-15#Text>
- Law No. 580-VIII. On the National Police. *The Verkhovna Rada of Ukraine*, 2015. Retrieved from <https://zakon.rada.gov.ua/laws/show/580-19#Text>



- Law No. 794-VIII. On the State Bureau of Investigation. *The Verkhovna Rada of Ukraine*, 2015. Retrieved from <https://zakon.rada.gov.ua/laws/show/794-19#Text>
- Law of Ukraine No. 1700-VII. On corruption prevention. *The Verkhovna Rada of Ukraine*, 2014. Retrieved from <https://zakon.rada.gov.ua/laws/show/1700-18#Text>
- Maistrenko, K.M., Akimova, L.M., & Akimov, O.O. (2024). The role of law enforcement bodies in the fight against corruption and collaboration: from practice to improving public administration. *Scientific notes of V.I. Vernadsky Taurida National University. Series: Public administration*, 35(74), 117-121. <https://doi.org/10.32782/TNU-2663-6468/2024.1/20>
- National Agency on Corruption Prevention (2022). *Anti-Corruption Strategy for 2021 – 2025*. Retrieved from <https://acortar.link/CYeqLI>
- National Agency on Corruption Prevention (2024). *NACP and Basel Institute on Governance sign Memorandum of cooperation*. <https://acortar.link/IXOVxN>
- Order No. 507. On the adoption and cancellation of national standards, cancellation of changes to the national standard. *State Enterprise "Ukrainian Research and Training Center for Standardization, Certification and Quality Problems"*, 2018. Retrieved from <https://zakon.rada.gov.ua/rada/show/v0507774-18#Text>
- Parliamentary Assembly (2017a). *Promoting integrity in governance to tackle political corruption. Doc. 14528 of April 11, 2018*. <https://acortar.link/YXhjT2>
- Parliamentary Assembly (2017b). *Youth against corruption. Resolution 2192 (2017) of 13 October 2017*. <https://assembly.coe.int/nw/xml/XRef/Xref-XML2HTML-EN.asp?fileid=24233&lang=en#>
- Prikhodko, A. A. (2020). *Administrative and legal support for preventing and countering corruption in Ukraine*. (Doctoral Dissertation Abstract). Dnipropetrovsk state University of Internal Affairs of Ukraine. <https://dduvs.edu.ua/wp-content/uploads/files/Structure/science/rada/auto/33/a3.pdf>
- United Nations (2015). *Transforming our world: the 2030 Agenda for Sustainable Development*. <https://sdgs.un.org/2030agenda>
- United Nations Office on Drugs and Crime (2004). *United Nations Convention Against Corruption*. New-York: United Nations. https://www.unodc.org/documents/brussels/UN_Convention_Against_Corruption.pdf
- Vasylevych, V., Mozol S., Poklonskyi, A., Poklonska, O., & Zeleniak, P. (2021). Regulatory framework for the fight against corruption in the National Police of Ukraine. *Cuestiones Políticas*, 39(68), 682-95. <https://doi.org/10.46398/cuestpol.3968.43>
- Zagorodnyuk, S. O., Medentsev, A. M., & Dopilka, V. O. (2022). The role of law enforcement and judicial authorities in ensuring law and law order. *State and Regions, Series: Law*, 4(78), 104-108. <https://doi.org/10.32840/1813-338X-2022.4.14>



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Assessment of public trust in the media under martial law

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Abstract

The aim of the article is to analyse changes in trust in different types of media. The article revealed that the decreased trust in traditional media and the growing role of social networks during military conflicts significantly affect the information space and the public's trust in traditional mass media. The results of the statistical analysis and linear regression indicate a steady trend of decreasing trust in mass media in the Ukrainian media space, which is at a level of 10% every year. The study assesses the level of public trust in the media under martial law, considering the ethical and philosophical aspects that influence trust formation. Interpreting the results, it is possible to point out the importance of adapting media strategies and communication approaches to maintain the trust of the audience and improve the quality of social dialogue, communication policy. A promising direction for further development is

Анотація

Метою статті є аналіз змін довіри до різних типів ЗМІ. У статті виявлено, що зниження довіри до традиційних ЗМІ та зростання ролі соціальних мереж під час військових конфліктів суттєво впливають на інформаційний простір та довіру населення до традиційних ЗМІ. Результати статистичного аналізу та лінійної регресії свідчать про стійку тенденцію до зниження довіри до ЗМІ в українському медіапросторі, яка щороку становить 10%. У дослідженні оцінюється рівень суспільної довіри до ЗМІ в умовах воєнного стану з урахуванням етичних та філософських аспектів, які впливають на формування довіри. Інтерпретуючи результати, можна вказати на важливість адаптації медіастратегій та комунікаційних підходів для збереження довіри аудиторії та підвищення якості соціального діалогу, комунікаційної політики. Перспективним

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the study of the impact of long-term information campaigns on public trust in the media.

Keywords: information space, media resources, communication policy, moral orientation, ethical concepts.

напрямок подальшого розвитку є дослідження впливу довготривалих інформаційних кампаній на суспільну довіру до ЗМІ.

Ключові слова: інформаційний простір, медіаресурси, комунікаційна політика, моральна орієнтація, етичні концепції.

Introduction

Public trust in the media is one of the most important and relevant issues of our time. The media acts as a means of informing and is an important factor in forming public opinion and stability in society. The media have a responsibility to provide reliable and objective coverage of events, but they face challenges related to censorship, propaganda and the widespread use of social media as a source of information because of the war. In the conditions of a military conflict, the media acts as a means of informing and serves as an important factor in forming public opinion and stability in society. In wartime, the role of the media becomes a source of moral guidance, as information affects the population's morale and its willingness to support state actions. In this period, trust in the media reflects a rational assessment of the reliability of sources, ethical and social values that are formed under the influence of the crisis. From a philosophical point of view, trust in the media includes objective criteria, such as the accuracy and promptness of information, and subjective aspects related to moral dilemmas and existential challenges facing society.

The current situation calls into question the ability of the media to maintain the trust of the audience, especially in the context of disinformation and biased coverage of events. The study focuses on the analysis of these challenges and the identification of key factors affecting the level of trust in the media.

The media space is characterised by uncertainty and dynamism. Military conflicts change the usual conditions of the functioning of the media, making corrections in the ways of information coverage and interaction with the audience. The example of Ukraine and the EU show how trust in various types of media is changing, trust in traditional media channels is decreasing, and the influence of social networks is growing. The concept of trust in media is deeply intertwined with ethical considerations, particularly in the context of credibility and manipulation within public discourse. Philosophical inquiry into this relationship reveals the complex dynamics between the perceived integrity of media institutions and the ethical responsibilities they bear. This study explores the foundational principles that govern media trust, emphasising the philosophical dimensions of ethics, credibility, and the potential for manipulation.

It is difficult to predict the future development of the media landscape and public trust in the media, but it is crucial for understanding potential changes in public attitudes and behaviour. Citizens tend to seek sources that reflect their moral beliefs and values. The conducted research uses linear regression methods to predict trends in media trust, providing an important tool for planning media strategies and communication campaigns. In view of the dynamics of modern media development, it can be expected that the future media landscape will be even more diverse and complex, and the interaction between different types of media and the audience will become more active and multifaceted. The issue of creating new opportunities for media organisations arises and poses new challenges to them in maintaining trust and objectivity in information coverage.

The aim of the study is to assess the level of public trust in the media. The aim involved the fulfilment of the following research objectives:

1. Establish a connection between the change in the information space during the military conflict and the level of trust in various types of media based on the analysis of data from Ukraine and European countries.
2. Assess the impact of current trends in trust in the media focusing on a comparative analysis of the use of traditional media and social networks in different countries.
3. Develop recommendations for improving media strategies and communication approaches aimed at preserving and increasing the level of public trust in the media in crisis situations, including proposals for adaptation to changing media conditions and modern challenges.

Literature Review

In the literature review on the philosophical foundations of media trust, it is essential to explore how various scholars have approached the dynamics of trust, ethics, and manipulation within public discourse. Sydorenko & Volobuieva (2022) offer a pertinent study on the media coverage of major global events like the Olympic Games, which underscores the role of media representation in shaping public trust. Their analysis can be tied to how trust in media coverage influences public perception of important events, illustrating the broader implications of credibility in media.

Similarly, Chaika et al. (2022) contribute to the discussion with their examination of multiculturalism in modern mass media, focusing on the analysis of stereotypes. Their findings highlight how media manipulation through stereotypes can affect societal trust, aligning with the notion that media content can both build and erode trust depending on its portrayal of diversity and inclusion. This is relevant when considering how trust in media is influenced by representation and the potential ethical consequences of biased reporting. Further extending the exploration of media trust, Zhylin et al. (2023) delve into the role of emotional intelligence in shaping identity across different European cultures, suggesting that emotional intelligence plays a key role in how individuals process media messages and form trust. This work bridges the philosophical aspects of trust with the psychological underpinnings of media consumption, emphasizing the importance of media that fosters critical thinking and emotional engagement rather than manipulation.

Cardey et al. (2024) provide a broader framework in their discussion of communication for development, which looks at inclusive communication in the context of environmental changes. Their research is pivotal when considering the role of media education and how it fosters critical citizenship. The link between media literacy and trust formation is crucial for understanding how media education can combat manipulation and build a well-informed, critically engaged public. These works emphasize the importance of trust in media, shaped by factors such as representation, emotional intelligence, and media literacy, and provide a comprehensive view of how media manipulation and trust intersect with public discourse and citizen participation.

The problem of assessing public trust in the media under martial law is an important issue in the context of modern geopolitical challenges, which are analysed by researchers and analysts who identify several key factors in their functioning. Urbániková & Smejkal (2023) emphasise that martial law poses significant challenges to the media industry regarding preserving objectivity and independence in the conditions of growing state control and censorship. The importance of this aspect is manifested in the preservation of democratic values and freedom of speech. The hypothesis advanced by McIntyre & Sobel Cohen (2021) indicates the growing role of social networks as an alternative source of information, which can both contribute to the spread of reliable information and pose a risk of increasing disinformation. According to Moreno et al. (2021) and Dragan et al. (2020), the effectiveness of social networks during a crisis depends on the interaction between media companies, the public, and government agencies.

Jõesaar et al. (2022) emphasise the importance of developing and implementing fact-checking and information verification mechanisms to counter the influence of fake news and propaganda. Indiyati et al. (2020) support this thesis, indicating a significantly increased need for media literacy among the population for critical perception of information. Abdulkareem et al. (2022) focus on the ethical challenges faced by journalists, including the balance between reporting the facts and the need to protect national security. According to Marković et al. (2020), ensuring a balance between freedom of speech and the need to comply with ethical norms is key to solving this challenge. There is a need for a deeper analysis of existing media practices and the development of new strategies that consider the rule of law and the ethical aspects of journalism. Kim et al. (2022) emphasise that the change in the media space during conflicts requires media organisations to adapt to the new conditions of the information front.

Thorbjørnsrud & Figenschou (2022) point out the importance of ensuring the transparency of information sources and emphasise the role of the media as a tool to support civil society and democratic institutions. Klarić & Mandić (2023) indicate that military conflicts often shift media focus from objective coverage of events to patriotic rhetoric, which can affect the objectivity of information. Nistor (2023) emphasises an important factor — the need for balanced coverage of war events, which includes the reflection of official positions and the civilian population. Yin (2023) describes the influence of social networks on the formation of public opinion. The researcher claims that social networks can act as an alternative information channel, but there are risks of spreading unverified and biased information. Knudsen et al. (2022) prove the need to

develop effective content quality control strategies in social networks to prevent disinformation. It is important to actively involve the audience in fact-checking and critical information analysis, which helps ensure information security.

Wang et al. (2023) focus on the ethical issues of journalists and the need to report on war crimes. The author recommends carefully weighing each coverage case against the potential impact on public safety and morality. Lovari & Materassi (2021) discuss the role of the media in maintaining civil peace and post-war reconstruction, emphasising the need to cover positive initiatives and peace settlement processes. So, the literature review emphasises the importance of the effective functioning of the media. Researchers point to the importance of a balanced approach to covering conflicts, considering ethical norms and actively using social networks' capabilities to provide quality and objective information during the war, which requires further research.

Methodology

For the qualitative analysis, a comprehensive literature review was conducted, incorporating both national and international sources to contextualize the evolution of media trust in Ukraine. Sources included studies on media consumption patterns, public trust in information sources, and the impact of sociopolitical factors, particularly martial law. Philosophical reflections were integrated by analyzing societal perceptions of credibility and authority, following the works of scholars such as Adorno and Hofstede. This approach allowed for a deeper understanding of how philosophical and ethical considerations influence media trust dynamics.

The regression model used in the analysis incorporated variables such as the type of media (e.g., television, social networks, internet media) and temporal data points spanning from 2015 to 2023. Each media type was operationalized as a percentage value representing the public trust level, measured through public opinion surveys and cross-referenced with secondary data sources, such as USAID reports. Measurement scales were standardized to ensure consistency across different media types and over the specified timeline.

The study of the level of trust in mass media in Ukraine and the EU was based on collected and analysed data from two reliable sources: Standard Eurobarometer 96 – Winter 2021–2022 (Data annex) for the European Union (European Union, 2022) and USAID/Internews data for Ukraine (USAID, 2023). Statistical sources provided comprehensive information on the level of public trust in various types of media during 2015-2023. The research design includes the stage of collecting and systematising data from the specified sources and performing data analysis in order to determine general trends and features of media consumption in different countries. The trust rating was used to build a forecast for 2025-2027 using statistical methods. This analysis also incorporates a philosophical examination of the underlying social, economic, and political factors that influence public trust, exploring how these elements contribute to broader societal reflections on truth, authority, and the ethical dimensions of media consumption.

The research methodology was based on data processing principles and provided several recommendations to improve the level of trust in mass media in Ukraine. The linear regression technique was used to analyse trends and forecast future development. The method made it possible to identify the main directions of changes in the level of trust in the media and to make reasonable assumptions about future trends. Regression analysis was chosen because of its effectiveness in predicting trends based on statistics from previous years. This approach also allows for a deeper philosophical reflection on the ethical implications of these trends, considering how shifts in media trust reflect broader societal concerns about credibility and the potential for manipulation in public discourse.

The study sample covered various demographic groups in different EU countries and Ukraine. Eurobarometer data is based on surveys of EU citizens, which makes it possible to assess the level of trust in the media in different cultural and political contexts (European Union, 2022). USAID/Internews data for Ukraine complement this picture, considering the specifics of the Ukrainian media space and public attitudes and containing reliable information on public opinion (USAID, 2023). The proposed sample made it possible to obtain representative information and thoroughly analyse the level of trust in the media in different regions.

The research used tools for data analysis and processing. The main tool is the formation of linear regression and the formation of a trend based on indicators of public trust in mass media. The tools were used to

visualise the trend graph data, which helped visualise the research findings. The accuracy and reliability of the data were ensured through the use of official sources of analytical centres in Europe, which guaranteed the reliability and relevance of the information used in the analysis.

The ethical framework of research is grounded in philosophical principles that emphasise the transparency of data collection and analysis, ensuring that methods and interpretations are openly disclosed. Furthermore, the research prioritises the philosophical commitment to objectivity, avoiding biases towards information sources or the research subject, and ensuring a balanced and equitable representation of diverse perspectives and interests within the discourse

Results and Discussion

The results of this study reveal clear instances of media manipulation, such as the selective reporting during the 2014 Ukraine crisis, where certain outlets emphasized nationalist rhetoric while downplaying international diplomatic efforts. This biased framing shaped public perceptions and fueled mistrust in both local and global media. In Ukraine, such contextual factors have had a profound influence on how citizens interpret media messages, particularly when manipulation involves polarizing political narratives. The study also underscores that strengthening media education and promoting ethical journalism can help counteract these effects. For instance, teaching the public to recognize manipulative tactics, like distorted headlines or selective omission of facts, can significantly improve media literacy and foster informed, critical citizenship.

The importance of reliable information plays an important role in maintaining public opinion and effective warfare, but the difficulty of verifying the reliability of news is increasing. Martial law requires the media to be more responsible and careful in selecting and presenting information. The decreased level of trust can also be related to the change in the audience's information needs and the growth of distrust in official sources.

Table 1.

Rating of public trust in the media in Ukraine, %

	2015	2016	2017	2018	2019	2020	2021	2022	2023
Internet media	47	55	54	60	59	48	48	42	41
TV	85	82	77	77	66	52	46	36	30
Radio	35	28	27	26	18	13	13	11	10
Print media	31	23	24	21	15	8	7	3	3
Social networks	51	52	45	53	68	62	63	74	76

Source: USAID (2023)

Data on the trust rating of various types of media in Ukraine during 2015-2023 were used for the analysis. The analysis of the dynamics presented in Table 1 revealed two main trends in the rating of public trust in various media types in Ukraine over several years. Television, traditionally considered the main source of information for many citizens, is experiencing a decline in trust between 2016 and 2023. As a result, it has lost more than half of its perception rating, falling from 85% to 30%. This shift suggests a growing philosophical scepticism towards centralised sources of information, reflecting a deeper societal reevaluation of what constitutes credible and trustworthy media. Society is becoming more critical of television information and prefers other news sources, such as social networks. There is a significant increase in trust in social networks from 51% in 2021 to the highest historical record of 76% in 2023. This trend is connected with the increased citizens' activity on social networks and a high decline in trust in mass media, which lost almost two-thirds of its rating from 2015 to 2023. These trends indicate the interweaving of technological shifts, changes in media consumption, and a philosophical transformation in the public's understanding of truth and authority in the information space, which should be taken into account for the further development of the information space in Ukraine.

Calculating the average level, minimum, maximum and changes from 2015 to 2023, determining the general trend of the rating of public trust in various types of media are important for understanding the dynamics of information perception and the media environment. The average value provides a generalised view of the level of trust, while the minimum and maximum indicate extreme variations in this rating. The change from 2015 to 2023 reveals long-term trends in media consumption and trust, information that can

be important for developing media strategies and journalism. The justification of the general trend makes it possible to understand how society perceives various media platforms and how this can affect the information landscape for the further conduct of an effective information war in Ukraine. Table 2 presents the calculated indicators.

Table 2.

Analysis of public trust in various types of media in Ukraine for 2015-2023 and under martial law

Category	Mean	Minimum	Maximum	Change 2015-2023	Trend
Internet media	50.44%	41%	60%	-6%	Decrease
TV	61.22%	30%	85%	-55%	Decrease
Radio	20.11%	10%	35%	-25%	Decrease
Print media	15.0%	3%	31%	-28%	Decrease
Social networks	60.44%	45%	76%	+25%	Growth

Source: calculated by the author

Calculations of the rating of public trust in various types of media in Ukraine in the period from 2015 to 2023 under martial law provide information for the formation of media policy and conducting effective communication with citizens. It is important to take into account the negative trends in media trust, as television and print media have been losing trust in recent years, while anonymous and independent social networks have gained a significant increase in public trust. Data analysis showed that trust in the media varies significantly depending on the source of the information and its perception by society. Trust under martial law was a rational assessment of the reliability of sources, an emotional response to moral dilemmas and general challenges facing society. This phenomenon is considered through the prism of ethical concepts, where trust indicates citizens' moral choices and value orientations. A critical trend in Ukraine is a 37% decrease in the level of trust in television, which reinforces the importance of restructuring communication with society. An open and accessible channel of informing citizens through social networks should become responsible for the quality and objectivity of the information provided.

The results of the study indicate the importance of maintaining media literacy among citizens so that they can be critical consumers of information and distinguish reliable sources from disinformation. Ukraine needs to develop a media policy aimed at ensuring information reliability and the formation of positive attitudes in society and consider the possibilities of regulating social networks in order to preserve their role as an important source of information while ensuring protection from unreliable information during large-scale war. The observed differences in trust levels across various media types highlight a broader philosophical question about the nature of authority and credibility in the digital age. For instance, while traditional media such as radio and television generally maintain higher trust levels in both Ukraine and many EU countries, internet media and social networks are often viewed with greater scepticism, reflecting deeper societal debates on the ethics of information dissemination and the role of media in shaping public consciousness.

Table 3.

Trust in the media in Europe, 2022 (ranked by share, all countries)

Country	Written press (%)	Radio (%)	Television (%)	Internet (%)	Online social networks (%)
EU27	49	56	49	35	20
Austria	62	67	64	48	28
Belgium	57	66	61	32	17
Bulgaria	35	47	56	44	36
Croatia	36	46	51	32	27
Cyprus	30	49	47	42	33
Czech Republic	51	70	50	43	12
Denmark	70	83	79	35	13
Estonia	67	76	71	50	17
Finland	70	76	76	35	11
France	44	48	31	21	10
Germany	56	66	59	33	17
Greece	39	47	26	55	36
Hungary	38	43	45	51	36

Ireland	52	65	59	26	17
Italy	49	50	50	42	36
Latvia	40	54	52	38	20
Lithuania	37	46	45	37	22
Luxembourg	58	62	50	35	18
Malta	40	45	43	34	22
Netherlands	71	72	59	34	9
Poland	41	52	48	51	42
Portugal	69	76	71	44	30
Romania	44	52	52	38	30
Slovakia	41	51	51	40	26
Slovenia	36	44	37	28	16
Spain	37	45	32	22	12
Sweden	66	79	70	21	7
<i>Non-EU countries</i>					
Albania	73	60	67	60	57
Bosnia-Herzegovina	25	34	45	34	23
Iceland	74	80	82	43	17
Montenegro	45	44	46	38	31
North Macedonia	34	34	53	39	30
Norway	74	81	77	37	10
Serbia	30	32	46	38	29
Switzerland	73	83	71	25	7
Turkey	35	32	37	43	37
United Kingdom	35	61	53	21	9

Source: European Union (2022)

According to Table 3, the level of trust in mass media in European countries is significantly different from the indicators of Ukraine. Compared to Ukraine, which experienced a significant decline in trust in all types of media in 2023, many countries in Europe have consistently high levels of trust, especially in traditional media such as radio and television. In countries that have a high level of trust in traditional media, such as Denmark, Estonia, Finland, and Norway, radio and television often have a higher trust rating than in Ukraine, which is determined by the differences in media systems, content regulation, and the general level of trust in government institutions.

In Ukraine, online media and social networks have experienced ups and downs in trust in recent years. At the same time, these indicators remain stable and practically unchanged in many European countries. For example, in Greece and Hungary, the level of trust in Internet media is higher than in traditional media, which indicates the role of digital media in the information space of these countries. A comparison of data on trust in mass media in Europe and Ukraine indicates significant differences caused by cultural, political, economic, and social factors in each of the countries, which reflects the difference in conducting a transparent and effective communication dialogue. These differences underscore the philosophical challenges of maintaining a transparent and effective dialogue of communication across diverse societies. The available statistics serve as a foundation for forecasting Ukraine's future information policy, which must navigate these philosophical and practical complexities in its ongoing information campaigns.

The linear regression is applied to forecast the level of trust in various types of media in Ukraine for 2025, 2026 and 2027, which is widely used in statistical analysis to forecast future trends based on historical data from 2015-2023. The obtained data are visualised in Figure 1.

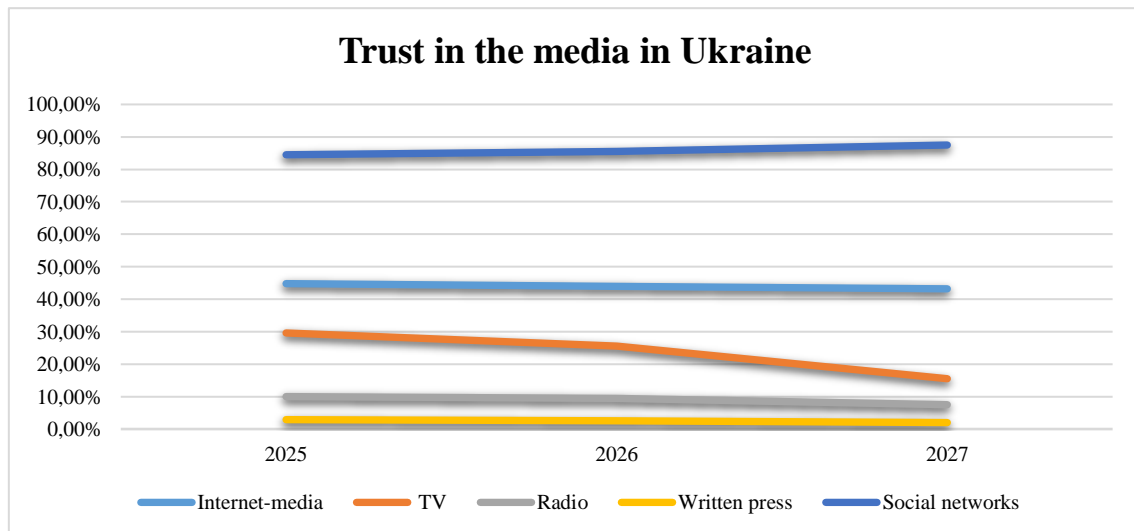


Figure 1. Forecast of the level of trust in mass media in Ukraine for 2025-2027, %.

Source: calculated by the author

According to the forecast, the general trend of the level of trust in traditional mass media in Ukraine, such as online media, television, radio and print media, shows a further decrease in the trust rating during 2025-2027. This can be caused by a wide range of factors, including changing media preferences, increasing influence of social networks, and expanding problem of disinformation and ineffective communication dialogue with society. Projected data indicate a significant increase in trust in social networks, from 79.5% in 2023 to 85.6% in 2027. This transformation of the media landscape signifies a deeper shift in how society engages with information as social networks increasingly become the primary source for a broad audience. These changes necessitate reforming Ukraine's information policy, emphasising the importance of fostering a more philosophically grounded communication dialogue and enhancing media literacy among the population. Such efforts are essential for navigating the digital age's complexities and cultivating a more informed and ethically aware society.

An assessment of public trust in the media under martial law is conducted by Torres et al. (2023), where the growing role of social media as a primary source of information is emphasised. The results are confirmed by our research, which indicates a paradigm shift in media consumption where traditional channels are losing their prevalence. The research of Reveilhac (2022) is debatable, who argues for positions on the tendency to perceive information from social networks more critically than on the level of trust in traditional media. The hypothesis advanced by Smejkal et al. (2022) concerning the possible potential for manipulation and the spread of disinformation through social networks and negative consequences for society is confirmed. The view of Schröck & Falkesgaard (2021), who state that martial law requires special responsibility and caution from the media in reporting information, is common with this research, as they must include ensuring accuracy, objectivity and impartiality in the coverage of events (Lange-Ionatamishvili & Svetoka, 2015; Maulana et al., 2020).

Research by Carson et al. (2022) emphasises the issue of effective communicative social dialogue, which can help maintain and even strengthen trust in the media in difficult conditions. At the same time, the analyst Majid et al. (2021) point to potential challenges related to censorship and restriction of freedom of speech, which can also negatively affect trust in the media, which is emphasised by the high level of growth of trust in social networks. The researcher Apriliani (2022) draws attention to the importance of media literacy. The common point is the critical importance of understanding and analysing media content by society, which will positively impact increasing trust ratings in society. The study by Dralega & Napakol (2022) confirms that educational programmes and campaigns on media literacy can effectively contribute to the improvement of critical thinking and the development of skills to recognise false information using the examples of European countries (Huber et al., 2019; Markov & Min, 2020).

The article of Klarić, D., & Mandić (2023) reveals the problems of the media, which have a unique opportunity to act as a tool for promoting peace and dialogue. Trust can decrease due to ineffective reporting and the need to cover initiatives for its settlement and humanitarian issues. The research conducted by Mohammadi et al. (2020) confirms a stable level of trust in the media in Europe due to maintaining a

balance between presenting information and taking into account ethical aspects, which can be difficult under martial law. The discussion in the field of media studies shows that the assessment of public trust in the media under martial law is multifaceted and requires an integrated approach from the state, which includes the adaptation of the information space to changing conditions (Sørensen et al., 2021; Yuan et al., 2023).

Conclusions

In 2022, during the Russian invasion of Ukraine, numerous media outlets employed manipulative tactics, such as spreading disinformation about military operations and exaggerating civilian impact to evoke emotional responses. This manipulation significantly influenced public trust, with citizens often relying on alternative sources to verify the credibility of the news. These findings highlight the need for enhanced media education and journalistic integrity, especially in conflict zones, where factual reporting is crucial to maintaining public trust and preventing further manipulation of information.

Assessment of public trust in the media under martial law reveals complex interaction dynamics between media, information, and society. Crisis periods affect the social structures and moral qualities that underlie trust and prompt a rethinking of the values and moral choices that determine trust in information sources (Sheremet et al., 2021). The study results indicate a significant decrease in trust in traditional media, including television, radio and print media, with a simultaneous increase in the role of social networks as the main source of information. Perceptions of information quality and reliability are deeply intertwined with broader philosophical questions about truth and trust in an increasingly complex media landscape. Social networks, serving as both conduits of rapid information and vehicles for unverified content, highlight the ethical dilemma of balancing access with accuracy. The challenges faced by media organisations and society reflect a philosophical struggle to uphold objectivity and maintain public trust in an age where information is both a tool for empowerment and a potential source of manipulation. Under martial law, the constraints on freedom of speech raise critical ethical concerns about the influence on editorial independence, complicating the quest for objective truth and driving a philosophical reevaluation of the role of social networks and independent media in shaping public discourse.

The data analysis gave grounds for forecasting that in the coming years, the trend of decreasing trust in traditional media will continue in favour of increasing the influence of social networks. The data indicates a drop in trust in online media, television and radio by a third, while social networks are gaining a critical high for a large proportion of the audience. Implementation of ethical standards in the media will help increase the level of trust among citizens. This, in turn, emphasises the importance of adapting media strategies to changes in media consumption and management of information flows. There is a potential risk of increasing disinformation and propaganda through social media. There is a need to develop effective mechanisms for fact-checking and verifying information and question the effectiveness of social dialogue and communication policy.

Bibliographic References

- Abdulkareem, A. K., Abdulkareem, Z. J., Ishola, A. A., Bello, M. L., & Oladimeji, K. A. (2022). The influence of openness of public organisations and social media use on e-participation: The mediating effect of trust in e-government. *International Review of Public Administration*, 27(4), 281-296. <https://doi.org/10.1080/12294659.2022.2136054>
- Apriliani, R. (2022). Gaining public trust through digital media by government public relations of Sleman Yogyakarta. *Prophetic: Journal of Communication*, 15(1), 34-47. <https://doi.org/10.14421/pjk.v15i1.2212>
- Cardey, S., Eleazar, P.J.M., Ainomugisha, J., Kalowekamo, M., & Vlasenko, Y. (2024). Communication for development: Conceptualising changes in communication and inclusive rural transformation in the context of environmental change. *Social Sciences*, 13(6), 324. <https://doi.org/10.3390/socsci13060324>
- Carson, A., Gibbons, A., Martin, A., & Phillips, J. B. (2022). Does third-party fact-checking increase trust in news stories? An Australian case study using the “Sports Rorts” Affair. *Digital Journalism*, 10(5), 801-822. <https://doi.org/10.1080/21670811.2022.2031240>
- Chaika, O., Sharmanova, N., Maliuga, N., & Savvytska, I. (2022). Multiculturalism in modern mass media: analysis of stereotypes. *Amazonia Investiga*, 11(60), 10-22. <https://doi.org/10.34069/AI/2022.60.12.1>



- Dragan, O. V., Yermakova, G. S., Chvaliuk, A. M., Kurchin, O. G., & Karagodin, O. V. (2020). Psychological aspects of corruption in public administration: Case-study of Ukraine. *Academic Journal of Interdisciplinary Studies*, 9(6), 264-277. <https://doi.org/10.36941/ajis-2020-0130>
- Dralega, C. A., & Napakol, A. (2022). *COVID-19 and the Media in Sub-Saharan Africa: Media Viability, Framing and Health Communication*. Emerald Group Publishing Ltd. <https://doi.org/10.1108/9781803822716>
- European Union. (2022). *Standard Eurobarometer 96 - Winter 2021-2022*. Retrieved from <https://europa.eu/eurobarometer/surveys/detail/2553>
- Huber, B., Barnidge, M., Gil de Zúñiga, H., & Liu, J. (2019). Fostering public trust in science: The role of social media. *Public Understanding of Science*, 28(7), 759-777. <https://doi.org/10.1177/0963662519869097>
- Indiyati, D., Chotijah, S., Khusnia, H. N., & Muhlis, M. (2020). Media vs public trust during the pandemic. *JCommSci - Journal of Media and Communication Science*, 3(Special Issue), 38-44. <https://jcomm.unram.ac.id/index.php/jcomm/article/view/95>
- Jõesaar, A., Rožukalne, A., & Jastramskis, D. (2022). Trust in public service media in the Baltic states. *Journal of Baltic Studies*, 53(4), 587-611. <https://doi.org/10.1080/01629778.2022.2127816>
- Kim, A., Gil, S., & Rodriguez, A. (2022). The role of social media influencing public trust in government during the COVID-19 Pandemic. *Journal of Student Research*, 11(3). <https://doi.org/10.47611/jsrhs.v11i3.2954>
- Klarić, D., & Mandić, J. (2023). Case study of the russian disinformation campaign during the war in Ukraine – propaganda narratives, goals and impacts. *National Security and the Future*, 24(2), 97-139. <https://doi.org/10.37458/nstf.24.2.5>
- Knudsen, E., Dahlberg, S., Iversen, M. H., Johannesson, M. P., & Nygaard, S. (2022). How the public understands news media trust: An open-ended approach. *Journalism*, 23(11), 2347-2363. <https://doi.org/10.1177/14648849211005892>
- Lange-Ionatamishvili, E., & Svetoka, S. (2015). *Strategic Communications and Social Media in the Russia Ukraine Conflict. Cyber War in Perspective: Russian Aggression Against Ukraine*. Retrieved from <https://www.ceeol.com/search/gray-literature-detail?id=659914>
- Lovari, A., & Materassi, L. (2021). Trust me, I am the social media manager! Public sector communication's trust work in municipality social media channels. *Corporate Communications*, 26(1), 55-69. <https://doi.org/10.1108/CCIJ-01-2020-0027>
- Majid, U., Wasim, A., Truong, J., & Bakshi, S. (2021). Public trust in governments, health care providers, and the media during pandemics: A systematic review. *Journal of Trust Research*, 11(2), 119-141. <https://doi.org/10.1080/21515581.2022.2029742>
- Markov, Č., & Min, Y. (2020). The origins of media trust in a young democracy. *Communication and Society*, 33(3), 67-84. <https://doi.org/10.15581/003.33.3.67-84>
- Marković, I., Nikolovski, S., Milojević, S., Živković, D., Knežević, S., Mitrović, A., ... & Djurdjević, D. (2020). Public trust and media influence on anxiety and depression levels among skilled workers during the COVID-19 outbreak in Serbia. *Military Review*, 77(11), 1201-1209. <https://doi.org/10.2298/VSP200713108M>
- Maulana, I., Manulang, J. M. br., & Salsabila, O. (2020). The influence of social media influencers on consumer behavior in the digital economy era. *Wise Scientific Magazine*, 17(1), 28-34. <https://doi.org/10.31334/bijak.v17i1.823>
- McIntyre, K., & Sobel Cohen, M. (2021). Public trust in state-run news media in Rwanda. *Journalism and Mass Communication Quarterly*, 98(3), 808-827. <https://doi.org/10.1177/1077699021998647>
- Mohammadi, M. R., Zarafshan, H., Bashi, S. K., Mohammadi, F., & Khaleghi, A. (2020). The role of public trust and media in the psychological and behavioral responses to the COVID-19 pandemic. *Iranian Journal of Psychiatry*, 15(3), 189-204. <https://doi.org/10.18502/ijps.v15i3.3811>
- Moreno, Á., Tench, R., & Verhoeven, P. (2021). Trust in public relations in the age of mistrusted media: A European perspective. *Publications*, 9(1), 1-20. <https://doi.org/10.3390/publications9010007>
- Nistor, D. I. A. (2023). Target audiences characteristics and prospective in countering information warfare. *Proceedings of the 22nd European Conference on Cyber Warfare and Security, Greece*. <https://doi.org/10.34190/eccws.22.1.1169>
- Reveilhac, M. (2022). The deployment of social media by political authorities and health experts to enhance public information during the COVID-19 pandemic. *SSM - Population Health*, 19, 101165. <https://doi.org/10.1016/j.ssmph.2022.101165>

- Schröck, G., & Falkesgaard, S. (2021). Public trust in information media of the spread of COVID-19. *Journal of Asian Multicultural Research for Social Sciences Study*, 2(1), 30-35. <https://doi.org/10.47616/jamrsss.v2i1.92>
- Sheremet, O. S., Voluiko, O. M., Posmitna, V. V., Poda, T., & Bidzilya, Y. M. (2021). Political and legal aspects of the information warfare. *Amazonia Investiga*, 10(45), 31-41. <https://doi.org/10.34069/AI/2021.45.09.3>
- Smejkal, K., Macek, J., Slavík, L., & Šerek, J. (2022). Just a “Mouthpiece of biased elites?” populist party sympathizers and trust in Czech Public service media. *International Journal of Press/Politics*. <https://doi.org/10.1177/19401612221143067>
- Sørensen, J. K., van den Bulck, H., & Kosta, S. (2021). Stop spreading the data: PSM, trust, and third-party services. *Journal of Information Policy*, 10, 474-513. <https://doi.org/10.5325/JINFOPOLI.10.2020.0474>
- Sydorenko, N., & Volobuieva, A. (2022). Media coverage of the Olympic Games. *Amazonia Investiga*, 11(51), 61-70. <https://doi.org/10.34069/AI/2022.51.03.6>
- Thorbjørnsrud, K., & Figenschou, T. U. (2022). The alarmed citizen: Fear, mistrust, and alternative media. *Journalism Practice*, 16(5), 1018–1035. <https://doi.org/10.1080/17512786.2020.1825113>
- Torres, P., Augusto, M., & Rodrigues, T. (2023). The mechanisms that make social media effective in building citizens’ trust on local government. *Digital Policy, Regulation and Governance*, 25(2), 138-152. <https://doi.org/10.1108/DPRG-06-2022-0069>
- Urbániková, M., & Smejkal, K. (2023). trust and distrust in public service media: A case study from the Czech Republic. *Media and Communication*, 11(4), 297-307. <https://doi.org/10.17645/mac.v11i4.7053>
- USAID. (2023). *USAID-Internews survey on media consumption: Ukrainian media, attitude and trust in 2023*. Retrieved from <https://internews.in.ua/wp-content/uploads/2023/10/Ukrainski-media-stavlennia-ta-dovira-2023r.pdf>
- Wang, C., Zhu, J., & Zhang, D. (2023). The paradox of information control under authoritarianism: Explaining trust in competing messages in China. *Political Studies*. <https://doi.org/10.1177/00323217231191399>
- Yin, Y. (2023). Research on the construction of public trust in news media related to the epidemic in social media in the post-epidemic era. *Lecture Notes in Education Psychology and Public Media*, 3(1), 800-808. <https://doi.org/10.54254/2753-7048/3/2022351>
- Yuan, Y. P., Dwivedi, Y. K., Tan, G. W. H., Cham, T. H., Ooi, K. B., Aw, E. C. X., & Currie, W. (2023). Government digital transformation: Understanding the role of government social media. *Government Information Quarterly*, 40(1). <https://doi.org/10.1016/j.giq.2022.101775>
- Zhylin, M., Mendelo, V., Cherusheva, G., Romanova, I., & Borysenko, K. (2023). Analysis of the role of emotional intelligence in the formation of identity in different European cultures. *Amazonia Investiga*, 12(62), 319-326. <https://doi.org/10.34069/AI/2023.62.02.32>



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Cultivating values in early childhood: case study in rural and urban contexts

ВОСПИТАНИЕ ЦЕННОСТНОГО ОТНОШЕНИЯ ДЕТЕЙ К СОЦИОКУЛЬТУРНОЙ ДЕЯТЕЛЬНОСТИ

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Abstract

This article investigates the value attitudes of older preschool children towards socio-cultural reality in urban and rural settings in Russia. Diagnostic studies were conducted with 85 children, utilizing interviews and visual materials to assess their understanding of their social environment, attitudes towards material and spiritual goods, and comprehension of moral actions. Findings indicate that the emotional-value criterion is more developed in children than the operational-behavioral one, with no significant differences observed between urban and rural children. However, parental assistance varied based on location. Children demonstrated an understanding of ecological, aesthetic, and moral values. To further develop the operational-behavioral criterion, projects focusing on historical, local, social, and ethnocultural aspects were implemented, yielding positive results in children's cognitive and social development. The study highlights the importance of early childhood


Аннотация

В статье исследуется ценностное отношение детей старшего дошкольного возраста к социокультурной реальности в городских и сельских условиях России. Проведено диагностическое исследование 85 детей с использованием интервью и наглядных материалов для оценки понимания ими социального окружения, отношения к материальным и духовным благам, осмысления нравственных поступков. Результаты показали, что эмоционально-ценностный критерий развит у детей в большей степени, чем операционально-поведенческий, при этом значимых различий между городскими и сельскими детьми не наблюдалось. Дети продемонстрировали понимание экологических, эстетических и нравственных ценностей, однако желание оказать физическую помощь родителям более ярко выражена в сельской местности. Для дальнейшего развития операционально-

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education in fostering value attitudes towards socio-cultural reality and suggests further research directions in this field.

Keywords: Child rearing, emotional development, moral development, mental development, socialization, socio-cultural situation.

поведенческого критерия были реализованы проекты, посвященные историческим, местным, социальным и этнокультурным аспектам, что дало положительные результаты в когнитивном и социальном развитии детей. Исследование подчеркивает важность дошкольного образования в формировании ценностного отношения к социокультурной реальности и предлагает дальнейшие направления исследований в этой области.

Ключевые слова: воспитание детей, эмоциональное развитие, познавательное развитие, нравственное воспитание, социализация, социокультурная действительность.

Introduction

The issues of a person's value attitude to the surrounding reality in the modern socio-cultural situation are of particular importance. We find confirmation of this in the provisions of the federal laws such as "The Law on Education in the Russian Federation" (Federal Law No. 273-FZ, 2012), "The Federal educational program for preschool education" (Decree No. 1028, 2022) and by the analysis of educational practice. The main provisions of mentioned documents determine the relevance of domestic traditions of education with a focus on the value bases of human life, education of a highly moral person who shares Russian traditional spiritual values, possesses relevant knowledge and skills, and able to realize his potential in modern society.

The purpose of the study is determination of the features of the value attitude of older preschool children to the socio-cultural reality in urban and rural society.

We first review the relevant literature on values, exploring different perspectives. Then we will describe the research methodology, which is an interview method with preschoolers in city and urban contexts. Then we will present the results of our study by analyzing the children's answers and presenting the forms of working with them on the issue of values formation. Finally, we will discuss the implications of our findings for educational practice and suggest directions for future research.

Theoretical framework

Value is a special social phenomenon of positive significance in the system of social and historical activity of people. Values are related to real human activity. Values express the social and personal form of being of the phenomena of reality (Ilyichev et al, 1989). Value is a term used in various sciences to indicate the human, social and cultural significance of certain objects and phenomena. Value, characterizing personal meaning, is also defined as a special form of reflection of objects and phenomena in people's minds. But we must remember that values include only positively significant events and phenomena related to social progress. The concept of "value" initially has a positive meaning: value is what we value, what we desire, what we strive for and what we want to achieve. The interiorized values which become personal internal beliefs govern life choices or behavioural evaluation.

The value acquires the motivating force of the motive of activity when a person can clearly formulate the goals of his activity, see its humanistic meaning. And this determines the need to provide opportunities and create conditions in the educational process for testing models of behaviour of the emerging personality on the basis of accepted norms, formation and development of personal qualities. In this regard education can be considered as a socially organized process of forming human values, forming an attitude to sociocultural reality based on accepted values. Attitude, as a special kind of relationship, manifests itself in three main forms: rational (attitude is formed in the course of cognition of things, phenomena, events, etc.), emotional (feelings, emotions), behavioral, in which relationships exist and manifest themselves (Golovanov, 2020).

An attitude towards values is always subjective, an individual formulates his attitude towards the world around him/her, shapes the way of interacting with the world and the degree of preservation of what is important to the individual. Personal experience is acquired through interaction with socio-cultural reality. It is personal experience that underlies value relations, considered as the integral education of a personality. Value relations are stable selective relations with objects of the surrounding world, regulated by objective and subjective values of social significance (Afanasyev, 2010). The development of cultural and value orientations, the building of a hierarchy of values in the child, his spiritual sphere, begins in the pre-school stage. (Stepanova et al., 2022). The categories of "value" and "value attitude" in preschool pedagogy have been the subject of study since the late 80s of the last century.

In the second half of the 20th century, there is a deep reassessment of values. The traditional society is being replaced by a digital civilization, the foundations of civilization are being shaken by an environmental crisis. All this leads to a reassessment of ideas about the criteria of progress, about the means of solving national and interstate conflicts, etc. In our country, at the moment, there is a reassessment of values in all areas, starting from the state structure to the field of education.

When we talk about values, we touch upon the problem of value relations. An integral part of the value relationship to society, which includes a set of relationships to a person, life, society, and Homeland. Based on the highlighted forms of relationship existence, the value attitude of children is formed on the basis of the values of cognition, experience and transformation (Arsenova, 2012).

The problem of value relations is studied in preschool education from different perspectives:

- From the point of view of the development of social value orientation of children, taking into account the interaction of psychological, ethical and philosophical components (Bezrukova, 1999);
- From the perspective of designing a subjective space that provides a child with pedagogical support in the process of self-development and self-knowledge in the aspect of the health (Vodneva, 2003);
- In the process of the child's internalization of universal values corresponding to national cultural traditions (Love for people, Family, Kindness, Work, Peace, Freedom, Conscience, Truth) (Kosmacheva, 2009);
- In the context of the child's socialization at different levels, when the child acquires social experience (Marshitskaya, 2018).

Significant material on the study of children's value attitude to the world around them is presented in the collective monograph "Problems of preschool childhood in the multicultural space of changing Russia. The results of an interregional study" (Gogoberidze, 2010), which highlights the peculiarities of the manifestation of value relations among preschoolers in different areas all over Russian Federation including big cities, industrial centres and towns. The group of researchers pointed an increased interest of preschoolers in material values but a low level of spiritual choices (Stepanova et al, 2022). The analysis of existing research on the problem under consideration shows that the value attitude of older preschool children to sociocultural reality is formed in the process of their socialization, within the framework of cognitive, moral education, and the development of socially significant activity of a preschooler. The child's value attitude to society is formed as a result of learning (accumulation of a system of knowledge about the surrounding world, about the properties of cognizable objects), acquisition (mastering cultural skills, ways of activity in accordance with accepted normative guidelines) and appropriation (introduction into the personal structure of values, building their own hierarchy of values) of the value bases of human life. A value attitude is formed in the process of cognition of historical and cultural values (first of all, one's native land), oneself, one's family, patterns, norms of behavior; emotional feeling, experience, admiration, surprise of the observed, cognizable, accomplished; actions and deeds actually performed. Since for pre-school children the process of cognition begins with the closest, understandable and comprehensible understanding, the study of the process of formation of the value attitude of older pre-school children to the socio-cultural reality is connected with objects and phenomena "close" to the child, with what directly surrounds him - the microsocium, meaningfully highlighting such areas as the history of the small homeland, traditions, morality of relations. The process of forming attitudes to reality takes place under the influence of many factors: both purposeful and spontaneous influences, the experience of which expands the child's personal experience of interacting with the world; whether or not his opinion confirms the correctness of actions performed in specific situations of interaction and communication. And as a result, they allow you to combine and vary your behaviour according to the context of the situation. (Zakharova, 2022).

The effectiveness of the educational process is determined by the formation of a value attitude towards people, the surrounding reality, and building one's behavior in accordance with accepted norms and patterns of behavior based on traditional values. According to a number of researchers, parents and the immediate environment have a greater influence on children in small towns than in megacities, which helps to preserve traditions, but the older generation does not always have a high or sufficient level of education and horizons to be a stimulus for the moral and cognitive growth of children, to understand the demands of modern childhood (Neyasova et al., 2023).

Methodology

A diagnostic study of children's attitudes was carried out to determine their values towards sociocultural reality. The study involved 85 preschoolers in urban (43) and rural areas (42) in Ulyanovsk region, Russian Federation. The research is a part of our larger study of contemporary childhood and the training for teachers who work with preschoolers (Silakova & Zakharova, 2018; Zakharova et al, 2021). Besides in different aspects of the research topic include 250 children, 20 kindergartens and more than 40 adults – parents and teachers.

We supposed that the socio-cultural situation of children's development in rural and urban societies differs in a number of indicators, and, consequently, the conditions and mechanisms of education and development of value attitude are different.

The number of agents of socialization are less in the cities. The most obvious problem is that communication of the older generation with grandchildren mostly is episodic. But in rural areas, the direct transfer of socio-cultural experience from its holders takes place purposefully in the process of daily communication, when the assimilation and acceptance of value bases takes place.

The next point is that the specifics of the sociocultural situation of growing up in rural areas are characterized not only by closer interaction with nature, but also by practical activities for its preservation. Children are presented with direct examples of nature conservation behaviour and value attitudes. Natural objects (forests, ravines, water bodies), located in the vicinity, organically enter into the natural life of children and with skillful use have a beneficial effect on the emotional development of the child, the formation of his or her mental attitude, the ability to live with nature. Direct personal, practically acquired knowledge (in the process of caring for pets, plants), the child's impressions related to the environment and agricultural work are the most valuable.

The way an urban child learns about the world and the natural environment is most often mediated by television, literature and the Internet, which negatively affects the development of his spirituality and the ecologization of consciousness.

The value of labor, as an important component of human activity, is learned by the child gradually, starting with the fulfillment of assignments and joint participation with elders in labor, accessible and age-appropriate activities. The early involvement of children in work processes that are significant, first of all, for their family, allows them to comprehend the value of labor and its results, educates the value attitude of children to the person of labor, develops activity, independence and responsibility. In rural areas, children spend a significant amount of time outdoors, its motor activity has a beneficial effect on the physical health of children. An early study conducted showed that children prefer outdoor and sport like games. The results show a positive correlation between parents who lead an active lifestyle and their children who prefer active leisure and attend sports clubs (Zakharova & Zakharova, 2018).

Considering the peculiarities of the influence of socio-cultural conditions in urban and rural society, we note the closer connection of the child with folk traditions, elements of folk culture, which are often present in everyday situations.

Considering these trends, we have developed a conversation with children, the answers to which will allow us or not to state the manifestation of the highlighted specifics in the development of children's value attitude, to determine priority orientations, the value bases of children's activities. An interview was developed with 3 thematic blocks of questions, taking into account the children's ability to demonstrate their knowledge of their immediate social environment, the nature of their attitudes towards material and spiritual goods, and their understanding of the nature of moral actions. The interview was conducted

individually, using visual material of old and modern buildings of our city Ulyanovsk (earlier Simbirsk). It was assessed on the independence of the answer, the emotionality of the answer, the understanding of the significance of the action and the explanation of the answer.

Results

The first set of questions was related to the knowledge of the history of the hometown / village, the attitude towards it, the desire to make it better, more beautiful.

The analysis of the responses showed that 100% of respondents know the modern name of their city, village, 11% of children could not remember the historical name of the city and explain why it was called that way. At the same time, two children from urban preschool organizations expressed their admiration for the old look of the city (according to photos): "I like the old name more because it is magical, mysterious." More than half of the children living in rural areas could not give a positive answer to the question about the historical name of their village. This is largely due to the fact that the rural settlements retained their former name, and the children were unable to navigate the essence of the proposed issue.

All children love their city, village, motivating by the fact that it is "beautiful", "it's fun to walk here", "my home is here". I especially like the fact that it is "big, reliable, my kindergarten is located here." The answers of the children allow us to state the formation of children's identity when they relate themselves to their place of residence, realizing themselves as a member of society. One of the answers ("my city is kind, good") characterizes the child's attitude to the city as a "living" being that also needs care.

In explaining their love for their small homeland, rural children (33%) motivated their positive attitude by the presence of those features that we highlighted earlier and that are characteristic of socialization in rural areas - close interaction with bearers of traditional values - the older generation and proximity to nature: "grandma lives here", "there is a river and a forest".

The children, answering the question about where they like to go, listed parks, places of entertainment, kindergarten. The responses of children attending a rural kindergarten were related to the opportunity to spend time at nature, among other things: "I like to fish with friends", "swim in the river" (26%) children indicated the opportunity to play on the playground with their friends, 53% of children like to go to the store with their parents. We suppose visiting a store is like an outstanding event because in the city we have big beautiful supermarkets where every child wants to buy something. And there are 1-2 small counter-type shops in the villages, which usually do not go as often as in the city, and not only for shopping, but also for communication.

Among the options for the preservation of the city, suggestions were made related to respect for nature, planting flowers so that it "brings joy" of respect for people, and the construction of new houses. Children are aware of the close relationship between the beauty of the environment and the preservation of natural heritage, the preservation of order and stability. There was no particular difference in the responses of rural and urban children to this question. Only some details can be noted: the safety of the village, its beauty depends on the morality of its inhabitants: garbage collection, creating conditions for animals living next to people: "so that dogs and kittens are not homeless" (Arina, 6 years).

The second set of questions allowed us to determine children's priorities in choosing activities, attitudes to devices, knowledge of elements of folk culture traditionally present in a child's life - folk games, fairy tales. Among the children's preferences of favorite activities are construction, games, drawing, one child named folk games. It is significant that when naming their favorite activities, children name games related to research activities (8%). Outdoor games and outdoor games are a priority for children, because "it's boring to sit at the screen" (75%). Children understand that digital technologies make life easier, it is easier to find information with them, but they are already aware of the disadvantages of excessive enthusiasm for computer games: eyes deteriorate, lack of live communication. The responses of children in both urban and rural kindergartens have minor differences. 18% of the children living in the village named computer games among their favorites. The rest preferred street games and "fishing". This once again confirms the influence of socio-cultural specifics on the development of value priorities.

Among the favorite outdoor folk games are the brook, "Zarya-zarnitsa", "Selling pots", "Cossacks-robbers", "Blind Man's Buff". 14% of respondents could not name a single folk game, while almost all

children like to listen and read folk tales, they call "Sister Alyonushka and brother Ivanushka", "Sivka Burka", "Geese -swans", "Princess Frog", etc. A. Pushkin's fairy tales were also considered favorite and often read: that once again confirms the meaning of the great poet's works. There are no differences between the responses of rural and urban children, which allows us to talk about a single educational space of the world of childhood, in which the FOP is implemented, focused on traditional Russian values. At the same time, negative responses related to ignorance of folk culture, lack of interest in it ("boring fairy tales" Demid. 6 years) determine the need to actualize educational work in the field of "immersion" of the child in the space of folk art, using active methods of cognition.

The third set of questions concerned the relationships and real actions of children. An analysis of the responses in the third block showed that all children try to help their parents around the house: vacuuming, cooking when mom gets tired. Some children were really expressive in their answers: "I always help my mother so that she doesn't get tired and can dress up and do her hair more often" (Elizabeth, 6 years) – in the city, but rural children say "I like helping father with tools", "I clean up snow in winter and grass in summer". Here we can highlight the difference in what needs to be done around the house in the city and in the countryside.

Supporting friends is usually done through playing, as the most common response to the suggestion to continue the sentence "With friends we can ..." is to play (90%). According to the children, "a real friend is someone who you can play with, who shares his toys, who gives you sweets". The children have a fairly clear idea of who a friend is. They name children with whom they often play, walk, one child called his father a friend. However, it is difficult to identify the qualities and actions of the children they call friends. Children often describe 'good' in their answers.

The analysis of children's responses took into account the accuracy, correctness, independence of responses, emotional reactions accompanied by conversation, and the activity of children.

Table 1.
Levels of value perception of preschoolers

Levels	Number of answers/ %	
	Rural kindergarten	City kindergarten
Optimum	1 / 2,4	2 / 4,7
Medium	21/ 50	23 / 53,5
Minimum	20/ 47,6	18/ 41,8
	42/ 100	43/ 100

The assignment of the levels was carried out on the basis of the selected criteria: cognitive, emotional-value, operational-behavioural (Sharikova, 2019).

As the table "Levels of value perception of preschoolers" shows, despite the specifics of manifestation and the nature of children's responses in rural and urban kindergarten, there are insignificant differences between the identified levels of children's value attitude development. Interviews with children in rural and urban kindergartens revealed an average level of development of values, with a preponderance of emotional and value components, in which aesthetic values (beauty of nature and its protection), values of helping (to an adult, to a friend), values of health were clearly emphasized.

The analysis of the results of the research made it possible to outline the prospects of educational work on development of children's value attitude to socio-cultural reality through project activities, which allows to educate a child as a subject of pedagogical interaction, to develop skills of partnership interaction, to stimulate children's interest in the history of Russia, to socio-cultural values and to activate their cognitive and creative activity, to develop social activity.

The content of the projects was specific in accordance with the living conditions and location of the preschool organization. Historical and local history, social, and ethnocultural projects were developed and implemented. The inclusion of children in the implementation of historical and local history projects enriched the cognitive sphere, developed the cognitive activity of children, formed skills of interaction and cooperation. "Russian Land Holy Defenders" project broadened children's ideas about the historical past of Russia, about the heroes-defenders of the Russian land, such as Alexander Nevsky, Dmitry Donskoy,

Fyodor Ushakov, who were canonized by the Russian Orthodox Church.; it formed the need for preschoolers to show kindness, help and empathy in their relations with adults and peers, honesty, fairness. The social projects took into account the peculiarities of the socio-cultural reality and motivated the children to perform actions and deeds in order to provide real help to others in accordance with their age. The projects "Make the village green", "Our friends" contributed to the development of empathy and a value attitude towards flora and fauna, the desire to help animals and birds in difficult conditions, supported the activity and independence of children in decision-making, formed communicative skills. "The Social Assistance Laboratory" project focused on involving children in activities that provide assistance to people. In order to develop children's independence and activity, the project "Little Ulyanovsk man" was implemented by means of "lessons on the contrary", where children took over the functions of a teacher, told what they know, answered questions of adults, led "excursions" through modern Ulyanovsk on the basis of photographs of famous and beautiful buildings, monuments, parks. During the implementation of the project, children acted not only as guides, but also as architects and designers when designing the layouts of city parks, editors of albums with children's drawings.

Taking into account the negative attitude of some children to folk tales, special attention was paid to the ethno-cultural project focused on the inclusion of children in different types of activities: theatricalized, based on folk works, creation, together with parents, of little children's books illustrating their own fairy tales.

The final diagnostics using conversations, observation and analysis of the results of children's activities showed an improvement in the indicators of children's value attitude to sociocultural reality. Significant changes were observed in the cognitive and behavioral criteria.

Conclusions

On the basis of the work presented, it can be stated that the value attitude of older preschool children towards the socio-cultural environment is a personal characteristic formed on the basis of cognition, experience, acceptance and transformation of the value bases of human life and manifested in the process of interaction with the outside world. The value attitude is formed in the process of internalization of universal values in socially significant activities. There were no particularly significant differences in the development of value attitudes towards socio-cultural reality among children in rural and urban areas. Aesthetic and moral values prevailed at the stage of cognition. The implementation of projects on knowledge of the history, culture and traditions of the home country contributed to the development of indicators of an operationally effective criterion of value attitudes.

We understand that the assessment of the current state of children's value orientations is important and should be carried out regularly. on the one hand, modern society is changing very quickly, new interests and motives are emerging, on the other hand, it is important to note the trends towards the disappearance of familiar values, for example, folk traditions, which in 1-2 generations will be impossible to restore. And thirdly, the more conscious a preschool child grows, the more likely it is that in the future he will show high social responsibility (Aryabkina et al., 2024).

We made interviews only with children who go to kindergartens because of the special organized process of education and upbringing. So further research can be extended to compare children not attending kindergarten, but working directly with families is the most difficult area.

The results of our work will be used to develop educational programs in kindergartens in the region and methodological recommendations on specialized forms of work with children.

Bibliographic References

- Afanasyev, A.V. (2010). Scientific approaches to the study of the concept of "Value attitude". *The world of science, culture, education*, (1), 194-197. <https://cyberleninka.ru/article/n/nauchnye-podhody-k-issledovaniyu-ponyatiya-tsennostnoe-otnoshenie/viewer>
- Arsenova, M.A. (2012). Technology of formation of value attitude to the social world in children of senior preschool age in the process of cognitive activity. *Concept*, (6), 51-55. <http://e-koncept.ru/2012/12075.htm>

- Aryabkina, I., Spiridonova, A., Belonogova, L., & Kazakova, L. (2024). Sociocultural education as a key to fostering social responsibility in modern youth. *Amazonia Investiga*, 13(78), 113-123. <https://doi.org/10.34069/AI/2024.78.06.10>
- Bezrukova, L.V. (1999). *Formation of value attitude to the surrounding world in senior preschoolers* (diss. candidate of pedagogical sciences). Ural State Pedagogical University, Ekaterinburg, 164 p.
- Decree No. 1028 "The Federal educational program for preschool education" Ministry of Education, (2022). Recovered from: <https://www.garant.ru/products/ipo/prime/doc/405942493/?ysclid=m27fxtuwo5660511750>
- Federal Law No. 273-FZ. "The Law on Education in the Russian Federation", Russian Federation, 2012. Recovered from https://www.consultant.ru/document/cons_doc_LAW_140174/?ysclid=m27exsl6cj191808965
- Gogoberidze, A. G. (Ed.) (2010). *Problems of Preschool Childhood in the Multicultural Space of Changing Russia*. St. Petersburg: Herzen Russian State Pedagogical University.
- Golovanov, V. P. (2020). Education in modern socio-cultural conditions: new challenges, opportunities, responsibility. *Social and political research*, 3(8), 123-133. <https://doi.org/10.20323/2658-428X-2020-3-8-123-133>
- Ilyichev, L.F., Fedoseev, P.N., Kovalev, S.M., & Panov, V.G. (Ed) (1989). *Philosophical Encyclopedic Dictionary*. 2nd ed. Moscow: Soviet Encyclopedia, 815 p.
- Kosmacheva, N.V. (2009). *Formation of moral value orientations in preschoolers* (diss. candidate of pedagogical sciences) Ryazan: Ryazan State Pedagogical University named after S. Yesenin, 222 p. <https://acortar.link/Qd0dh6>
- Marshitskaya, V.V. (2018). Development of emotional and value attitude of senior preschool children to social reality. Science and Education a New Dimension. *Pedagogy and Psychology*, VI(71). <http://doi.org/10.31174/SEND-PP2018-173VI71-06>
- Neyasova, I.A., Buyanova, I.B., Serikova, L.A., & Gorshenina, S.N. (2023). Diagnostics of structural components of social experience in senior preschool children in the context of a provincial society. *Bulletin of the Kazan State University of Culture and Arts*, 1, 10-14. <https://acortar.link/FkaxTm>
- Sharikova, S.G. (2019). Parameters for diagnosing the value-semantic perception of music in children of senior preschool age. *World of science, culture, education*, 5(78). 296-298. <https://acortar.link/cjPQzQ>
- Silakova M. M., & Zakharova L. M. (2018). Sociocultural Context of Emotional Intelligence Development of 5-7-year-old Children. *Journal of Psychology and Cognition*, 3(1), 249-253 <https://doi.org/10.35841/psychology-cognition.3.1.6-10>
- Stepanova, N. A., Levshina, N. I., Sannikova, L. N., & Yurevich, S. N. (2022). Study of value relations of preschool children to the world around them. *Prospects of Science and Education*, 1(55), 266-283.
- Vodneva, E.V. (2003). *Pedagogical conditions for the formation of a value attitude towards health in children of senior preschool and primary school age* (abstract of the thesis. dis. ... cand. ped. Sciences). Smolensk State University of Education, Smolensk.
- Zakharova, L.M., & Zakharova, V.S. (2018). Influence of Motor Activity on the Development of Voluntary Attention in Children Aged 6-7 Years in Rural and Urban Microsociety. *International Education Studies*, 11(4). <https://doi.org/10.5539/ies.v11n4p126>
- Zakharova, L.M., Maydankina, N.Yu., Chibisova, T.A., Subbotina, E.S., & Zakharova, V.S. (2021). Readiness of future teachers for sociocultural education of children in modern conditions of society development. *Amazonia Investiga*, 10(47), 293-300. <https://doi.org/10.34069/AI/2021.47.11.30>
- Zakharova, L.M. (2022). *Sociocultural development of children in modern conditions: theory and practice: practice-oriented, monography*. Ulyanovsk: Ulyanovsk State Pedagogical University named after I.N. Ulyanova. 129 p.




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Social media and public opinion formation in times of war: A case study from Ukraine

Соціальні медіа та формування громадської думки під час війни: кейс з України

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Abstract


The purpose of the study is to identify the impact of social media on the formation of public opinion in Ukraine. In the context of the war in Ukraine, public opinion plays a crucial role in resistance, morale, and support for government policies. This study examines the impact of social media use on the formation of Ukrainian public opinion during the conflict. Using a survey methodology (N=310), the relationship between social media use, interpersonal trust (ITS), and Fear of Missing Out (FOMO) was assessed. Results reveal that active social media use is associated with lower interpersonal trust and a pronounced FOMO syndrome ($R^2=0.571$), suggesting a reduced ability for critical evaluation of information. These findings have implications for the development of communication strategies, public policies, and psychosocial interventions aimed at counteracting


Анотація

У контексті війни в Україні громадська думка відіграє вирішальну роль у опорі, моральному стані та підтримці урядової політики. У цьому дослідженні розглядається вплив використання соціальних медіа на формування української громадської думки під час військових дій. Використовуючи методологію опитування (N=310), було оцінено взаємозв'язок між використанням соціальних мереж, міжособистісною довірою (ITS) і страхом втратити (FOMO). Результати показують, що активне використання соціальних мереж пов'язане з нижчою міжособистісною довірою та вираженим синдромом FOMO ($R^2=0.571$), що свідчить про знижену здатність критично оцінювати інформацію. Ці висновки мають значення для розробки комунікаційних стратегій, державної політики та психосоціальних втручань,

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disinformation and promoting informed public opinion in times of conflict.

Keywords: information flow, interpersonal trust, social media, digital technologies, public opinion.

спрямованих на протидію дезінформації та сприяння інформованій громадській думці під час конфлікту.

Ключові слова: інформаційний потік, синдром втраченої вигоди, соціальні медіа, цифрові технології, суспільна думка.

Introduction

The fast growth in the number of social network users, which has been observed since the beginning of the war in Ukraine, indicates the active use of the information provided by Ukrainians. At the same time, according to DataReportal, as of January 2024, 24.30 million active social network users are registered in Ukraine. This tendency indicates a high level of public confidence in information on social networks. Still, at the same time, it causes concern because of the constant misinformation and distortion of actual events.

The rapid scientific and technological development of society in recent decades has meant that mobile devices and the internet, and media in general, have become an integral part of people's lives (Wahyoedi et al., 2023). In the era of ever-increasing digital technologies, social media play a key role in the process of free expression and verbalisation of one's views and opinions (Maitri et al., 2023).

This has allowed people to easily express their thoughts and worldviews, exchange information and interact with others (Scheinfield & Voorhees, 2022). Thus, a lot of new content is constantly emerging in modern society, reflecting different viewpoints on social issues (Burbach et al., 2020). At the same time, the excessive flow of information reaching users on social media is shaping public opinion (Selvarajah & Fiorito, 2023). Social media platforms such as Facebook and Instagram have changed the way citizens interact with each other and have a mobilising effect on public opinion (Kellam & Stein, 2016). Social media, through their innovative potential, create a virtual space in which various current issues are analysed and discussed (Ausat et al., 2023). As such, social media are becoming not only a means of communication, but also a driving force in shaping public opinion, which in turn can influence other areas of public life (Wong, 2023). The virtual space of social media creates opportunities for expressing one's point of view, coordinating common opinions, and expanding opportunities for greater involvement of people in discussing current social issues (Shmalenko et al., 2021).

Modern information technologies allow you to directly track the movement of troops, the loss of the enemy or their redeployment, all this information is often presented in social networks and is actively supported by citizens (Sheremet et al., 2021). Thanks to modern technologies and social networks, it is also possible to record war crimes (Horska et al., 2023). Therefore, the presence of such evidence of crimes against citizens is often not just an information flow, but also evidence in criminal investigations.

Despite the benefits of social media and the speed of information transmission, it provides an optimal environment for the spread of false information, leading to polarisation and radicalisation in society (Pansanella et al., 2023). Content containing inaccurate information spreads rapidly and has a detrimental effect on citizens' perceptions of this information (Gabore & Deng, 2018).

Social media create a new space for the formation of opinions on current events, political processes, military operations, etc. At the same time, it is a space for the dissemination of distorted, out of context information that is used to attempt to control public opinion (Gorodnichenko et al., 2021). The spread of disinformation under martial law is a hybrid threat to Ukraine's security, as it undermines interpersonal trust in the state apparatus and spreads hardline ideology (Gulzar et al., 2023). In this way, the information sphere has become another battleground in the context of war, where the enemy conducts an equally organised and targeted attack (Skarpa et al., 2023). Among such attempts, the most relevant in terms of disinformation are religious hatred, violation of Ukraine's sovereignty, violent change of state leadership, and destabilisation of society (Geissler et al., 2023). At the same time, social media are now also a source of danger for citizens, as they are often subject to hacking (Alonso-Martín-Romo et al., 2023). In addition, fake news, i.e. false news that has not been verified or filtered by users, spreads very easily on social media (Ciuriak, 2022). This leads to the distortion of social and political attitudes and the destabilisation of society.

The purpose of the study is therefore to identify the impact of social media on the formation of public opinion in society. The following research objectives were defined on the basis of the purpose:

- To survey young and mature respondents and determine the extent to which they use social media;
- To highlight the level of interpersonal trust among respondents;
- To diagnose the level of FOMO (or lost opportunity) syndrome among the respondents;
- To determine the impact of social media use on levels of trust and FOMO (or lost opportunity) syndrome.

Based on the purpose and objectives, the research hypothesis is formed: active users of social media in Ukraine under martial law have low interpersonal trust and a pronounced FOMO (or lost opportunity) syndrome, which negatively affects the formation of public opinion.

Literature Review

Theories of public opinion formation

Public opinion serves as an institution of civil society and represents the basic value and cultural norms and ideals of citizens, their attitude to society in general or specific events. (Jannière & Scrivano, 2020). Public opinion serves as collective views and individuals' judgements related to certain relevant events or topics of society (Moussaïd et al., 2013). In this case, public opinion is based on the communicative interaction of society members who share information, experience and views with each other (Mallinson & Hatemi, 2018). Policy directions are formed and products or services are developed on the basis of public opinion. In other words, public opinion involves political, socio-economic, cultural and value aspects of life (Gabore & Deng, 2018). The feature of public opinion is its representation of a set of personal views, attitudes and beliefs on a certain topic expressed by a significant part of the community (Tiratelli, 2023). Therefore, the general public opinion of a particular society strongly depends on each separate citizen (Boichuk et al., 2023). Not all scientists share this approach because some of them interpret public opinion as a synthesis of the similar views of society members (Scheufele & Eveland, 2001). While others consider that public opinion is represented by various contrary worldview positions (Lee et al., 2022). Despite such dichotomy of public opinion definitions, the public opinion in each of these approaches is a set of views of a certain number of individuals.

Influence of social media on public opinion

The rapid social and political transformations that occur in modern society significantly impact the establishment of a sustainable and balanced interaction system between civil society and the state (Huang, 2020). Under such circumstances, public opinion is perceived as the most important social institution that serves as a regulator of interactions between the state and civil society (Chang & Tsai, 2022). Nowadays in Ukraine, the public opinion is a stimulating factor in the development and preservation of state integrity. (Geissler et al., 2023). It provides adoption of legislative decisions in the interests of social communities; is a source of important information about events, including military operations; contributes to accelerating, facilitating the implementation of certain decisions or preventing their implementation if this decision contradicts public views and needs.

Public opinion is mainly determined by the mechanism of online interaction via social networks. Social networks provide users with access to real-time information without any limitations (Chang & Tsai, 2022). This is highly relevant at a state of war as it allows to monitor the news and all changes continuously. In this case, the formation of public opinion depends on experience and learned information (Chernysh et al., 2023; Chernets et al., 2023). But at the same time, it can change rapidly under the influence of various factors: the amount of received information, its quality, emotional background, and its value for each individual (Hatamleh et al., 2023). Therefore, the type of social network has a weak influence on the distribution of information content, but the quality of information content significantly impacts the number of users (Ausat, 2023).

Disinformation and online manipulation

Large groups of people with similar interests create an atmosphere of mutual trust between members of a social network. In such groups, if an actual member of the network shares information, it is perceived and

distributed by the group members without much criticism. In such an environment, users are vulnerable because they do not only express their opinions, but also reveal their personal data (Gündüç, 2020). Consequently, fraudsters who can disguise themselves as group members can collect personal information and use it for their own purposes. At a state of war, the issue of the reliability of social network content is particularly urgent, as the enemy widely spreads anti-government narratives, fake news, and false socio-political views. Social network users do not always verify the reliability of such information, so it leads to its active distribution in the virtual environment (Chen et al., 2022). The final result is the formation of a certain public opinion concerning this information, which is based on unrealistic events, but has its influence on society (Gorodnichenko et al., 2021). Propaganda on social media can take different forms. These are mainly fake news, false images and video editing, and all sorts of provocations (Jannièrè & Scrivano, 2020).

Case studies on social media and conflict

Due to the development of social networks and their value in the life of society, some scientists introduce the concept of "online public opinion", which is defined as a set of relevant opinions expressed by the public via the Internet on a particular social phenomenon or topic in a particular period of society development (Huang, 2020). This concept is relevant to the current events in Ukraine, as most citizens, especially young and mature people live by the news obtained from social networks and messengers (Donofrio et al., 2022).

For almost two years of war, Ukrainians have become quite competent in recognising false information but the enemy still applies active attempts to spread disinformation, fakes, impose their opinion, and force people to think in the way they need. An important step in preventing disinformation influence is a ban on all Russian content, including music, literature, bloggers, etc. Ukraine also has a Centre for Countering Disinformation, a working body of the National Security and Defence Council of Ukraine, whose main task is to prevent the dissemination of false information, fight against corruption and counter disinformation on the Internet and media. But despite the active countering of the enemy's disinformation influence, social networks are still the main source of news in Ukraine.

Open-source intelligence (OSINT) platforms gained popularity in Ukraine. Their use made it possible to investigate certain situations or events during the war. For example, during the tragedy with the Malaysian plane, Boeing-777 researchers from Bellingcat exploiting materials on the network proved the guilt of pro-Russian separatists who used the Buk air defence system of one of the Russian brigades (Horska et al., 2023).

It is also worth mentioning the numerous videos of the crimes of Russian soldiers, which they distribute in telegram channels. Thus, thanks to the spread of the invaders, it was possible to identify Oleksandr Matsievsky, involved in the shooting on March 8, 2024, who was shot point-blank after the words "Glory to Ukraine". Also, through social networks, criminal proceedings were initiated due to the shooting on October 1 of 16 military men in the Pokrovsky direction and 9 Ukrainian military men by invaders in the Kurshchyna on October 10, 2024. Unfortunately, there are a lot of such examples, and in this case, social networks make it possible to expose the involvement of criminals and bring them to justice.

Therefore, considering the purpose and hypothesis of the study, it may be noted that social networks are the main means of presenting information in the conditions of war in Ukraine. This information is not always true and often requires verification and filtering. But thanks to them, Ukrainians learn about the course of the war, the advancement of the military, threats due to constant shelling, and Russian crimes.

Methodology

Study procedure

The study took place during March 2023 - December 2023 and had 4 consecutive stages (Figure 1). The first stage included the organization of the programs of sociological study, selection of the study cohort, selection of the study methods, and documentation of survey forms in electronic form. In the second stage, a survey of the respondents of the selected age group was conducted, and the received results were entered into an Excel database. The third stage included conducting calculations according to each method. The fourth stage allowed quantitative, qualitative and statistical analysis of the data obtained in the study. The

research was conducted in a remote format in Google Forms. This allowed to engage a large number of respondents, different in age, social status, and profession.

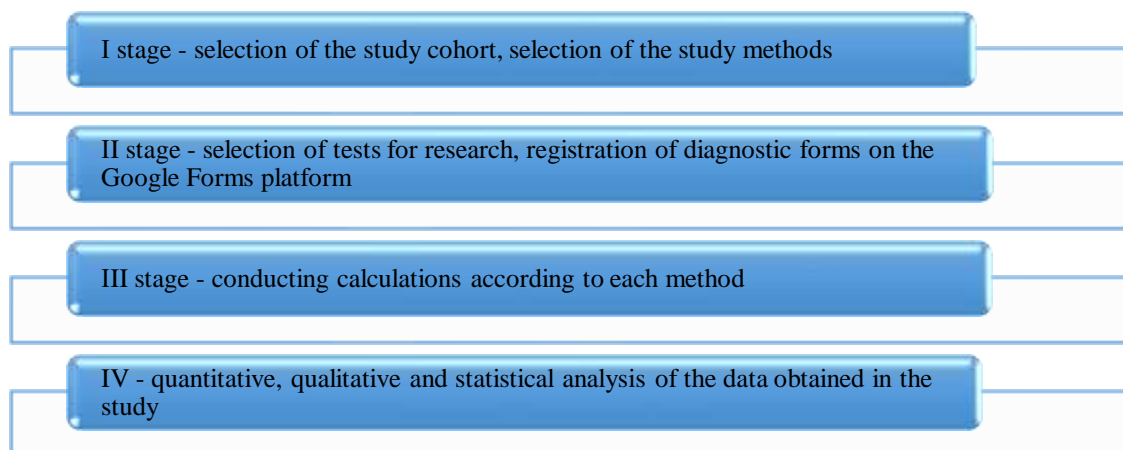


Figure 1. Flowchart of the different stages of the research process.

Sample formation

310 people in the age from 20 to 55 participated in the study. The sample number ensures its representativeness of the general population. The total number of respondents included 178 women and 132 men. Exclusion criteria was the age under 20 years, as by this time value system is not finally developed and world-view positions are categorical in relation to real events. As well as the age above 55 years, when critical thinking in relation to received information decreases.

Methods

To determine the role of social networks in public opinion formation the following methods were used:

Survey 'The use of social networks'. The questionnaire included the following questions:

- 'Do you use social networks?' (active user, moderate user, sometimes use, rarely use, almost do not use).
- 'Which social networks/messengers do you prefer' (Twitter, Instagram, Facebook, TikTok)/(Telegram, Viber, WhatsApp, Messenger).
- 'Name the main source for receiving news (TV, social networks, informational channels).

As part of the study's purpose, it was important to investigate how citizens have confidence in social and political institutions. This would allow us to determine the degree of confidence in the information provided in social networks. Therefore, J. Rotter's Interpersonal Trust Scale (ITS) allows us to measure the level of social trust, which consists of people's trust in the people around them and society in general. The level of social trust reflects the ability to perceive other people and external information as constructive and safe. According to the methods key, the received results vary from 25 scores (strong disagreement) to 125 scores (strong agreement). The high Alpha-Kronbach value ($\alpha = 0.83$) confirms the reliability of the test.

Since social networks have become a kind of addiction among Ukrainians, and they constantly try to control news and events, it is advisable to explore a phenomenon called the Fear of missing something important. For this, we used the Fear of missing out, FOMO, scale. The methodology was developed by Polish authors Przybylski, Murayama, DeHaan & Gladwell (2013). The method aims to determine the level of fear of missing important information, and not to be aware of the situation. The Alpha Cronbach score for the test was $\alpha = 0.87$, so we can argue that the test is reliable.

Data processing was done using Microsoft Excel and SPSS 22.0 software. Using descriptive statistics, test averages and standard deviations were described. Frequency analysis made it possible to present frequency diagrams of variables. Regression analysis was used to determine the impact of using social networks on social trust and Fomo syndrome.

Results and Discussion

The picture demonstrates that among the presented social networks, Facebook is the most used by the respondents, TikTok is somewhat less used, almost half of the respondents use Telegram to receive information, and 35% of the participants prefer Instagram. Active users of Twitter, Viber, WhatsApp and Messenger account for the lowest share. Therefore, it is possible to conclude that most of the news Ukrainians receive from Facebook, which is international and allows to share posts outside their social circle. Information and comments exchange allows for forming clear worldview positions on a certain range of issues. In particular, patriotic slogans and narratives, uniting people, creating a feeling of unity, and supporting the patriotic spirit, quickly spread during the war. At the same time, unreliable and unverified information may be actively spread by the users and be perceived as real, forming a public opinion of Ukrainians concerning certain situations or events.

The survey showed, that Ukrainians receive the largest share of news from social networks (Figure 2).

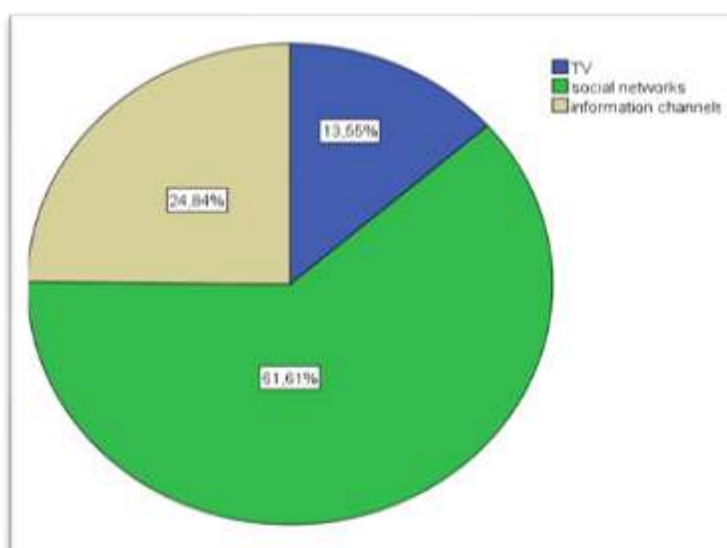


Figure 2. Sources of receiving informational news from Ukrainians.

Source: (Developed by the authors)

The sampled group was found to receive the largest share of news from social networks and informational channels, and they received less information from TV. After two years of war, public trust in television in Ukraine has significantly decreased. Trust in social media, where maximum news is received, has increased instead. This indicates that under martial law public opinion in Ukraine is mainly formed under the influence of social networks.

The level of social trust of the public and the level of FOMO syndrome were also found (Table 1).

Table 1.

Indicators of social trust and FOMO syndrome

Gender		Social trust	FOMO
Male	Mean	49,06	32,56
	N	132	132
	SD	16,02	9,55
Female	Mean	64,57	28,65
	N	178	178
	SD	26,91	11,09
Total	Mean	57,97	33,32
	N	310	310
	SD	24,14	10,62

Source: (developed by the authors)

According to the table, the sample group has a low level of social trust and a high level of FOMO syndrome. Herewith, low social trust and a high level of FOMO syndrome prevail among male representatives. A high level of social trust and a high level of FOMO syndrome prevail among female representatives. Such results indicate that under conditions of war, a large share of the participants are quite prone to being dependent on social networks and have a fear of missing certain important events. They spend excessive time using gadgets, tracing military and social events. Constant psycho-emotional stress and anxiety because of the possibility of missing something important on the web reduce the level of importance of the received information. Because of this, false public opinion, imposed on the public via social networks, is formed.

Regression analysis detected the influence of social network use on social trust and FOMO syndrome (Table 2).

Table 2.

The influence of social networks use on social trust and FOMO syndrome

Parameters	β	SD	R	R ²	F	P
Social trust	0,31	0,02	0,756	0,571	204,708	0,000
FOMO	-0,17	0,05				

Source: (developed by the authors)

Regression analysis detected that the use of social networks defines social trust and FOMO syndrome by 57%. Received results allow to state the more actively Ukrainians use social media, the lower their social trust and the higher FOMO syndrome is.

Thus, social networks were found to influence public opinion in Ukraine under martial law, as they are the main source of receiving information and news. At the same time, active use of social networks leads to the reduction of social trust and increase of the fear of missing something important.

Received results showed that half of the questioned young and mature Ukrainians are active users of social networks, the fifth part of them consider themselves to be average users, and only a small percentage of respondents do not use social networks. Nowadays, social networks are the main source of information under conditions of martial law in Ukraine. At the same time, Facebook, Tik-Tok and Telegram are the most popular networks among all users. Ukrainians were found to have low social trust and a high level of FOMO syndrome. At the same time, active use of social networks causes a low level of social trust and a high level of FOMO syndrome. This indicates that excessive use of social networks causes certain addictions when a very high need to receive information is combined with low filtration of the quality of this information, which reduces social trust. Such addiction to social networks distorts public opinion, as people's misinformation prevents them from making realistic conclusions.

Similar results were received in other studies, which showed that social networks can lead to negative consequences for personality and can lead to FOMO syndrome development (Scheinfeld & Voorhees, 2022). The more actively people use social networks, the higher the risk of FOMO, which causes to reduction of the threshold of objectivity of perceived information (Rozgonjuk et al., 2020). Active use of the Internet and social networks is a normal expression of social mobility in current conditions. Their excessive use leads to the reduction of interpersonal interaction, constant tension, mistrust and negativism (Acharjee & Panicker, 2023).

An increase in the number of users of social networks allows to introduce desired content from a certain political angle into information space, affecting the views of citizens and their position (Shmalenko et al., 2021). Ausat (2023) in his study showed that social networks play a significant role in public opinion formation and influence economic decision-making. Both certain individuals and groups can use them for interaction with each other, information sharing, and discussions, which in general form collective views in society (Ausat, 2023).

Hatamleh et al. (2023) state that active social network users have a high level of trust, however, the authors believe this reduces their criticality and ability to constructively evaluate received information. Due to this, users are more vulnerable to disinformation (Hatamleh et al., 2023). It was proved that the higher ability of fake news detection a people have, the lower their trust in information on social networks is (Skarpa et al., 2023).

As a set of diverse views and judgements, public opinion was proved to have undergone critical changes in formation mechanism due to the influence of social media (Dwivedi et al., 2023). Due to the possibility of active opinion exchange among users, social networks created a 'dynamic virtual public arena, where dialogue, debates and spread of information can happen at an incredible speed' (Arisanty et al., 2020). On the one side, social networks give the possibility to actively communicate in a virtual environment and instantly spread new information. At the same time, large information volumes are not always filtered in time, which creates a false understanding of the consequences of this information for society and the public. Study results demonstrate that active news sharing via social networks significantly affects public opinion formation (Gabore & Xiujun 2018).

Public opinion formation plays an important role, as it affects the process of society development in general. The more truthful, reasonable and logical the public opinion is, the more positively society develops. Selvarajah and Fiorito (2023) prove that information truthfulness in social networks is the source of constructive public opinion, developed on personal attitude to real events under conditions of martial law in Ukraine. Some studies have a wider presentation of the aspects of social networks' influence on public opinion and indicate that non-registered users play a significant role (Mir et al., 2023). Thus, unverified users of social networks may spread false information concerning the war in Ukraine to a greater extent.

Finally, it is necessary to note that there exists a need to improve the quality of the social network environment, reduction of negativism in informational messages, and control over subversive activities of pro-Russian channels and users. This demands the government and related organizations introduce effective measures to solve present issues (Saaida & Alhouseini, 2023). In the process of state policy formation, the government should consider the opinions and positions of local social institutes, extend methods of information processing and ensure clear control of the trustworthiness of information in social networks.

Conclusions

The conducted study proved, that social networks are the main information source as well as the means of expression of the own attitude to the events around. Regardless of the low level of social trust and fear of missing important events, the active participation of Ukrainians in virtual news is very high. Still, large volumes of information, available in social networks and low criticality of their understanding lead to distorted perception of real situations.

The received results are valuable for the development of effective methods of filtration and control of sources of information, published in social networks. Verification of users' accounts requires special attention as there are a number of bots, oriented on destabilization.

Study limitations lie in the high dynamics of social network use and the impossibility of conducting a final analysis of their effect on a certain public opinion. Furthermore, the war lasts, and changes in political, and social military areas take place every day and affect public opinion expression and the general mood of the society.

Political and social institutions should implement programs to track the veracity of information and the ways of its transmission and dissemination. This will reduce the impact of disinformation on citizens. At the same time, citizens should filter the information they receive from social networks since only reliable information can lead to a positive solution to the military conflict.

Bibliographic References

- Acharjee, S., & Panicker, A.T. (2023). Trust levels in social networks. *Heliyon*, 9(9), 19850. <https://doi.org/10.1016/j.heliyon.2023.e19850>
- Alonso-Martín-Romo, L., Oliveros-Mediavilla, M., & Vaquerizo-Domínguez, E. (2023). Perception and opinion of the Ukrainian population regarding information manipulation: A field study on disinformation in the Ukrainian war. *Profesional de la Información*, 32(4), 320405. <https://doi.org/10.3145/epi.2023.jul.05>
- Arisanty, M., Wiradharma, G., & Fiani, I. (2020). Optimizing social media platforms as information dissemination media. *ASPIKOM Journal*, 5(2), 266. <https://doi.org/10.24329/aspikom.v5i2.700>

- Ausat, A. (2023). The role of social media in shaping public opinion and its influence on economic decisions. *Technology and Society Perspectives (TACIT)*, 1, 35-44. <https://doi.org/10.61100/tacit.v1i1.37>
- Ausat, A. M. A., Permana, R. M., Angellia, F., Subagja, A. D., & Astutik, W. S. (2023). Utilisation of social media in market research and business decision analysis. *Polgan Minfo Journal*, 12(2), 652-661. <https://doi.org/10.33395/jmp.v12i2.12485>
- Boichuk, O., Lyebedyeva, Y., Stadnyk, M., Mishchuk, A., & Shcherbin, L. (2023). Effectiveness of virtual space in the socialization process of teenagers (under martial law). *Amazonia Investiga*, 12(63), 266-276. <https://doi.org/10.34069/AI/2023.63.03.25>
- Burbach, L., Halbach, P., Ziefle, M., & Calero Valdez, A. (2020). Opinion formation on the Internet: The influence of personality, network structure, and content on sharing messages online. *Frontiers in Artificial Intelligence*, 3, 45. <https://doi.org/10.3389/frai.2020.00045>
- Chang, H.-T., & Tsai, F.-C. (2022). A systematic review of Internet public opinion manipulation. *Procedia Computer Science*, 207, 3153-3160. <http://dx.doi.org/10.1016/j.procs.2022.09.373>
- Chen, L., Chen, J., & Xia, C. (2022). Social network behavior and public opinion manipulation. *Journal of Information Security and Applications*, 64, 103-122. <http://dx.doi.org/10.1016/j.jisa.2021.103060>
- Chernets, V., Stadnyk, M., Marukhovska-Kartunova, O., Kolybabiuk, S., & Svorak, S. (2023). The impact of Russian military aggression on the establishment of a new Ukrainian political nation. *Cuestiones Políticas*, 41(78), 357-373. <https://doi.org/10.46398/cuestpol.4178.25>
- Chernysh, R., Chekhovska, M., Stoliarenko, O., Lisovska, O., & Lyseiuk, A. (2023). Ensuring information security of critical infrastructure objects as a component to guarantee Ukraine's national security. *Amazonia Investiga*, 12(67), 87-95. <https://doi.org/10.34069/AI/2023.67.07.8>
- Ciuriak, D. (2022). *The role of social media in Russia's war on Ukraine*. SSRN. Retrieved from <https://ssrn.com/abstract=4078863>
- Donofrio, A., Rubio-Moraga, Á., & Abellán-Guzmán, C. (2022). Russia-Ukraine, a comparative analysis of the Twitter audience of the profiles of the government of the Russian Federation and the Office of the President of Ukraine. *Revista Latina de Comunicación Social*, (81), 18-43. <https://www.doi.org/10.4185/RLCS-2022-1819>
- Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., Baabdullah, ... & Wright, R. (2023). So what if ChatGPT wrote it? Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management*, 71, 102642. <https://doi.org/10.1016/j.ijinfomgt.2023.102642>
- Gabore, S. M., & Xiujun, D. (2018). Opinion formation in social media: The influence of online news dissemination on Facebook posts. *Communicatio*, 44(2), 20-40. <https://doi.org/10.1080/02500167.2018.1504097>
- Geissler, D., Bär, D., Pröllochs, N., & Feuerriegel, S. (2023). Russian propaganda on social media during the 2022 invasion of Ukraine. *EPJ Data Science*, 12, 35. <https://doi.org/10.1140/epjds/s13688-023-00414-5>
- Gorodnichenko, Y., Pham, T., & Talavera, O. (2021). Social media, sentiment and public opinions: Evidence from Brexit and USE lection. *European Economic Review*, 136, 103-772. <http://doi.org/10.1016/j.eurocorev.2021.103772>
- Gulzar, R., Gul, S., Verma, M. K., Darzi, M. A., Gulzar, F., & Shueb, S. (2023). Analyzing the online public sentiments related to Russia-Ukraine war over Twitter. *Global Knowledge, Memory and Communication (ahead-of-print)*. <https://doi.org/10.1108/GKMC-03-2023-0106>
- Gündüç, S. (2020). *The effect of social media on shaping individuals opinion formation*. Complex Networks and Their Applications VIII. Cham: Springer. https://doi.org/10.1007/978-3-030-36683-4_31
- Hatamleh, I. H. M., Safori, A. O., Habes, M., Tahat, O., Ahmad, A. Kh., Abdallah, R. A.-Q., & Aissani, R. (2023). Trust in social media: Enhancing social relationships. *Social Sciences*, 12(7), 416. <https://doi.org/10.3390/socsci12070416>
- Horska, K., Dosenko, A., Iuksel, G., Yuldasheva, L., & Solomatova, V. (2023). Internet platforms as alternative sources of information during the Russian-Ukrainian war. *Amazonia Investiga*, 12(62), 353-360. <https://doi.org/10.34069/AI/2023.62.02.36>
- Huang, B. (2020). Analyze the influence of Internet public opinion on public policy. *Open Access Library Journal*, 7, 1-9. <https://www.scirp.org/journal/paperinformation?paperid=102284>
- Jannièrè, H., & Scrivano, P. (2020). Public debate and public opinion: Notes for a research on architectural criticism. *CLARA*, 7, 18-29. <https://doi.org/10.3917/clara.007.0018>
- Kellam, M., & Stein, E. A. (2016). Silencing critics: Why and how presidents restrict media freedom in democracies. *Comparative Political Studies*, 49(1), 36-77. <https://doi.org/10.1177/0010414015592644>

- Lee, W., Yang, S.-G., & Kim, B. J. (2022). The effect of media on opinion formation. *Physica A: Statistical Mechanics and its Applications*, 595, 127-141. <https://doi.org/10.1016/j.physa.2022.127075>
- Maitri, W. S., Suherlan, S., Prakosos, R. D. Y., Subagja, A. D., & Ausat, A. M. A. (2023). Recent trends in social media marketing strategy. *Polgan Minfo Journal*, 12(1), 842-850. <http://dx.doi.org/10.33395/jmp.v12i1.12517>
- Mallinson, D. J., & Hatemi, P. K. (2018). The effects of information and social conformity on opinion change. *PLoS ONE*, 13(5), 0196600. <https://doi.org/10.1371/journal.pone.0196600>
- Mir, A., Sevukan, R., Gul, S., & Bhat, S. (2023). Exploring the perceived opinion of social media users about the Ukraine–Russia conflict through the naturalistic observation of tweets. *Social Network Analysis and Mining*, 13(1), 44. <https://doi.org/10.1007/s13278-023-01047-2>
- Moussaïd, M., Kämmer, J. E., Analytis, P. P., & Neth, H. (2013). Social influence and the collective dynamics of opinion formation. *PLoS ONE*, 8(11), 78-103. <https://doi.org/10.1371/journal.pone.0078433>
- Pansanella, V., Sirbu, A., Kertesz, J., & Rossetti, G. (2023). Mass media impact on opinion evolution in biased digital environments: A bounded confidence model. *Scientific Reports*, 13, 146-168. <https://doi.org/10.1038/s41598-023-39725-y>
- Przybylski, A. K., Murayama, K., DeHaan, C. R., & Gladwell, V. (2013). Motivational, emotional, and behavioral correlates of fear of missing out. *Computers in Human Behavior*, 29(4), 1814-1848.
- Rozgonjuk, D., Sindermann, C., Elhai, J. D., & Montag, C. (2020). Fear of missing out (FoMO) and social media's impact on daily-life and productivity at work: Do WhatsApp, Facebook, Instagram, and Snapchat use disorders mediate that association? *Addictive Behaviors*, 110, 106-138. <https://doi.org/10.1016/j.addbeh.2020.106487>
- Saaida, M., & Alhouseini, M. (2023). The influence of social media on contemporary global politics. *International Journal of Research and Analytical Reviews*, 10(1), 799-809.
- Scheinfeld, E., & Voorhees, H. L. (2022). How social media, FoMO, and isolation influence our perceptions of others who “break the rules”. *Social Media + Society*, 8(2). <https://doi.org/10.1177/20563051221103841>
- Sheremet, O. S., Voluiko, O. M., Posmitna, V. V., Poda, T., & Bidzilya, Y. M. (2021). Political and legal aspects of the information warfare. *Amazonia Investiga*, 10(45), 31-41. <https://doi.org/10.34069/AI/2021.45.09.3>
- Scheufele, D., & Eveland, W. (2001). Perceptions of ‘public opinion’ and ‘public’ opinion expression. *International Journal of Public Opinion Research*, 13(1), 25-44. <https://doi.org/10.1093/ijpor/13.1.25>
- Selvarajah, S., & Fiorito, L. (2023). Media, public opinion, and the ICC in the Russia–Ukraine war. *Journalism and Media*, 4(3), 760-789. <https://doi.org/10.3390/journalmedia4030048>
- Shmalenko I., Yeftieni N., & Semenets-Orlova, I. (2021). Impact of social media influencers on public policy and political discourse. *Proceedings of the International Conference on Social Science, Psychology and Legal Regulation*, 617, 88-93. <https://doi.org/10.2991/assehr.k.211218.015>
- Skarpa, P. E., Simoglou, K. B., & Garoufallou, E. (2023). Russo-Ukrainian war and trust or mistrust in information: A snapshot of individuals’ perceptions in Greece. *Journalism and Media*, 4(3), 835-852. <https://doi.org/10.3390/journalmedia4030052>
- Tiratelli, M. (2023). The centre ground hypothesis and the shape of public opinion. *The Political Quarterly*, 94, 45-56. <https://doi.org/10.1111/1467-923X.13231>
- Wahyoedi, S., Suherlan, S., Rijal, S., Azzaakiyyah, H. K., & Ausat, A. M. A. (2023). Implementation of information technology in human resource management. *Al-Buhuts*, 19(1), 300-318. <https://doi.org/10.30603/ab.v19i1.3407>
- Wong, B. (2023). *Top social media statistics and trends of 2024*. Forbes Advisor. Retrieved from <https://www.forbes.com/advisor/business/social-media-statistics/>



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Innovative technologies for the development of critical thinking in students

Інноваційні технології у розвитку критичного мислення студентів

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Abstract


The article reveals the content and level of critical thinking; the key provisions of the philosophy of education, on which the organization of the development of critical thinking of students of higher education should be based, are highlighted; the levels of the process of formation of critical thinking skills and the most important factors and components of the development of critical thinking are considered. The methodological foundations of the research are: leading propositions of the theory of scientific knowledge; general scientific principles of historicism, systematicity, and scientificity; conceptual provisions of pedagogical, psychological, and sociological sciences; ideas of experience based on the simultaneous study of pedagogical, socio-cultural and economic phenomena; philosophical and pedagogical ideas of the development of


Анотація


У статті розкрито змістове та рівневе наповнення критичного мислення; виокремлено ключові положення філософії освіти на які повинна спиратися організація розвитку критичного мислення здобувачів вищої освіти; розглянуто рівні процесу формування навичок критичного мислення й найважливіші чинники та складники розвитку критичного мислення. Методологічними засадами дослідження є: провідні положення теорії наукового пізнання; загальнонаукові принципи історизму, системності, науковості; концептуальні положення педагогічних, психологічних, соціологічних наук; ідеї досвіду на основі синхронного вивчення педагогічних, соціально-культурних і економічних явищ; філософсько-педагогічні ідеї розвитку сучасної освіти. Методологічна

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modern education. The methodological basis of the research is presented on four hierarchically subordinated levels: philosophical, general scientific, specifically scientific, and technological. The diagnostics of the system for improving students' critical thinking and the professional readiness of future specialists allowed us to talk about integrated indicators of the formation of the professional readiness of future specialists and increasing the level of critical thinking of students at the formative stage of the experiment. The increase in students' critical thinking and the formation of professional readiness of future specialists by all indicators is 15%, which is a positive result. Positive changes in the levels of student's critical thinking and the formation of professional readiness of future EG specialists compared to CG were revealed. Increasing the level of this readiness among EG students is due to the introduction of the author's system for improving students' critical thinking with the use of innovative technologies. The conclusion emphasizes that the use of innovative technologies increases the level of critical thinking of students and their professional readiness.

Keywords: innovative technologies, critical thinking, students, professional readiness, pedagogical innovations.

основа дослідження представлена на чотирьох ієрархічно підпорядкованих рівнях: філософському, загальнонауковому, конкретно науковому та технологічному. Проведена діагностика системи підвищення критичного мислення студентів та професійної готовності майбутніх фахівців дозволила говорити про інтегровані показники сформованості професійної готовності майбутніх фахівців та підвищення рівня критичного мислення студентів на формуальному етапі експерименту. Підвищення критичного мислення студентів та сформованості професійної готовності майбутніх спеціалістів за всіма показниками становить 15%, що є позитивним результатом. Виявлено позитивні зміни у рівнях критичного мислення студентів та сформованості професійної готовності майбутніх фахівців ЕГ порівняно з КГ. Підвищення рівня цієї готовності у студентів ЕГ зумовлено впровадженням авторської системи вдосконалення критичного мислення студентів з використанням інноваційних технологій. У висновку наголошено що використання інноваційних технологій підвищує рівень критичного мислення студентів та їх професійної готовності.

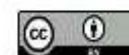
Ключові слова: інноваційні технології, критичне мислення, студенти, професійна готовність, педагогічні інновації.

Introduction

The development of scientific and technical progress today has led to the fact that society is gradually entering a new era of development, where the main values are information and knowledge. Global informatization, the rapid increase in the speed of information exchange, and the change in the methods, forms, and purposes of this exchange have caused the emergence of information inequality - the stratification of society according to a new feature: those who use new information and communication realities for their own development, education, simplifying the performance of daily tasks, and those, who falls outside the boundaries of the world process and, due to his own ignorance, becomes an object of influence and manipulation.

The use of modern technologies in education should play a key role in creating the necessary conditions for the self-development of all subjects of educational activity, activating cognitive and creative processes, forming the necessary competencies, and promoting the establishment of humanistic ideas. The global spread of global information and communication networks requires different content and quality of pedagogical education, legitimizes the rapid change of traditional educational models to integrative, dynamic ones that combine humanistic and technological approaches, making it possible to reveal the cognitive and creative potential of future specialists (Liakisheva et al., 2022).

Conducted research in the domestic educational space shows the spontaneous emergence and spread of digital narratives in social networks, the intensive expansion of biographical digital narratives in modern mass media, and the purposeful use of various types of narratives in the advertising industry. At the same time, we note insufficient coverage of the problem of improving the quality of education of future masters of education through the use of various types of digital narratives for the formation of 21st-century competencies, in particular, the development of student's cognitive, creative, communicative and technological skills, which is extremely important in both personal and professional life.



Critical thinking is considered to be a skill of the 21st century because in the digital age, without it, it is impossible to comprehensively analyze real-life situations, to be an effective and modern citizen of the world, and to consider ways of realizing and protecting one's rights in it. Thinking critically, a person can protect and realize their rights because they can reject tampering, ask questions, be honest with themselves, freely follow the connections between phenomena, overcome confusion, make their conclusions based on obvious facts, and are intellectually independent. Undoubtedly, the introduction into the educational process of learning, which is focused on the development of critical thinking and the use of innovative technologies to improve the critical thinking of students, is a methodical urgent problem of the 21st century and the modern educational paradigm. So, the time has come when not natural resources, technology, or capital but the mental abilities of people will determine the decisive line between failure and success, between leaders and subordinates (Terno, 2023).

At the same time, the changing world, external and internal challenges, and the rapidity of social, economic, and political processes in the modern world and Ukraine require citizens capable of critical perception of information, vital self-identification, determination of goals based on universal human values, making responsible decisions, creative solutions life tasks, including professional ones, which requires mastery of critical thinking. The ability of future generations to think critically will determine the vector of the country's development, and the formation of such an ability must begin with the modernization of the system of professional training of specialists.

So, the relevance of insufficient development of the raised problem of innovative technologies in the development of student's critical thinking and the need for their solution at the scientific-theoretical, methodical, and practical levels determined the choice of the topic of the article.

Investigating the problem of innovative technologies in the development of student's critical thinking, we paid attention to the following main aspects:

- Contentful and level filling of critical thinking.
- The most important factors and components of the development of critical thinking.
- Groups and types and systematics of pedagogical innovations to increase the level of critical thinking of students.
- Use of innovative technologies to increase the level of critical thinking of students.
- The problem of innovative technologies in the development of students' critical thinking has been experimentally tested.

The purpose of the study. Increasing the level of critical thinking of students and the professional readiness of future specialists through the use of innovative technologies.

Literature Review

Nowadays, pedagogues and psychologists are actively developing the problem of developing critical thinking in students. Methodological developments are published, dissertations are defended, and scientific articles, monographs, etc. are written.

Thus, the use of technology for the development of critical thinking of higher school graduates was investigated by H. Yurchak (2020) in classes on the discipline "Ukrainian language (for professional orientation)". In particular, the meaning of the concept of "critical thinking" was revealed, the latest scientific research was analyzed in the field of critical thinking development strategies, the main principles and characteristic features of critical thinking were defined, and effective implementation methods were analyzed. The main signs of the developed critical thinking of students are given (the ability to make informed decisions, draw logical conclusions, and evaluate the received information). The significance of the application of effective, innovative techniques, with the aim of a collective search for innovative solutions, which leads to the cooperation of the teacher with students, shows the necessity of using the technology of human critical thinking in institutions of higher education. The main stages of development of critical thinking are analyzed: "comprehension", "challenge", and "consolidation". It has been proven that the development of critical thinking and the use of innovative technologies to increase the critical thinking of students is a multifaceted systematic learning process, the purpose of which is the formation of one's own thinking style, the ability of a person to politely defend and objectively evaluate one's own position, to form a personal independent opinion, to be resistant to the influence of other people's opinions.

To raise the professional level of students by mastering the technology of developing critical thinking, A. Liakisheva, V. Vitiuk, & I. Kashubiak (2022) proposed a manual for future primary school teachers, which provides examples of the application of techniques and methods of developing critical thinking in individual subjects, in particular, during the study of integrated courses in mathematics, linguistics, and natural sciences in primary grades. The proposed casebook can be implemented in the school to provide various forms of integrated learning. The casebook contains a description of the most common techniques and methods of developing critical thinking.

The method of developing critical thinking is disclosed, and the advantages of the theory of critical thinking by S. Terno (2023) are presented. The basis of the methodology for the development of critical thinking is the postulate that critical thinking is reflective, independent, conscious, goal-directed, controlled, self-organized, and grounded thinking. The essential feature of the methodology for the development of critical thinking is singled out – the involvement of students of higher education through the use of problem-based methods and interactive forms of learning to solve problematic problems that involve reflection of cognitive activity and scientific dialogue.

P. Pintrich (2002) emphasizes the responsibility and importance of using new educational technologies for awareness of one's own knowledge and thinking. It has been proven that education traditionally emphasizes actual, conceptual, and procedural learning of higher education students, and it is precisely these types of student knowledge that are evaluated resources, and without metacognitive knowledge, learning is very problematic. If students all increase their thinking about cognition, they will become more developed. According to the scientist, "metacognition consists of two components: knowledge about cognition (knowledge of learning and thinking strategies, knowledge about different types of tasks and cultural norms, self-knowledge – knowledge about oneself); processes of control and regulation of cognition". These components are deployed and interact in parallel.

The theoretical aspects of the development of educational technologies were presented in research by scientists L. Rebukha, I. Bilous, R. Brik, A. Demyaniuk, V. Savvytska, O. Krychivska, & V. Kavetskyi (2022): foreign experience in the development of the latest technologies in the educational field, current trends were considered development of innovative technologies. Innovative learning technologies are characterized in the education system as innovations in the educational process – media learning technologies, interactive and remote learning technologies, technologies of the personally-oriented educational process, and technologies of creative personality formation. Methodological foundations of innovative learning technologies are disclosed. In institutions of higher education in the conditions of digitalization, the theoretical and methodological foundations of the design of the educational process were considered. Special attention is paid to the practical context of the application of innovative educational technologies. In the conditions of modernization of modern education, pedagogical innovations are investigated.

So, scientists revealed the meaning of the concept of "critical thinking", as well as analyzed the latest scientific research in the field of strategies for the development of critical thinking, defined the main principles and characteristic features of critical thinking, and analyzed effective methods of implementation. The main signs of the developed critical thinking of students are given (the ability to make informed decisions, draw logical conclusions, and evaluate the received information). The main stages of the development of critical thinking are analyzed. The method of development of critical thinking is disclosed, and the advantages of the theory of critical thinking are presented. The theoretical aspects of the development of educational technologies are presented in the research of scientists: the foreign experience of the development of the latest technologies in the educational field and the current trends in the development of innovative technologies are considered. Innovative learning technologies are characterized in the education system. Methodological foundations of innovative learning technologies are disclosed, and in the conditions of modernization of modern education, pedagogical innovations were investigated. However, the ways of using innovative technologies to improve students' critical thinking have not been sufficiently revealed.

At the same time, the study of the results of scientific research revealed the insufficiency of scientific research in the direction of the formation of critical thinking of future specialists in the conditions of informatization of education.

In particular, our analysis of the state of development of the problem gave rise to the following contradictions:

- Between the demand of Ukrainian society for specialists with developed critical thinking and established approaches to their professional training, oriented to a greater extent on the acquisition of professional knowledge and skills, insufficient orientation of the educational process in vocational education institutions on the development of future specialists' high-level thinking skills (analysis, synthesis, comparison, comparison, generalization, systematization, etc.);
- Between the development of information technologies, the increase in the weight of informatics disciplines in programs of professional training of specialists, and the lack of effective models for the development of critical thinking of future specialists in the process of their study.

So, the relevance of the problem's theoretical and practical significance determined the choice of the topic of the article.

Methodology

The methodological foundations of the research are: leading propositions of the theory of scientific knowledge; general scientific principles of historicism, systematicity, and scientificity; conceptual provisions of pedagogical, psychological, and sociological sciences; ideas of experience based on the simultaneous study of pedagogical, socio-cultural and economic phenomena; philosophical and pedagogical ideas of the development of modern education.

The methodological basis of the research is presented on four hierarchically subordinated levels: philosophical, general scientific, specifically scientific, and technological.

To solve the set goal, the following research methods were used at various stages of scientific research:

- **Theoretical** – scientific synthesis and analysis of psychological and pedagogical, philosophical sources, Internet resources, scientific literature on the research problem; deduction and induction for the formation of conceptual foundations of research; summarizing and studying the practice of higher education; to find out the current state of the identified problem, a comparative analysis of the use of innovative technologies to improve students' critical thinking was carried out; comparison and classification to determine the essential characteristics of innovative technologies to improve students' critical thinking and professional readiness of future specialists;
- **Empirical** – (observations, interviews, questionnaires, self-assessment, expert assessment) to diagnose the level of critical thinking of students using innovative technologies and the readiness of future specialists for professional activity; a pedagogical experiment with a qualitative and quantitative analysis of the results to check the effectiveness of the author's system for improving the critical thinking of students and the professional readiness of future specialists;
- **Methods of mathematical statistics** for qualitative and quantitative analysis of research results, checking their validity and objectivity.

The program and methodology of research and experimental work to check the effectiveness of the system for raising the level of critical thinking of students using innovative technologies was carried out in several stages with the determination of scientific and pedagogical methods and tasks of research organization.

The first stage is informational, consisting of the formation of student's ideas about the specifics of future professional activity in the conditions of modern society.

The second stage - the technological stage consists of the formation of future specialists' abilities and skills to realize the purpose, functions, and tasks of professional activity in the conditions of education, training, and development in the mastery of general pedagogical, creative technologies to increase the level of critical thinking of students.

The third stage is creative, consisting of the formation of the ability to reflect, mastering the system of increasing the level of critical thinking of students, the experience the professional activity of the future specialist, and improving professional skills and professional activity skills through the introduction of innovative technologies.

For the experiment with higher educational institutions, a representative sample of the number of students was determined. 140 students were involved in the ascertaining stage of the experiment. The control group consisted of 54 people, and the experimental group - 50 respondents from higher educational institutions.

Quantitative methods were used in the study to study a large group of people, and subsequently, the obtained data were analyzed using statistical methods.

The experiment was conducted at Sumy State Pedagogical University named after A. S. Makarenko, Vasyl' Stus Donetsk National University, National Technical University of Ukraine "Ihor Sikorskyi Kyiv Polytechnic Institute". The conduct of the experiment is permitted by the scientific councils of the universities in order not to violate ethical considerations in institutions of higher education.

The program and methodology of research and experimental work to check the effectiveness of the system for improving students' critical thinking using innovative technologies was carried out in several stages with the determination of scientific and pedagogical methods and tasks of the research organization.

After the formative stage of the experiment, we found positive dynamics of increasing the level of critical thinking of students and the professional readiness of future specialists in EG, while in CG, these changes turned out to be practically unchanged.

The conducted diagnostics of the system for increasing students' critical thinking and professional readiness of future specialists allowed us to talk about integrated indicators of the formation of professional readiness of future specialists and increasing students' critical thinking at the formative stage of the experiment.

The increase in critical thinking of students and the formation of professional readiness of future specialists by all indicators is 15%, which is a positive result. With the help of K. Pearson's linear correlation method, the Kolmogorov-Smirnov statistical criterion, and the E. Pustilnyk method, the reliability of the obtained data was checked using the SPSS Statistics 17.0 package to check the compliance of empirical data with the laws of factor analysis and normal distribution.

Consequently, positive changes in the levels of student's critical thinking and the formation of professional readiness of future specialists in EG compared to CG were revealed. The increase in the level of this readiness among EG students is due to the introduction of the author's system for improving students' critical thinking using innovative technologies. According to all indicators, the increase in students' critical thinking using innovative technologies and the formation of future specialists' professional readiness at the experiment's formative stage is 15%, which is a positive result.

Before using survey instruments to collect data and to assess the quality of the collected data, we aimed to ensure in the research process that, we used survey instruments in the experiment that were reliable, accurate, and valid. The reliability, accuracy, and validity of the data were of decisive importance in our study since they guarantee the consistency, accuracy, and reliability of the obtained research results, contribute to the formation of conclusions, and their justification, which is the key to the success of the study.

We considered the measurement tool to be reliable because it consistently gave the same results when we repeated it to measure the same phenomenon.

We considered the measurement tool to be valid because it accurately measured the concepts and gave results that are relevant and significant for proving the effectiveness of the system for improving students' critical thinking using innovative technologies. We assert that reliability and validity have agreed on the measurement, and validity has proven the truthfulness and accuracy of the measurement, ensured the results obtained with the measurement instrument, and proven the significance and relevance of the research question.

With the help of SPSS (Statistical Package for Social Science) and MS Excel programs, statistical processing was performed to assess the reliability, homogeneity, reliability, and validity of experimental and control data.

The assessment of the reliability, homogeneity, reliability, and validity of experimental and control data in the process of developing our research tool to verify the effectiveness of the system of increasing students' critical thinking using innovative technologies such as surveys, questionnaires confirmed between different respondents the consistency, stability of the measurement, and the validity showed the degree, to which the instrument measures what is planned for the experimental study and increases the reliability and quality of the study.

Results and Discussion

Critical Thinking Analysis:

Critical thinking is considered in the modern world as learning the ability to think, as an urgent need for life, which allows any professional activity to correctly solve a wide range of practical problems and is necessary for everyday life, in scientific activity, in human relationships (situations of moral choice), etc. They associate critical thinking with science as a field of research aimed at obtaining knowledge about society, thinking, and nature. Critical thinking is considered a scientific approach to solving a wide range of problems – from professional to everyday problems.

The most important characteristic of scientific thinking is criticality, and the search for contradictions or inconsistencies is criticism. And scientific progress consists in the elimination of contradictions.

In the process of learning, critical thinking has several levels:

- 1) **General thinking** – the general process of information processing;
- 2) **Subject thinking** (historical, mathematical, etc.) – the process of processing information using methods of scientific research on a certain subject, enriched with methodological and subject knowledge;
- 3) **Critical thinking** – the process of monitoring the course of the subject and general thinking their improvement.

Each subsequent level includes the previous one.

Critical thinking consists of certain procedures of factual validity aimed at ensuring the logical perfection and value appropriateness of reasoning from certain attitudes of the researcher, which orient him to the breadth of coverage of factual information, taking into account the context, etc.

Let's consider six levels of the process of formation of critical thinking skills. It is quite complex and lengthy and includes:

- 1) Collection of necessary information, that is, the level of discovery of facts;
- 2) Level of problem detection;
- 3) Creation of conditions for solving the problem, that is, the level of identifying the essence of the problem;
- 4) Level of discovery of ideas;
- 5) Identification of possible solutions;
- 6) To solve the problem situation of drawing up an action plan, that is, the level of detection of support (Knysh et al., 2023).

Critical thinking consists of skills (disclosure of possibilities and alternatives, reasoned judgment, productivity in perception and formation of ideas, etc.), as well as dispositions (attention to the research procedure; conviction of the need for self-correction of the research method; readiness to be self-critical and critical; consideration of other points vision), which constitutes dedication to the research orientation in education and the further life position of a person (Zaitaseva, 2022).

The most important factors and components of the development of critical thinking.

Let's single out the four most important factors in the development of critical thinking:

- 1) **Form of education** – in the process of solving choice situations, dialogue is provided;

- 2) **The teaching method** – provides for the systematic creation of choice situations for students in the field of education;
- 3) **Method of control and self-control** – involves the following individual and group reflection and written tasks (criticism and analysis, self-criticism, and self-analysis). According to the effectiveness of educational and cognitive activities, methods of control and self-control include methods of laboratory-practical control and self-control, methods of written control and self-control, and methods of oral control and self-control. Each group is appropriate for teaching critical thinking and has its own advantages;
- 4) **The right to make a mistake** gives the learner a learning style that simulates situations of correcting mistakes because it is the mistake that is a companion in any independent activity, but it is important to learn to correct it and notice it. The teacher and students should not be afraid of a mistake, but there should be a desire to correct and understand it. Correcting one's attitudes and procedures involves self-organization of thinking. Thus, both the teacher and the student in the course of learning should have the right to make a mistake since a mistake is an integral and natural part of learning according to the principle of complementarity (Terno, 2023).

In the modern educational process, one of the important components is the use of innovative and active methods, methods, and learning technologies in classes to improve students' critical thinking. Such classes are the most successful because the student is encouraged to think critically and independently, think about what he is learning, and where he can apply what he has learned in real life or for independent work or further education. Learning becomes effective, effectively uses the teacher's time, saves society's funds, does not give place to passivity, is actively used in practice, and provides an opportunity for personality development (Kuchai & Demianiuk, 2021).

The choice and use of innovative technologies to improve students' critical thinking during education depends on the education system in which the education process takes place. The most optimal are the technologies of a problematic, research, heuristic nature that contribute to the development of critical thinking of the individual, allow students to freely express their opinions, and tolerantly discuss communicate with communicators of different ages and genders since critical thinking is social thinking (Liakisheva et al., 2022).

We consider innovation to be a purposeful, specially organized, controlled, continuous process of accelerated entry of an individual into an independent life process, a process of practical implementation by the subjects of innovative activity of new means of learning, new technologies, organizational and management approaches, ideas that result in a significant increase in the indicators of the development of the individual as a carrier of knowledge, quality of education, relevant competencies (Rebukha et al., 2022). The main goal of innovations in education is "the need to respond to the challenge of globalization transformations, environmental problems, multicultural trends in the world... It is characteristic for our time to establish the priority of innovative development of education based on the modernization of all components of the system (content..., training of pedagogical personnel, management, financing, etc.)" (Prosalova et al., 2022).

So, if innovation is the main form of development in the entire field of education, then innovation management is the main mechanism, which is a process that includes the creation of conditions for the reproduction of innovative education and determines its quality as a whole. Thus, in the conditions of modernization of modern education, innovations, in particular, innovative technologies for increasing the critical thinking of students and their implementation in the practice of the educational process of a higher school, represent a diverse, rather complex pedagogical phenomenon, which assumes systematic and active creativity of the individual (Rebukha et al., 2022).

Groups and types and systematics of pedagogical innovations to increase the level of critical thinking of students.

Let's emphasize important groups of pedagogical innovations that are necessary to improve students' critical thinking (Dychkivska, 2015):

1. *Depending on the scope of application:*

- Innovations in the technology of education and training of the individual for interaction in the educational process and renewal of teaching and learning methods;
 - Innovations in the content of education to increase students' critical thinking (updating manuals, textbooks, curriculum content, etc.);
 - Innovations in the organization of the pedagogical process (updating the forms and means of the educational process);
 - Innovations in education management for innovative organization and management of educational institutions, and renewal of the structure of the educational process.
2. *Depending on the scale of transformations (they involve restructuring the entire institution according to a certain idea, creating a new educational institution based on a previous one, or creating an innovative concept):*
- Partial unrelated (single, local) innovations;
 - Modular innovations, a complex of partial innovations, interconnected, belonging to one age group of people, to one group of subjects, etc.;
 - Systemic innovations covering the entire educational institution.
3. *Depending on the innovation potential:*
- Modifying innovations to improve students' critical thinking is aimed at the personal aspects of the tool, the technological one that is being updated, related to the rationalization, modification, improvement, and modernization of what has a prototype or analog (program, separate development, methodology, etc.);
 - Combinatorial innovations are a constructive combination in which new system properties appear, generating a new effect of innovations that have not yet been used in this version;
 - Fundamental, radical, basic, and global innovations, which are discoveries that contribute to the creation of fundamentally new means in education, most often arise as a result of creative integration.
4. *Depending on the position of its predecessor:*
- Substitute innovations that are used instead of a specific outdated tool;
 - Canceling innovations, which consists of canceling the form of work in stopping the activities of certain bodies or associations if they inhibit development, is unpromising given the needs of the development of the educational institution;
 - Groundbreaking innovations that involve the development of new technology, a new type of educational services, a new program, etc.);
 - Retro-introduction – in the institution of higher education, the development of innovations that were used and existed earlier in pedagogical practice was canceled by mistake.
5. *Depending on the place of appearance:*
- The introduction of pedagogical innovations to increase students' critical thinking in science (updating pedagogical theory);
 - Innovation in practice, and update of pedagogical practice to improve students' critical thinking.
6. *Depending on the time of appearance:*
- Historical innovations of pedagogical innovations to increase students' critical thinking (revival of historical and pedagogical heritage in new conditions);
 - Modern innovations of today's pedagogical innovations to improve student's critical thinking.
7. *Depending on the level of forecasting, planning, and anticipation:*
- Planned expected innovations to improve students' critical thinking;
 - Unplanned, unexpected innovations to improve students' critical thinking.
8. *Depending on the field of pedagogical knowledge:*

- Educational, in the field of education, innovations to improve students' critical thinking;
- Didactic, in the field of education, innovations in pedagogical innovations to improve students' critical thinking;
- historical and pedagogical, in the field of history of pedagogy, innovations, etc. (Kharchenko, 2019).

Use of innovative technologies to increase the level of critical thinking of students.

The technology of personally oriented training. The goal of modern education is an independent, creative, free personality, capable of learning the skills, knowledge, skills, and self-development needed in life, and not a person who has simply mastered a set of certain knowledge, skills, and abilities. Such a goal of modern education can be achieved by building our education based on personally oriented education.

"Personally oriented education involves a shift in emphasis from an informational and gnostic approach to a developmental and active one, based on the formation of a personality capable of active, creative activity" (Terno, 2023).

The development and formation of the humanistic paradigm are the main characteristic features of modern education. It is this kind of education that highlights the significance of the dignity and value of people to increase their activities, independence, and freedom.

The creation of personally-oriented situations requires a personally-oriented learning technology that requires the student to adapt to his own interests, search for meaning, create a model or image of his own life, and choose a critical assessment and creative direction. These tasks require cognitive searches, not just existing knowledge. To effectively master technology, a student must be able to reflect during the learning process. Taking into account the individual characteristics of the student in the educational process is one of the typical features of the personally-oriented training of its participants: students, teaching staff, etc. (Shetelya et al., 2023).

Interactive learning technologies can be divided into the following groups:

- Frontal technologies ("brainstorming", microphone, openwork saw, "unfinished sentence");
- Interactive collective and group training (work in pairs, rotating threes, "Two-four – all together", "Aquarium", "Carousel", work in small groups);
- Situational training ("Dramatization", "Roleplay", "Simplified court hearing");
- Training in discussion ("Method press", "Decision tree", "Discussions", and "Take a position" (Koval, 2016).

It is important during the formation of students' creative abilities to follow the stages of their development, taking into account the levels of formation of students' knowledge qualities (Plakhotnik et al., 2023):

Level 1 – reproductive – involves the reproduction of activity methods and knowledge;

Level 2 – constructive – means the ability to transform acquired knowledge into similar learning situations that require the ability to analyze and synthesize, constructive thinking, and repetition of tasks;

Level 3 – creative nature of activity – is manifested in the ability of students to creatively apply their knowledge in non-standard situations and look for new ways of thinking (Shunkov et al., 2023).

Distance and media technologies of education. In the context of the information society, in the conditions of the rapid development of distance learning, an innovation in the educational process is distance and media learning technologies, which involve the use of telecommunication and computer technologies, with the help of which participants in the educational process are provided with interactive interaction (Rebukha & Polishchuk, 2020).

Modernization of higher education in modern conditions is being actively carried out. Digital transformation is an important aspect of higher education. Remote service systems are popular in the educational process, including Moodle, Microsoft Teams, Zoom, Google Meet, and Google Classroom.

The formation of a digital society is a driver of the formation of a digital economy and digitalization of education. Given the transition of society to the blockchain, a new level of the Internet of Things, the development of big data processing technologies, intelligent and informational digital technologies, and

informatization, the era of digitalization is moving to an innovative level of development (Poddenezhnyi, 2021). That is, the era of informatization and computerization of modern society has changed to the era of digitalization (Zaspa, 2021). For the first time, the concept of digitalization was introduced by the American scientist in the field of computer science N. Negroponte (1996) and considered a process of transition from the processing of atoms to the processing of bits.

The development of flexible adaptation skills of people is conditioned by the digitalization of education, in particular, to changes in the professional environment and society (Selwyn, 2016). Marvin Minsky (2007) notes the unique opportunities for human development to improve critical thinking in the digital environment and emphasizes the special role of a unique feature of a person in this environment, which is the flexibility to "switch" any actions and mental processes between different ways of performing professional tasks.

To increase critical thinking, the following expected results of digitization of education are determined:

- Ensuring the opportunity for students to form an individual educational trajectory to improve critical thinking through the wide use of modern control and diagnostic tools and electronic resources (Puhach et al., 2021);
- Formation of a unified academic and information environment "offline" and "online", expansion of opportunities for collective work and university communication (Buinytska et al., 2020);
- As an alternative to the teacher's digital profile and the classic scorebook, the creation of a student's digital profile that reflects the results of innovative, scientific, pedagogical activities (Havrilova & Topolnik, 2017);
- Material support of the educational process and implementation of its automation planning in making management decisions on the use of data regarding the course of education (Poddenezhnyi, 2021).

The emergence of innovative technological means of learning, such as smart boards, laptops, mobile devices, tablets, MOOCs (Massive Open Online Courses), virtual laboratories, dynamic visualization technologies, etc., has led to the improvement and creation of an innovative educational process in higher education. In the educational field, the use of remote platforms for learning is becoming more and more popular and widespread due to modern reality. These technologies bring the educational process to a fundamentally new qualitative level. It is worth emphasizing the importance of modern digital tools, in particular, augmented and virtual reality applications, used for remote training of future specialists.

Cooperation technologies (partner technologies) in the educational process of a higher school. In general, partnership pedagogy is based on the cooperation of students and teachers and their communicative interaction, on the unification of aspirations and common goals, fostering responsibility for their results, and on the equality of process participants. The phenomenon of cooperation is implemented between different social groups as a means of interaction, as a special mechanism of social relations between educational institutions, employers, and employee representatives, and is the result of the development of cooperation pedagogy (Terno, 2023).

Project activities involve teamwork, so a large amount of information in the process of working on a project forces students to unite. It must be worked out with the help of technologies that must be applied, which contributes to the formation of a socialized personality and its formation. Working in a team, students learn to resolve possible conflicts, communicate with each other, take responsibility for their choices, acquire ethical interpersonal communication skills, analyze performance results, and make decisions independently.

Modular rating learning technology. It includes the modular rating technology of education: through modular programs, the methodology of designing the content of education, principles, target components, a system of forms, methods, and means of education, and monitoring the results of educational activities. A comparative analysis of modular training and traditional training shows the advantages of modular training:

- In this type of activity, the goals of studying the educational material are formed and presented to students before the start of training, and during the individualized educational process, the activity with a mandatory learning outcome is aimed mainly at learning the educational material;
- Various methods are used to implement educational tasks, often developing and active;

- Modular training takes place at a time convenient for the student and in any place, depending on the intellectual capabilities of the student, which is very necessary for improving students' critical thinking, which is important in an individualized education system;
- Control is carried out in stages – as the module or the entire program of the module is mastered;
- Thanks to the creation of certain didactic conditions, the modular rating system largely neutralizes the shortcomings of traditional education (Rebukha et al., 2022).

Experiment.

The program and methodology of research and experimental work to check the effectiveness of the system for raising the level of critical thinking of students using innovative technologies was carried out in several stages with the determination of scientific and pedagogical methods and tasks of research organization.

The first stage – informational, consisted of forming students' ideas about the specifics of the future professional activity in the conditions of modern society.

The second stage – the technological stage consists of the formation of future specialists' skills and abilities to realize the purpose, functions, and tasks of professional activity in the conditions of education, training, and development in mastering general pedagogical, creative technologies to increase the level of critical thinking of students.

The third stage – the creative stage, consists of the formation of the ability to reflect, master the system of increasing the level of critical thinking of students, the experience of professional activity of the future specialist, improvement of professional skills and professional activity skills through the introduction of innovative technologies.

A representative sample of the number of students was determined for experimenting with higher educational institutions.

One hundred four students were involved in the ascertainment stage of the experiment. The control group consisted of 54 people, and the experimental group – 50 respondents of higher education institutions.

At the ascertainment stage of the experiment, the following trend is observed (Fig. 1):

- The dominance of the reproductive level of students' critical thinking and professional readiness of future specialists 56% – in CG and 58% – in EG;
- The constructive level of students' critical thinking and professional readiness of future specialists is 21% – in CG and 17% – in EG;
- The productive and creative level of critical thinking of students and professional readiness of future specialists, respectively, is 11% – in CG and 12% – in EG;
- The elementary level of students' critical thinking and professional readiness of future specialists is determined by indicators of 12% – in CG and 13% – in EG.

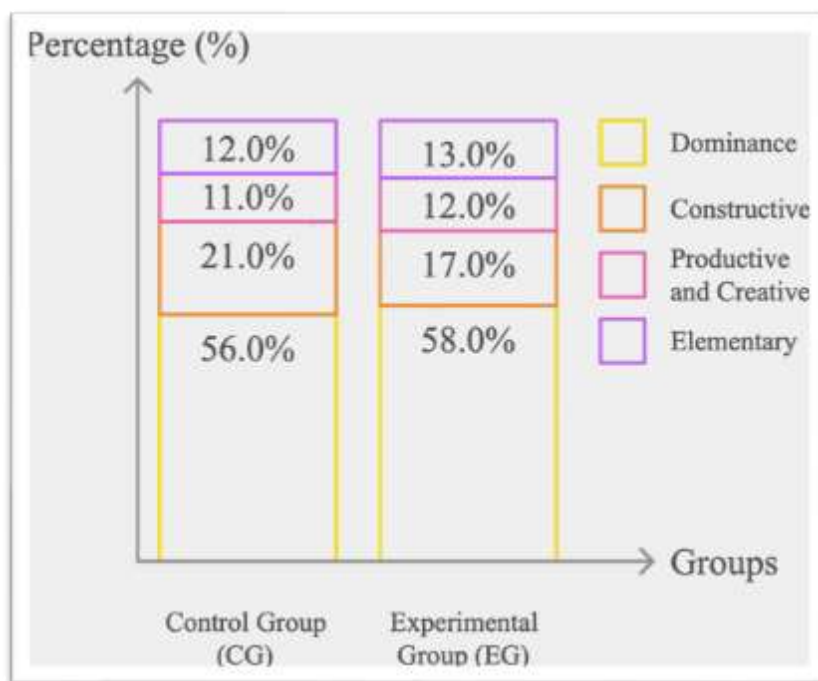


Figure 1. Critical thinking and professional readiness levels of students.

After the formative stage of the experiment, we found positive dynamics of increasing the level of critical thinking of students and the professional readiness of future specialists in EG, while in CG, these changes turned out to be practically unchanged.

The conducted diagnostics of the system for increasing students' critical thinking and professional readiness of future specialists allowed us to talk about integrated indicators of the formation of professional readiness of future specialists and increasing students' critical thinking at the formative stage of the experiment.

The data of the control section proved that the graduates of the higher school (Fig. 2):

- The productive and creative level of critical thinking of students and the formation of professional readiness of future specialists was recorded in CG in 9% of people – after its completion (in EG, this indicator is 22%, respectively);
- Constructive level – in CG at its completion – 24% – (in EG, we observe much higher results – 38%);
- Reproductive – showed almost the same number of CG students at the end of the experiment – 58%, while in EG, the number of students changed significantly – 33%;
- Elementary – in CG, the total number of respondents changed accordingly -10%, and in EG, this number decreased significantly to 8%, which is an increase.

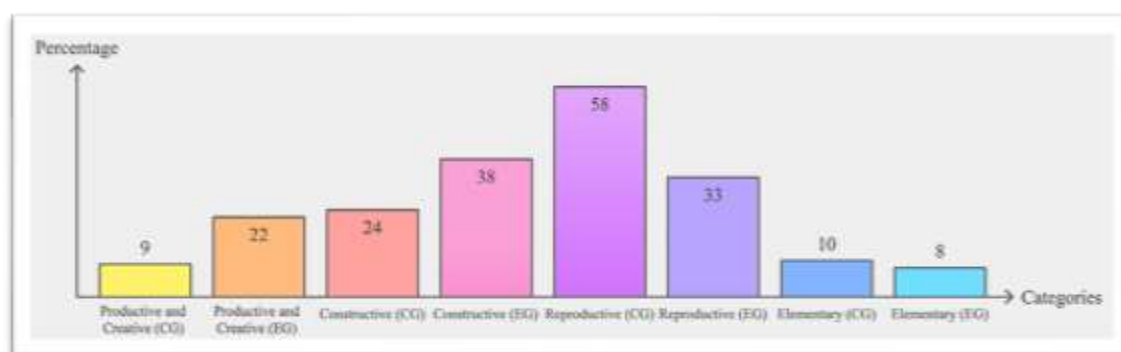


Figure 2. Comparison of critical thinking and professional readiness levels.

The increase in critical thinking of students and the formation of professional readiness of future specialists by all indicators is 15%, which is a positive result. With the help of K. Pearson's linear correlation method, the Kolmogorov-Smirnov statistical criterion, and the E. Pustilnyk method, the reliability of the obtained data was checked using the SPSS Statistics 17.0 package to check the compliance of empirical data with the laws of factor analysis and normal distribution.

Positive changes in the levels of student's critical thinking and the formation of professional readiness of future specialists in EG compared to CG were revealed. The increase in the level of this readiness among EG students is due to the introduction of the author's system for improving students' critical thinking using innovative technologies. According to all indicators, the increase in students' critical thinking using innovative technologies and the formation of future specialists' professional readiness at the experiment's formative stage is 15%, which is a positive result.

Qualitative research methods are used mainly to identify the problem and develop hypotheses. Also, they can be used as a preliminary before quantitative studies to determine the main indicators. Due to the small size of the research group of respondents, the results of qualitative research cannot be generalized to the entire population. However, they can be extremely useful for studying this or that issue and evaluating different programs. In addition, qualitative methods allow, unlike quantitative methods, to reveal people's internal motives and motivations.

The main difference between qualitative methods and quantitative methods is that in the first case, data is collected from a relatively small group of respondents and is not analyzed using statistics, while when using quantitative methods, a large group of people is studied, and the data is further analyzed using statistical methods. One of the most popular methods of qualitative research is the method of focus group discussions. Qualitative research methods are characterized by the fact that experimental data are collected from a relatively small group of respondents and are not analyzed using statistics, so we used quantitative methods in the study to study a large group of people, and subsequently, the obtained data were analyzed using statistical methods.

Our research depends on the accuracy and reliability of the data. In the framework of research work, the quality of data collection and analysis not only adds weight to the research but also contributes to the formation of sound conclusions, which is the key to academic success.

The following quantitative data collection tools were useful in the study:

- Google Forms – a simple tool for creating surveys that allows you to collect data from respondents, create questions of various types, and collect answers in spreadsheets.
- SurveyMonkey is a modern survey tool that offers a wide range of customization options and analytical tools for analyzing the collected data.
- Google Scholar and other academic search engines provide access to scholarly articles, books, and other academic resources that may be useful for literature review and theoretical data collection.

Taking into account the connection of our research with the previous literature, we note that for the educational practice of students of higher education institutions, the development of a methodology for the development of critical thinking in the process of informatization of society, which encourages the introduction and development of innovative means, methods, and forms that contribute to the development of the ability to distinguish between unreliable and reliable information, critically evaluate information, separate the necessary information from information flows, etc. and shows the importance of developing educational and methodological materials for the development of student's critical thinking using innovative technologies and improving the process of their professional training.

Disadvantages during the work were insufficient development of methods for working with artificial intelligence to process large amounts of information, identifying fakes, lack of an interactive board to improve students' critical thinking, which would allow higher education students to absorb 1.5 times more information, and increase student interest is more than 2 times higher.

The research had limitations regarding the identification of variable means of applying innovative learning technologies in the educational space of a higher educational institution and their impact on the creative side of students studying in a higher education institution.

Conclusions

The article examines and experimentally verifies the increase in the level of critical thinking of students and the professional readiness of future specialists through the use of innovative technologies. The content and level of critical thinking are revealed. The key provisions of the philosophy of education, on which the organization of the development of critical thinking of students of higher education should be based, are highlighted. Six levels of the process of formation of critical thinking skills and the most important factors and components of the development of critical thinking are considered. The four most important factors in the development of critical thinking and groups, types, and systematics of pedagogical innovations to improve students' critical thinking are analyzed. Ways of using innovative technologies to increase the level of students' critical thinking are substantiated. The main features of the modern stage of digitalization of education are named, which are necessary for increasing the critical thinking of an individual and the integral implementation of the relationship in the construction of the educational process of a higher education institution.

The conducted diagnostics of the system for increasing the level of students' critical thinking and the professional readiness of future specialists allowed us to talk about the integrated indicators of the formation of the professional readiness of future specialists and the improvement of students' critical thinking at the formative stage of the experiment.

Positive changes in the levels of student's critical thinking and the formation of professional readiness of future specialists in EG compared to CG were revealed. The increase in the level of this readiness among EG students is due to the introduction of the author's system for improving students' critical thinking using innovative technologies.

Nowadays, a person's ability to make a responsible decision is determined by his ability to process information and form his own assessment of events, facts, and processes on this basis. Therefore, on the one hand, it is important to prepare young people to quickly perceive educational information, analyze large volumes of data to make informed decisions, use electronic resources for their own improvement, and, on the other hand, form in them the ability to argue their professional position, critically evaluate their own achievements and achievements others, respect the views and accept the position of colleagues on various issues.

Technology for the development of critical thinking forms creative thinking and promotes the development of creativity. Critical thinking is necessary when solving problems, formulating conclusions, evaluating, and making decisions. Perception, understanding, awareness, and assimilation of educational information require active mental activity, including critical thinking.

So, the relevance, insufficient development of the raised problem of innovative technologies in the development of students' critical thinking and the need to solve them at the scientific-theoretical, methodical, and practical levels led to the choice of the research topic and the experiment proved the importance of using innovative technologies in the development of students' critical thinking.

Further research is needed to build a structural-functional model of the process of raising the level of critical thinking of students in a certain direction, the core of which is the ability to self-improvement the individual, the graduate's readiness for professional activity at a high scientific and pedagogical level, self-development.

The issue of training future specialists and practicing teachers for the formation of critical thinking of students of basic and specialized general secondary education needs further study. Therefore, we see the prospect of further research in the development of content and technologies for the training of teachers of a higher education institution for the formation of critical thinking of future specialists and practicing teachers of various specialties.

Bibliographic References

Buinytska, O., Varchenko-Trotsenko, L., & Hrytseliak, B. (2020). Digitization of higher education institutions. *Educological Discourse*, 1(28), 64-79. <https://doi.org/10.28925/2312-5829.2020.1.6>

- Dychkivska, I. M. (2015). *Innovative pedagogical technologies: Textbook* (3rd ed.). Academician. <https://eltutor.at.ua/Podskazki/Dychkivska.pdf>
- Havrilova, L. H., & Topolnik, Y. V. (2017). Digital culture, digital literacy, digital competence as the modern educational phenomena. *Information Technologies and Learning Tools*, 5(61), 1-14. http://nbuv.gov.ua/UJRN/ITZN_2017_61_5_3
- Kharchenko, S. Ya. (2019). *Innovations in pedagogical education in the conditions of today's challenges: monograph*. Kyiv: Talkom. https://elibrary.kubg.edu.ua/id/eprint/29717/1/V.Proshkin_mon_FITU.pdf
- Knysh, I., Budanova, O., Vakulenko, S., Syrotina, O., & Popychenko, S. (2023). Innovative educational technologies as a way of higher education enhancement. *Amazonia Investiga*, 12(68), 21-32. <https://doi.org/10.34069/AI/2023.68.08.2>
- Koval, N. V. (2016). Interactive teaching technologies as a way of forming professional competencies of the future managers. *Professional and Applied Didactics*, 1, 70-77. <http://188.190.43.194:7980/jspui/bitstream/123456789/588/1/PPD-1-10.pdf>
- Kovalenko, V. V., Marienko, M. V., & Sukhikh, A. S. (2021). Use of augmented and virtual reality tools in a general secondary education institution in the context of blended learning. *Information Technologies and Learning Tools*, 86(6), 70-86. <https://doi.org/10.33407/itlt.v86i6.4664>
- Kuchai, O., & Demianiuk, A. (2021). Modern technologies of distance learning. *Humanitarian studies: history and pedagogy*, 2, 77-85. <http://dspace.wunu.edu.ua/bitstream/316497/46142/1/КУЧАЙ.PDF>
- Liakisheva, A. V., Vitiuk, V. V., & Kashubiak, I. O. (2022). *Casebook of methods and techniques of critical thinking development technology in the New Ukrainian school: Teaching method manual*. Lutsk: FOP Ivanyuk V. P. <https://evnuir.vnu.edu.ua/bitstream/123456789/21285/1/casebook.pdf>
- Minsky, M. (2007). *The emotion machine: Commonsense thinking, artificial intelligence, and the future of the human mind*. New York: Simon & Schuster. <https://acortar.link/FjOQWI>
- Negroponte, N. (1996). *Being Digital*. New York: Knopf Paperback edition, 272.
- Pintrich, P. R. (2002). The role of metacognitive knowledge in learning, teaching, and assessing. *Theory Into Practice*, 41(4), 219-225. <https://acortar.link/7XqJJ0>
- Plakhotnik, O., Zlatnikov, V., Strazhnikova, I., Bidiuk, N., Shkodyn, A., & Kuchai, O. (2023). Use of information technologies for quality training of future specialists. *Amazonia Investiga*, 12(65), 49-58. <https://doi.org/10.34069/AI/2023.65.05.5>
- Poddenezhnyi, O. (2021). Management of Digital Transformation in Education: Modern Scientific Discourse. Scientific Papers NaUKMA. *Economics*, 6(1), 105-110. <https://doi.org/10.18523/2519-4739.2021.6.1.105-110>
- Prosalova, V., Hryhoshkina, Y., Ivanyshyn, M., Stepanenko, O., & Zamsha, A. (2022). Gamification, coaching, scribbling, storytelling in Ukrainian literature classes: innovative potential and effectiveness of application. *Amazonia Investiga*, 11(55), 327-333. <https://doi.org/10.34069/AI/2022.55.07.34>
- Puhach, S., Avramenko, K., Michalchenko, N., Chychuk, A., Kuchai, O., & Demchenko, I. (2021). Formation of Specialists' Legal Competence in the System of Life Long Education. *Romanian Magazine for Multidimensional Education*, 13(4), 91-112. <https://doi.org/10.18662/rem/13.4/472>
- Rebukha, L., & Polishchuk, V. (2020). Ukrainian society and COVID-19: The influence of the pandemic on educational processes in higher school. *Postmodern Openings*, 11(2), 120-127. <https://doi.org/10.18662/po/11.2/165>
- Rebukha, L., Bilous, I., Brik, R., Demyaniuk, A., Savytska, V., Krychkivska, O., & Kavetskyi, V. (2022). *Innovative learning technologies in the conditions of modernization of modern education: Monograph*. Ternopil: ZUNU. http://dspace.wunu.edu.ua/bitstream/316497/48105/3/монографія_Інноваційні%20технології%20на вчання%20в%20умовах%20модернізації%20сучасної%20освіти.pdf
- Shetelya, N., Oseredchuk, O., Cherkasov, V., Kravchuk, O., Yarova, L., & Kuchai, O. (2023). Competency approach in preparing professionals in an innovative educational environment in higher education. *Revista Conrado*, 19(S3), 298-307. <https://conrado.ucf.edu.cu/index.php/conrado/article/view/3512>
- Shunkov, V., Marushko, L., Mykhailov, V., Lutsenko, Y., & Teslenko, S. (2023). Ways of implementing information technologies in professional training of future specialists. *Amazonia Investiga*, 12(62), 140-148. <https://doi.org/10.34069/AI/2023.62.02.12>
- Selwyn, N. (2016). *Education and Technology: Key issues and debates*. London, Bloomsbury, 232. <https://www.bloomsbury.com/uk/education-and-technology-9781350145566/>
- Terno, S. T. (2023). *Critical thinking and innovative strategies in history education: A guide*. Zaporizhzhia: Zaporizhzhia National University. <https://dspace.znu.edu.ua/jspui/bitstream/12345/13540/1/0053505.pdf>
- Yurchak, H. M. (2020). Application of the technology for the development of critical thinking of students in the process of study of the discipline "Ukrainian language for professional communication."



- Transcarpathian Philological Studies*, 1(13), 127-131.
<https://dspace.uzhnu.edu.ua/jspui/handle/lib/32596>
- Zaitaseva, D. (2022). Editorial: Artificial intelligence as a new form of life: digital evolution in writing. *Amazonia Investiga*, 11(60), 7-9. <https://doi.org/10.34069/AI/2022.60.12.0>
- Zaspa, H. O. (2021). *Concentric information technology for the organization of digital transformation of educational activities of higher education institutions*. (Unpublished candidate of technical sciences dissertation). Cherkasy State Technological University.
<https://er.chdtu.edu.ua/bitstream/ChSTU/1985/11/Дисертація%20Заспа%20Г.О..pdf>



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Innovative technologies for healthy education: a practical guide for educational institutions


Інноваційні технології здоров'язберігаючої освіти: практичний рекомендації для закладів освіти


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Abstract


The article substantiates the health-preserving components of the educational environment, which determine the content of health-preserving technologies and factors that affect the state of human health; the functions performed by innovative health-saving technologies in the educational process are highlighted. The effectiveness of introducing innovative health-preserving technologies in educational institutions is shown. The main web orientations of the technology supporting health-saving education are described. The main segments of web-based technologies for supporting health education are described. Emphasis is placed on effective Web 2.0 technologies in foreign healthcare education practices. As shown by the results of the ascertaining stage of the pedagogical experiment,


Анотація


У статті обґрунтовано здоров'язбережувальні компоненти освітнього середовища, що визначають зміст здоров'язбережувальних технологій та чинники, які впливають на стан здоров'я людини; виокремлено функції, що виконують інноваційні здоров'язбережувальні технології в освітньому процесі. Показано дієвість впровадження інноваційних здоров'язберігаючих технологій у освітніх закладах. Розписано основні веб-орієнтовані технології підтримки здоров'язбережувального навчання. Описано основні сегменти веб-орієнтованих технологій підтримки здоров'язбережувального навчання. Наголошено на дієвих видах технологій Web 2.0 у зарубіжних практиках

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students do not pay much attention to health-preserving technologies in educational institutions and have a weak readiness to implement health-preserving systems in the process of life activities and a lack of interest in physical activities. A comparative analysis of the levels of readiness to use health-preserving technologies gave the following results: according to the cognitive-intellectual criterion, 7% of respondents showed a high level at the beginning of the experiment, at the end – 36%; the average level at the beginning of the experiment – 20%, at the end – 60%; 73% of respondents had a low level at the beginning, and 4% at the end. As the results of the conducted experiment showed, there is a natural connection between the introduction of innovative health-preserving technologies in educational institutions and the readiness of students to implement health-preserving systems in the process of life and interest in motor activity.

Keywords: innovativeness of the educational system, health-preserving technologies, web-oriented technologies, health-preserving education, digital health.

здоров'язбережувального навчання. Як показали результати проведеного констатувального етапу педагогічного експерименту студенти не дуже звертають увагу на здоров'язберігаючі технології у освітніх закладах та мають слабку готовність до здійснення здоров'язбережувальної системи у процесі життєдіяльності та недостатню наявність інтересу в них до фізичних навантажень. Порівняльний аналіз рівнів сформованості готовності до використання здоров'язберігаючих технологій дав такі результати: за когнітивно-інтелектуальним критерієм високий рівень на початку експерименту показали 7% респондентів, наприкінці – 36%; середній рівень на початку експерименту – 20%, в кінці – 60%; низький рівень на початку мали 73% респондентів, а наприкінці – 4%. Як показали результати проведеного експерименту, існує закономірний зв'язок між впровадженням інноваційних здоров'язберігаючих технологій у закладах освіти та готовністю студентів до впровадження здоров'язберігаючих систем у процесі життєдіяльності та інтересом до рухової активності.

Ключові слова: інноваційність освітньої системи, здоров'язберігаючі технології, веб-орієнтовані технології, здоров'язбережувальне навчання, цифрове здоров'я.

Introduction

The greatest value of a person is health. Humanity needs such conditions for a happy and healthy life, where the main place belongs to the environment in which a person lives and the way of life in it. A person should be in a health-developing and health-preserving environment, including an educational one, in addition, a person should constantly strengthen their health and monitor their health. The introduction and development of innovative technologies and educational systems, in particular those that have a health-improving and health-preserving orientation, involves the modernization of the content of modern national education, directing its development to the integration of the European educational space. After all, the modern young generation will be far-sighted and promising only if it is strengthened in all aspects and preserves its health. There is a need to apply health technologies and health technologies, creating a healthy environment in everyday life, not only in educational institutions.

The problem of strengthening, preserving, forming, and restoring human health in the conditions of renewal of socio-economic life remains relevant because modern society itself is characterized by a decrease in the human development index, which supports the state of human health and contributes to life expectancy.

Today's realities regarding the way of life, the state of health of student youth, and their existing health culture determine the relevance of the problem of health care. 50% of modern youth have functional disorders of various organ systems, and 42% have chronic diseases, unfortunately, in recent years, the prevalence of chronic pathology among young people has been increasing, morbidity is increasing, and the number of healthy people in all sex and age groups is decreasing (Romanova et al., 2022).

Among students of grades 2-8, compared to children of preschool age, posture disorders are registered more than 5.2 times, scoliosis 11.2 times, hearing disorders three times, and vision disorders 3.7 times. The share of healthy school-age children decreases significantly during the study period, which acquires a strategic

national significance: to 6-9% of high school-age children from 33% of healthy children of junior school age (Horiana, 2015).

The negative trend towards the deterioration of the mental and physical health of adolescents and children is primarily related to socio-hygienic life factors that lead to the growth of psychosomatic pathology and an increase in the risk of student maladjustment (neuro-psychological) due to the stages of pre-morbid and pre-morbid conditions; prevalence of bad habits (use of narcotic substances, alcoholic beverages, smoking); growth in the popularity of attractive non-physical activities among youth and children; deviant behavior; vagrancy; gambling addiction.

The educational process during the implementation of the policy of health promotion increases the capabilities of adults and children in terms of ensuring a favorable and safe physical, psychological, and social environment for health, contributes to the formation of a person's conscious attitude to the health of others and his own health. After all, only 37% of students believe that they monitor their physical health and lead a healthy lifestyle, and the rest want to be physically healthy but do not think about their lifestyle. This indicates the lack of personal, purposeful motivation of student youth to preserve, form, and strengthen their health.

In recent years, the increase in morbidity of the global population has been noted for congenital anomalies of development – by 21.5%, diseases of the circulatory system and blood – by 51.3%, digestive organs – by 28%, diseases of the respiratory system – by 21%, endocrine system – 47% (Rybalko, 2019).

Therefore, in a century when the problem of protecting the health of the younger generation has become acute because the state of health of pupils and student youth has significantly deteriorated, the effectiveness of the work of an educational institution must be measured by an environment that will contribute to the strengthening and preservation of the mental and physical health of its subjects, will safe, and not only the quality of education (Rybalko et al., 2020).

Even though humanity has constantly strived at all stages of the development of society to preserve health and life in the system "environment – man" and personal safety, this issue is relevant now.

The development of innovative technologies of health care education in the quality training of future specialists is currently an urgent issue of theory and teaching methods in the educational process. Based on this, we considered the following questions in the article:

- The main approaches to the interpretation of the definition of "health-preserving technologies", are health-preserving components of the educational environment, which determine the content of health-preserving technologies and factors affecting the state of human health.
- Analyze the isolated factors that affect a person's health.
- Functions performed by innovative health-preserving technologies in the educational process.
- Implementation of innovative health-preserving technologies in educational institutions.
- Web-oriented technologies for supporting health-saving training of education seekers.
- Formation of health care competence of student youth.
- Experiment with innovative technologies of health care education.

Literature Review

In the modern conditions of providing educational services, scientists from different countries are engaged in the implementation of innovative health-preserving technologies in educational institutions.

Scientists have made a theoretical analysis of the content of health-preserving competence of graduates of higher education. Thus, A. Chychuk, I. Oros, & O. Bida (2023) singled out different approaches, substantiated the expediency of using health-preserving technologies in educational institutions, presented the content of the concept of "health-preserving technologies" in a broad and narrow sense. In the professional training of future specialists, ways of forming key health-preserving competence are highlighted. The role of the family in the education of the personality (healthy, physically developed) and the formation of the health-preserving competence of a person, preparing him for socially useful activities, is shown. Tasks have been developed that will ensure the main areas of educational activity of the family.

The research of L. Horiana (2015) provides an overview of normative and legal documents on the problem of the introduction of health-preserving technologies and reveals the main categorical concepts of the introduction of health-preserving technologies into the system of pedagogical postgraduate education. Based on clear definitions, the essence of the formation of readiness for the implementation of health-preserving technologies of pedagogical workers is shown, and the contradictory and ambiguous interpretation of health-preserving technologies is clarified, which deepens the content of the professional competence of a person of any specialty. Based on the analysis of scientific sources, N. Onishchenko & O. Lykhovyd (2016) also revealed the main categorical concepts of the introduction of health-preserving technologies into the pedagogical education system and showed the essence of the concepts of "innovative activity", "health-preserving technology", presented various classifications of health-preserving technologies. Pedagogical aspects of the application of health-preserving pedagogy were considered during the preparation of future teachers to preserve their health, and that of their students, and pedagogical problems in the educational process of the higher school were investigated. In the system of training future teachers for innovative activities, the features of the use of health-preserving technologies are revealed. The examples prove the importance of the use of health-preserving technologies in education in connection with the deterioration of the health of pupils and student youth, which is an urgent modern problem because it is connected with the irresponsible attitude of the students themselves toward their health, with a low level of culture human health, insufficient worldview orientation of the individual; insufficient regular, timely, complete and medical examination; insufficient implementation of health-preserving measures in the educational process of the higher school, lack of due attention of teachers to the preservation of students' health.

The research of A. Sukhikh (2018) is interesting and important, where the problems of developing scientific-methodological support and theoretical justification of the health-preserving use of hardware and software by high school students are discussed. For teachers engaged in educational and educational work, working in institutions of general secondary education and extracurricular education, students who are still studying in institutions of higher pedagogical education, and for improving the qualifications of pedagogical workers, tasks have been developed that will ensure the main directions of the introduction of innovative health-preserving technologies in educational institutions.

In the educational environment of a higher pedagogical educational institution, Maryna Dyachenko-Bohun (2015) analyzed the main components and structural characteristics of the methodical system of teaching health-preserving technologies and revealed approaches to defining the concept of "health-preserving technologies". The author, who is engaged in the professional training of future biology teachers, specified the directions of the professional training of specialists capable of forming a high level of health culture in the students of education in further professional activities and not only providing knowledge for professional subject training.

L. Rybalko, O. Permykov, T. Synytsya, A. Ostapov, & T. Yopa (2020) dedicated their research to the institution of higher education, in particular, they showed the urgent problems of organizing a health-preserving educational environment and identified ways to solve them. Scientists have singled out the reasons for the deterioration of students' health and substantiated the factors of this phenomenon; the method of organizing a health-preserving educational environment is highlighted, various approaches to its organization are presented, its main components are characterized, and the content is revealed. Health-preserving educational technologies include all pedagogical technologies that create safe conditions and do not harm the health of students: health-preserving, physical culture and health, medical-hygienic, life safety, ecological-recreational, and others. The main characteristics of the educational health-preserving environment were established and researched, and the positive impact of the educational process on the development of the mental, physical, and health of the students was proven. The components that have a positive result in terms of strengthening, preserving, and forming the health of students have been determined. The expediency of the positive impact of technology on students' health, taking into account the individual and age characteristics of student youth, has been clarified.

However, despite a significant number of studies devoted to the implementation of health-preserving technologies in educational institutions and the training of future specialists to preserve their health and the health of children and young people, this problem requires a detailed solution, is relevant in the context of the application of innovative health-preserving technologies in the system of training future individuals for innovative activities and life.

Despite the significant interest of the scientific community in various aspects of health-preserving, the problem of innovative technologies of health-preserving education was not the subject of a comprehensive study. The relevance and expediency of the study of the specified problem require the resolution of several contradictions, namely, between:

- Society's need for teachers with developed health-preserving competence and future teachers' lack of awareness of the importance of health-preserving for the successful implementation of professional activities;
- The need to strengthen the health-preserving component of the content of the training of future teachers in higher education institutions and the lack of a unified approach to educational programs for the formation of health-preserving competence;
- The objective expediency of diversifying the forms of health-preserving activities of future teachers in extracurricular work and the lack of necessary content and methodical support.

Thus, the relevance of the problem of Innovative technologies in health-preserving education and certain contradictions led to the choice of the topic of our article.

The purpose of the study: to show the importance and necessity of introducing innovative health-preserving technologies in educational institutions.

Methodology

To achieve the goal, a set of the following research methods was used:

- **Theoretical** – method of synthesis and analysis during the study of educational and methodological documentation, documents, statistical data, scientific and pedagogical sources, etc.; analysis (structural and systemic) of educational and methodological support for the training of future specialists to clarify the specifics of the implementation of innovative health-preserving technologies in educational institutions; when comparing various approaches – the comparison method, to solve the problem under study; for formulating and concretizing conclusions – the method of theoretical generalization;
- **Empirical** – pedagogical observation, questionnaires, and interviews of respondents.

As shown by the results of the ascertaining stage of the pedagogical experiment, students do not pay much attention to health-preserving technologies in educational institutions and have a weak readiness to implement health-preserving systems in the process of life activities and a lack of interest in physical activities.

According to the results of the ascertainment stage of the study, it was determined that most respondents are not sufficiently motivated to use health-preserving technologies, are not ready to implement health-preserving systems in the process of life, and are not interested in physical exertion.

According to the results of the formative stage of the study, we can see that in the experimental group, the number of respondents with a high level and an average level has significantly increased according to the motivational-target criterion, while in the control group, this increase is not significant. The number of respondents with a low level significantly decreased in the experimental group according to the motivational-target criterion, while in the control group, the changes were not significant.

A comparative analysis of the levels of readiness to use health-preserving technologies students' readiness to implement a health-preserving system in the process of life and their interest in physical exertion at the beginning and end of the experiment in the experimental group shows positive changes.

As the results of the conducted experiment showed, there was a natural connection between the implementation of innovative health-preserving technologies in educational institutions and students' readiness to implement health-preserving systems in the process of life and their interest in physical activity. The pedagogical experiment took place in three stages.

The preparatory stage provided an opportunity to determine the purpose of the study, develop an experiment plan, distinguish CG and EG, and check their homogeneity according to the chosen measurement methods and methods of processing the results.

The main stage of the research allowed experimenting.

The final stage indicates that the results of the experiment analyzed on it are reliable. At this stage of the research, conclusions are made about the pedagogical expediency of the experiment.

We include the most important characteristics as criteria for evaluating the quality of pedagogical research: reliability, objectivity, validity, reliability, and accuracy of the obtained results.

We carried out statistical processing to assess the homogeneity of CG and EG using such programs as MS Excel and Statistical Package for Social Science.

As part of the conducted experimental work, we believed that the quality of the analysis of the collected data contributes to the formation of reasonable general conclusions and not only adds weight to the research. The research used digital data collection tools: Google Forms, JSTOR, Google Scholar, and other academic search engines, and Microsoft Excel for data analysis, data volume processing, and statistical analysis of research results.

The choice of each of the tools helped to achieve the most informative and accurate results. A key role in this process was played by the use of appropriate software, which facilitated the process of health and data analysis.

In the research work, we took into account the ethical aspects of data collection and processing. We tried to experiment transparently, honestly, with respect for the rights of participants in the experimental work. This is the consent of the participants of the experiment, anonymity of the research, confidentiality, compliance with ethical standards in the processing and collection of research data, responsible dissemination, and use of data.

Experimental research is conducted with respect for the well-being and rights of all its participants.

The choice of a pedagogical experiment in our research is a certain set of research methods that provides a scientific objective and evidentiary verification of the correctness of the goal justified at the beginning of the research. It allows you to check the effectiveness of certain innovations in education and upbringing more deeply than other methods, to compare the importance of various factors in the structure of the pedagogical process, and to choose the best (optimal) combination of them for the relevant situation, to identify the proper conditions for the implementation of certain pedagogical tasks.

The total volume of the sample in the article is 68 subjects. When creating the sample, the criteria of meaningfulness, representativeness, and equivalence were taken into account. The sample of respondents was formed by random selection using the technical procedure for calculating the selection step.

During the experiment, the target, substantive, and procedural components of the specialists were implemented, and the effectiveness of the ways we discovered in the use of innovative technologies in health-preserving education was verified. The results of the experimental study confirmed the applicability, optimality, and effectiveness of the proposed ways of using innovative technologies in health education.

The experiment was conducted at V.O. Sukhomlynskyi National University of Mykolaiv, Vasyl Stefanyk Precarpathian National University, Bohdan Khmelnytskyi National Academy of the State Border Guard Service of Ukraine, National University of Life and Environmental Sciences of Ukraine. The conduct of the experiment is permitted by the scientific councils of the universities in order not to violate ethical considerations in institutions of higher education.

The reliability and validity of the obtained results and the objectivity of their assessment were ensured by the application of a complex of different research methods and the use of the results of a group of respondents from educational institutions for analysis.

In our article, we used quantitative data analysis methods. This group of methods of empirical research includes methods of obtaining information about the researched object, which allows it to reveal its quantitative characteristics.

Results and Discussion

The main approaches to the interpretation of the definition of "health-preserving technologies", are health-preserving components of the educational environment, which determine the content of health-preserving technologies and factors affecting the state of human health.

The problem of preserving and strengthening people's health requires purposeful management of this process and special work and is extremely important.

We will distinguish the main approaches to the interpretation of the definition of "health-preserving technologies", namely:

- **System** – an indicator of the quality of educational technologies;
- **Personally oriented** – provision of the educational process and training taking into account the age, psychophysiological, and individual characteristics of the students of education;
- **Environmental** – creation of an educational environment favorable for health;
- **Competent** – technologies for forming a picture of the world of a healthy individual, teaching the basics of health, forming health-development and health-preserving competencies, and a healthy lifestyle;
- **Active** – optimal combination with techniques, principles, methods, and traditional learning technologies aimed at supporting and preserving the health of the young generation;
- **Integrated** – educational and methodical complex of medical and preventive health and physical education activities.

Expands the understanding of the essence of the concept of "health-preserving technologies" by distinguishing scientific approaches, which makes it possible to understand it as the construction of techniques, content, means, and education of learning, a systematic method of programming goals aimed at creating a health-preserving educational environment in an educational institution, raising the level individual health, formation of health-development and health-preserving competencies under the conditions of monitoring the state of health of subjects studying.

Let's name the health-preserving components of the educational environment that determine the content of health-preserving technologies:

- Content (study of elements of health care provided by the content of educational disciplines);
- Physical culture and health (high adaptability of the body, formation of its physical qualities using increasing motor activity, sports training, a system of physical exercises, hardening of the body);
- Axiological (the influence of value orientations on the highest vital value of a person – health);
- Ecological (dependence of human health on the ecological state of the environment, awareness of the unity of nature and man, the formation of a valuable attitude towards nature itself);
- Epistemological (formation of a system of scientific knowledge about the basics of skills for leading a healthy human lifestyle, personal health, safe behavior in society, and practical skills);
- Emotional-volitional (formation of stable emotional behavior of a person: responsibility, organization, honor, duty, dignity);
- Functional (correct alternation of rest and work, compliance with the diet, prevention of functional diseases and disorders of the body, and harmful human habits) (Rybalko, 2019).

The experts of the World Health Organization determined the (approximate) ratio of factors that ensure the health of a modern person, distinguishing the following four main groups of factors:

- Conditions and lifestyle of people – 50-55%;
- Environmental condition – 20-25%;
- Genetic factors – 15-20%;
- Medical care – 10-15%.

Let's analyze the isolated factors that affect a person's health.

1. **Conditions and lifestyle.** First of all, the diseases of modern man are caused by his everyday behavior and lifestyle. Nowadays, a healthy lifestyle is considered the basis of disease prevention. This is confirmed by the fact that in the USA, for example, infant mortality rates are reduced by 80% and the mortality rates of the entire population by 94%, and the expected average life expectancy of a person increases by 85%, which is not associated with the success of medicine, but with the rationalization of the method life of the population and improvement of working conditions and human life. A sufficient number of people, at the same time, lead an unhealthy lifestyle. Let's emphasize the factors that should be included in the structure of a healthy human lifestyle: rational lifestyle, rational nutrition, optimal movement mode, psychosexual and sexual culture, psychophysiological regulation, hardening, immunity training, valeological education, and the absence of bad habits.

As a system, a healthy lifestyle consists of the following main interchangeable and interconnected elements, three cultures:

- Food culture (food corresponds to natural technologies of assimilation of food substances);
- Movement culture, which includes physical exercises (swimming, walking, skiing, running, working on a plot of land, etc.) in natural conditions;
- The culture of emotions (maintenance and formation of positive emotions that contribute to human success and preserve health).

Thus, a healthy lifestyle of each individual has a decisive influence on strengthening the health of each person, which should be constantly and purposefully formed during a person's life and not depend on life situations and circumstances. Therefore, during the educational process, it is important to develop the valeological literacy of children, adolescents, and young men.

2. **State of the environment.** The basis on which human health is based is the biological features of the body. However, the genetic program of a person in the presence of certain environmental conditions ensures its development. An organism without an external environment will not exist, here lies the inseparable unity of the environment and man, his residence.

The environment includes natural, social, artificially created biological, chemical, and physical factors, that is, what affects human health, life, and activity. The human himself is a part of society – a special social environment, because he is a social being, not just a biological one. The social basis of a person's existence is the leading one and mediates his biological ways of dispatching and the existence of physiological functions, which makes it necessary to determine the place of educational institutions, health care authorities, family, and physical education organizations in the performance of the main task of social policy – the formation of a healthy lifestyle for a person.

3. **Genetic factors.** The development of daughter organisms, which is ontogenetic, is determined by the hereditary program that they inherit with chromosomes from their parents. The structural elements of chromosomes and the chromosomes themselves – genes, can be exposed to harmful influences throughout the life of the future parents, and as a result, this is the occurrence of hereditary diseases. Despite the importance of the influence of upbringing and environment, the determining role of hereditary factors is revealed. The environment and heredity play their role in the pathogenesis of any disease act as etiological factors, and the greater the share of one factor, the smaller the contribution of the other. Hereditary factors play an important role in ensuring human health. In the majority of cases, taking into account these factors through the rationalization of a person's lifestyle can make his life healthy and long-lasting.
4. **Medical support.** Most people associate their hopes for health with this factor, but the share of responsibility of this factor turns out to be unexpectedly low. As diseases spread more widely and civilization developed, medicine began to pay less and less attention to human health and, to a greater extent, began to specialize in the treatment of diseases. Curative medicine does not always improve human health. Often, treatment reduces the stock of health due to the side effects of medicines. The most effective are primary and secondary prevention, which means working with people who have just started to get sick or with healthy people. Primary prevention involves close cooperation between the doctor and the population. Although the health care system itself does not provide the necessary time for this process, therefore the doctor does not meet with the population to clarify issues of prevention, and the contact with the patient is for examination, examination, and prescribing treatment. Today requires shifting the center of attention to physiology, psychology, cultural studies, and sociology from

medical aspects, as well as to specific regimes, to the spiritual sphere, technologies of education, training, and physical training (Dubaseniuk, 2020).

Functions performed by innovative health-preserving technologies in the educational process.

Health-preserving technologies perform the following functions in preparing future specialists for innovative activities:

- **Formative** (it is carried out based on hereditary qualities and social and biological patterns of personality formation, which determine the individual mental and physical properties of a person);
- **Informative and communicative** (ensures the continuity of traditions, the transmission of experience in organizing a healthy lifestyle, and value orientations to form a caring attitude toward one's own life and personal health);
- **Adaptive** (provides an increase in resistance to stressogenic factors of the social and natural environment, optimization of the state of one's own body, education in the acquirers of the educational space for a healthy lifestyle);
- **Diagnostic** (based on prognostic control aimed at monitoring the development of students, at comparing the actions of the teacher and his efforts by the natural capabilities of the individual);
- **Integration** (in the field of physical education, combines educational standards, national experience, all systems of education, and innovative scientific concepts regarding the preservation of the health of the younger generation);
- **Reflexive** (to preserve health consists in rethinking a person's personal previous experience) (Onishchenko & Lykhovyd, 2016).

Implementation of innovative health-preserving technologies in educational institutions.

Art therapy harmonizes personality development through self-discovery and self-expression. When using art therapy technologies, learners of educational space become more self-confident, gradually assert themselves, can dialogue with peers and teachers, look forward to the next classes, and become more open, they like everything that happens around them. Art therapy corrects the emotional state, heals the child's soul, harmonizes it with the surrounding world, relieves accumulated mental tension after classes, calms the child, and helps him concentrate. Art therapy can be used if there is no problem of a psychological nature to relieve a person of overfatigue after class work, which helps to understand a person's preferences, reveal his abilities in art, and open up.

Let's highlight the most common types of art therapy: drawing, music therapy, fairy-tale therapy, color therapy, drama therapy, mask therapy, origami therapy, image therapy, bibliotherapy, and others.

One of the main methods of art therapy is drawing or isotherapy, which allows a person to express his fears on paper to help survivors of any violence. A new type of abstract art is fluid art, which is also used in art therapy classes.

You can use the method of music therapy, which is passive and in which you can listen to classical calm music or the sounds of nature, which allows a person to relax and rest with the help of good music.

Fairytale therapy and play therapy allow you to project yourself into the role of the main character, invent a story, and, together with the hero, find a way out of difficult situations to model your happy future.

Library therapy is a pleasant way to communicate because a person does not worry about the veracity of the drawn object. Glue allows a person to learn to sculpt his emotions, negative and positive, and to destroy negativity. Drama therapy – small theatrical productions on various topics allow you to improvise, learn your roles, or imagine yourself as the main characters in the city. Mask therapy and film therapy are important for showing different life situations and getting out of them. Origami therapy – work with an origami of different sizes and sand therapy is popular today, which promotes the development of speech and fine motor skills of hands, develops the sensory perception of a person, relieves stress, calms down, and relaxes after a busy day. It is necessary to alternate and combine different types of art therapy to reveal a person expressing his inner experiences and doubts.

We will prescribe methodical tips that are important when using art therapy in classes (Kuchai et al., 2022):

- 1) Remember that it can be difficult for a person to realize his functional capabilities;

- 2) A person must independently choose what he will do;
- 3) Find a common language with the student;
- 4) Choose such types of art therapy that are available for independent implementation and obtaining a positive result;
- 5) The art process itself: this is the main thing in art therapy – you don't need to do something for the personality to adapt it, and it doesn't matter what the result will be;
- 6) 2 hours, this is the maximum time for an art therapy class;
- 7) The entire process should be discussed with the student and what he wants to achieve at the end of the class.

In the process of art therapy classes, each person expresses his feelings, inner images, loneliness, and insecurity. After art therapy classes, a person can relax and is in harmony with the whole world and with himself, becomes interesting, active, mobile, more hardworking, and works to obtain results (Starubinska & Tanska, 2020).

The system of hardening actions in the system of innovative health-preserving technologies in educational institutions is aimed at improving a person's adaptation to rapid and drastic changes in society and increasing the body's endurance and resistance to bad environmental factors. Natural factors are primarily means of hardening: air, earth, sun, and water. Any natural factor that meets hygienic needs can be used for health purposes. The following hardening procedures are the most effective: wiping with a glove, hardening with water, walking barefoot, dousing the feet, swimming in a pool, hardening with air, hardening with sunlight, etc. (Kornilova & Pavliuchenko, 2020).

Web-oriented technologies for supporting health-saving training of education seekers.

We will reveal the meaning of the concept of the phenomenon of digital health, which is of great importance in educational institutions regarding the introduction of innovative health-preserving technologies and arose as a result of the convergence of the digital revolution with health, society and life, and health care. Investment in digital health in the US has exceeded \$4.1 billion annually. The concept of digital health involves expanding the opportunities and rights of members of society to better track, improve, and manage the health of families and their own health.

In the field of health care, digital technology reduces costs, improves access to information resources, makes medical care more personalized and accurate, and improves its quality.

The key elements of digital health as a result of the integration of health care and ICT contribute to the creative restructuring of medicine because the digital revolution creates a better healthcare system. These include the Internet, mobile networks, social networks, software and hardware, health information technologies, wireless devices, sensors, genomics, integrated and microprocessor circuits, and personal genetic information.

The conceptual sphere of digital health is extensive and includes the following categories: wireless health (Wireless Health), electronic health (e-Health), mobile health (mHealth), cloud computing (Cloud Computing), health 2.0 (Health 2.0), healthcare information technologies (Healthcare IT), electronic patients (e-Patient(s)), health and healthcare data, personalized medicine (Personalized Medicine), telemedicine (Telemedicine) and other health-related concepts.

There are more than 300 concepts of digital health, but all of them reflect the unity of ICT, health preservation measures, and health prevention, characterized by the wide use and mass production of digital logic circuits and derivative technologies (cell phones, computers). Digital health is created for the well-being of people. In the era of the digital revolution, 80% of people aged 18-50 have smartphones, and among people aged 18-30 – 95% of citizens, in particular, 72.5% of people who have smartphones use mobile applications.

The Google company submitted the Im2Calories project – software that will allow smartphone applications to count calories from a photo of food. Many applications nowadays function to calculate a physical activity and calories, the so-called "mobile trainers and nutritionists". Among the most popular calorie counters are FatSecret, MyFitnessPal, Sandwich, Diet&Diary, fitness applications Nike Training Club, Endomondo, In Shape Free, Samsung Gear Fit (fitness bracelet), and Runkeeper. Such applications have advantages: they

stimulate physical fitness, save time (for example, keeping a calorie diary), can always be with the user, etc.

So, digital health is a social program to preserve people's health using digital technologies. The category "digital health" is used to mean the use of devices to improve the entire health care system, social software tools, and devices to improve the health care of a specific person. Depending on the platform that underlies the use of web technologies for health care, Health 4.0, Health 3.0, and Health 2.0 are distinguished.

Health 2.0 is defined as a movement that unites all healthcare entities that use Web 2.0 technologies to improve the quality of this process. The term "Health 2.0" reflects the integration with the Web 2.0 platform of health care technologies and means the use of social software tools to promote collaboration between patients, rehabilitators, medical workers, consultants, educators, instructors, and other health care workers.

The social program includes the following components:

- To enrich the experience of consumers – personalized search for health-preserving information;
- Dissemination of knowledge between communities, dissemination of technologies for mutual exchange and delivery of content;
- The focus of each individual's activities on the development of self-care processes for their own health throughout life.

Web-oriented technologies for supporting health-preserving education of education seekers are "technologies of purposeful use of the Internet to improve access to health-preserving informational messages on the Internet, the creation and functioning of supportive virtual communities, with the help of which students can create subjectively meaningful health-preserving knowledge and exchange them" (Rybalko, 2019).

Web-oriented technology for supporting the health-preserving education of students combines four main segments:

1. *General problems of health-preserving and Web technologies:*

- In the field of health care and health care education, as a promising set of technologies – development of Web 2.0 social software;
- To improve the popularization of a healthy lifestyle for education seekers using Web 2.0;
- To promote a healthy lifestyle using Web 2.0;
- To ensure the need for the high-quality functioning of modern health-preserving, the use of innovative technologies.

2. *Methodology of using web technologies in health care education:*

- Cloud technologies in education;
- Integration of Web 2.0 into health education;
- Technologies, ideas, and their application in education;
- Studying the experience of using social networks in fitness and health care;
- The use of web technologies for multi-content training from strategic planning;
- The use of YouTube as an effective Web 2.0 information channel for health education.

3. *The use of web technologies (Web 2.0) in health education of students:*

- Prospects for the development of health-preserving education for the digital generation;
- Recommendations for the use of social networks in education;
- The use of web technologies in health education in schools and institutions of higher education;
- Health education in the 21st century and social networks and deepening the student experience through social networks.

4. Use of web technologies in professional training of health professionals:

- Use of Facebook in higher education;
- Social networks in the professional education of health professionals;
- Adaptation of Web 2.0 technologies in the education of health professionals;
- Creative ways to use social media to improve fitness and improve health knowledge (Shuliak et al., 2022).

Learning through web technologies is a useful tool for the realization of educational goals because innovative technologies, which are called the "network generation", are increasingly popular among modern students. Pupils of the network generation feel more comfortable while studying in the online environment, students of the "network generation" feel more comfortable and, when using web technologies directly, have the opportunity to:

- To maximize self-motivation,
- To form skills of self-study, time management,
- Are responsible for active participation in training and their own educational development;
- Are constantly in touch with each other;
- Have digital literacy;
- Cooperate in a well-structured environment.

Therefore, the availability of technological competencies among all subjects of training significantly increases the effectiveness of training due to the influence of a health-preserving educational environment. Effective types of Web 2.0 technologies in foreign health care education practices. The following types of Web 2.0 technologies are used in foreign health education practices: blogs, social networks, wikis, podcasts, video exchanges, and chats.

In health education, thematic blogs that reflect different points of view are used – simple websites with short messages that contain information that is presented in a narrative form. Health education also uses special web pages and wiki pages that highlight health issues, which allow everyone to delete, add, and edit information. To connect users in the field of health care and allow them to communicate according to their interests, electronic social networks. Audio recordings in the form of chats, lectures, interviews, podcasts, and chats are used in health education, such as network tools for rapid real-time exchange of text messages between Internet users. Video sharing is a web page that allows professional or private users to upload video files. The most common type of health-preserving technologies in education, which are used to improve communication and expand the channels of information perception, are social networks that promote interaction with others, work in groups, cooperation, and creativity. Interesting results of the research of foreign scientists in the context of the introduction of innovative health-preserving technologies in educational institutions are the research of scientists.

R. Frimming, to obtain health information, directed his research to the evaluation of the quality of the use of social networks:

- 51% of higher education students believe that the long-term use of sites to introduce innovative health-preserving technologies in educational institutions improves the fitness regime of students;
- 52.9% of higher education students claim that they received the most useful information about innovative healthcare technologies from social networks.

It has been proven that for deepening and improving the knowledge of pupils and students, the ideal place for using social networks is educational institutions, both higher and secondary.

V. Asher proved that the following four groups of skills are developed and formed in healthcare education as a result of the use of social networks:

- The ability to communicate;
- Transform information;
- Control information;
- To adapt information to the needs of a specific group of people (Puhach et al., 2021).

In the educational space, it is advisable to conduct restorative and preventive classes while working with a computer in the context of the introduction of health-preserving technologies aimed at reducing the impact of hypodynamia and hypokinesia factors on the body, prevention, and correction of posture; decrease in tension of the visual analyzer and the psycho-emotional sphere; improvement of blood supply to the brain, relief of tension in the psycho-emotional sphere, increase in work capacity; normalization of digestive organs, prevention of stagnation in the lower limbs and pelvic organs.

When working with a computer, eye tag exercises deserve attention when bright visual tags (pictures) with one game plot are hung on the walls, under the ceiling, and in the corners of the computer classroom.

Students are asked to follow the plot during micropauses, moving their eyes from one mark to another slowly, without turning their heads, and turning their heads to observe a different plot (Alnabulsi, 2022).

It is worth doing visual gymnastics after working with a computer, which includes exercises to shift the fixation of vision from close-by objects to distant ones with the maximum amplitude of eye movements and to carry it out together with exercises to relieve general fatigue; ergonomic exercises to improve posture (stretching of tendons, muscles, ligaments); techniques that neutralize the negative impact of ICT on the user, athletic and rhythmic gymnastics, which should be carried out in extracurricular time using ICT to strengthen all muscle groups (with an emphasis on muscles that ensure the correct position of the spine) (Yastrebov, 2016).

Various health-preserving technologies are offered by researchers from foreign countries for the educational space, which will allow the safe use of web technologies and ICT without harmful consequences to people's health. In matters related to the quality of life of adults and children and their health, the usefulness and importance of the exchange of experience between scientists of different countries should be emphasized. The creation of favorable working conditions and the effective implementation of health-preserving technologies in a computer-oriented environment must be decided on a global scale and at the state level because the use of web technologies contributes to the provision of cognitive and creative development of students education, health-preserving training, formation of students of education the ability to use technologies to support motor activity and cooperation, organization of a healthy lifestyle (Yastrebov, 2019).

Formation of health care competence of student youth.

In the education of modern youth, one of the leading directions in the system of educational space is strengthening health, promoting the harmonious development of the personality, and preparing specialists for competitiveness in professional activities. Therefore, the formation of health-preserving competence is mandatory for students of general secondary education institutions and students of higher education in higher education. In the process of forming health care competence throughout a person's life, and not only during all the years of his acquisition of a modern educational trajectory, but it is also necessary to constantly strengthen health, improve the level of physical development, protection and safety of life, functional increase and improvement of the working capacity of the body of higher education students, hardening (Lushchynskyi & Shtompel, 2022).

The formation of a healthy lifestyle culture among students of higher education involves the formation of health-preserving competence of student youth because "the successful formation of health-preserving competence of young people consists in the ability of the individual to resist the pressure of the environment. Therefore, the formation of health-preserving competence of students is versatile and possible with:

- Harmonization of the body and spirit of the individual and nature in the process of physical education of students
- Ensuring the full development of the personality;
- Strengthening the health of modern youth;
- Formation of physical abilities of students of higher education, etc.

Special educational institutions, sports organizations, public organizations, educational institutions of all levels, sports schools, etc., participate in their decision (Shetelya et al., 2023).

The experiment.

Working in educational institutions, we observe that:

A large part of young people have health problems: 90% of students studying in higher education have health problems. The most widespread problems are deviations in the activity of various functional systems of the students' body – 58% of young people; abnormalities of the cardiovascular system are observed in 30%; 37% of students have neuropsychiatric disorders; diseases of digestive organs have 17%.

A significant part of the student youth improves their health by smoking (Fig. 1):

- At the age of 10-11 years, a significant part of teenagers start smoking;
- Up to 16 years of age, the number of such children among girls is 30%, and among boys – 50%;
- 60% of girls and 80% of boys smoke by the age of 18.

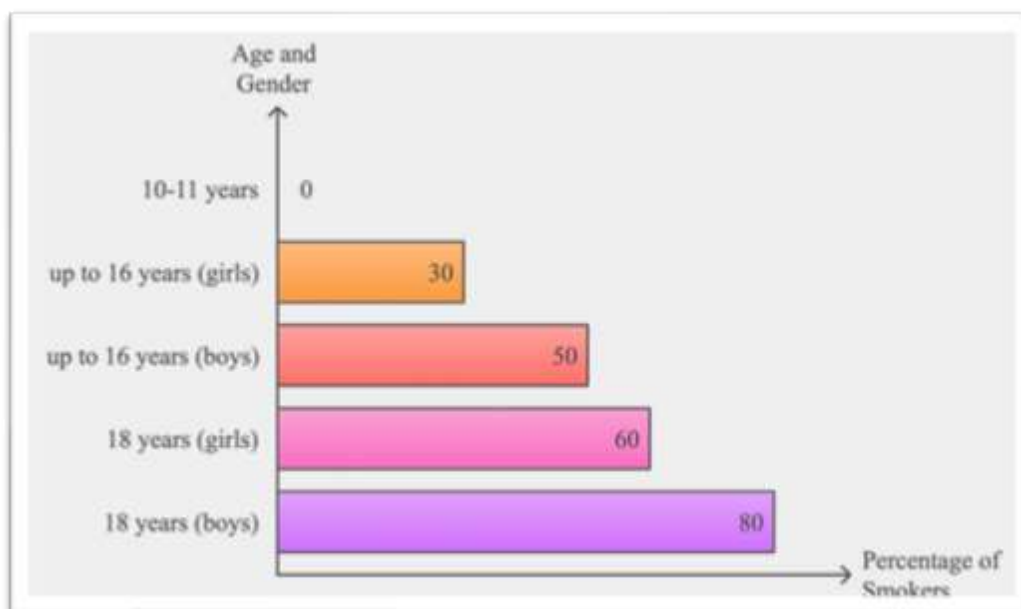


Figure 1. Teenage Smoking Rates by Age and Gender.

Student youth weakens their health by drinking alcohol:

- 30% of young people drink alcohol often;
- 20% of girls drink alcohol often;
- 13% of students tried drugs.



Figure 2. Drug and alcohol use by young people.

Scientists have proven that for human health, the minimum amount of physical activity should be 8-10 hours per week.

But, according to our research, this norm is observed by a small part of young people (Fig. 3):

- 25% of student youth spend 8-10 hours a week for physical activity;
- 40% of student youth spend 2 hours a week on sports and physical exercises;
- 35% of student youth spend 3 hours a week on sports and exercises.

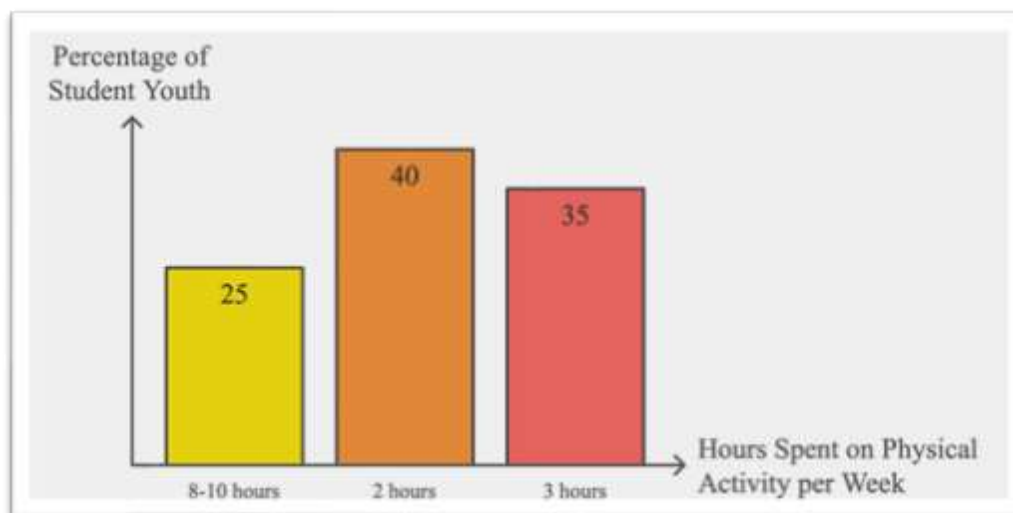


Figure 3. Student Youth Physical Activity Participation.

As shown by the results of the ascertaining stage of the pedagogical experiment, students do not pay much attention to health-preserving technologies in educational institutions and have a weak readiness to implement health-preserving systems in the process of life activities and a lack of interest in physical activity.

At the ascertainment stage of the experiment, according to the results of the questionnaire in the control group:

- 11% of respondents had a very positive personal attitude towards health-preserving technologies in educational institutions and readiness to implement health-preserving systems in the process of life activities and the presence of interest in physical exertion;
- 27% of respondents had a positive personal attitude;
- 16% of respondents had a negative personal attitude;
- 23% of respondents are undecided;
- It is difficult to answer 23% of respondents.

In the experimental group

- 10% of respondents had a very positive personal attitude towards health-preserving technologies in educational institutions and readiness to implement health-preserving systems in the process of life activities and the presence of interest in physical exertion;
- Positive 19% of respondents;
- Negative 21% of respondents;
- 30% of respondents are undecided;
- It is difficult to answer 20% of respondents.

So, we see that the problem of using health-preserving technologies in educational institutions, the readiness to implement health-preserving systems in the process of life, and the presence of interest in physical exertion are very relevant and timely. Young people are sufficiently ready for its implementation, know how to learn in the process of professional training, and also feel their own need for it.

The obtained results of the survey among students of the 1st to 4th years proved that:

1. The level of teaching of disciplines in a higher educational institution aimed at health-preserving technologies and the readiness of students to implement health-preserving systems in the process of life activities and the presence of their interest in physical exertion:
 - Very high – 30% of respondents;
 - High – 40% of respondents;
 - Sufficient – 20% of respondents;
 - Difficult to answer – 10% of respondents.
2. The level of practical training is aimed at health-preserving technologies and the readiness of students to implement health-preserving systems in the process of life and their interest in physical exertion in a higher educational institution:
 - Very high – 55% of respondents;
 - High – 25% of respondents;
 - Sufficient – 15% of respondents;
 - Difficult to answer – 5% of respondents.
3. Students determined their own setting for further readiness to implement health-preserving systems in the process of life and their interest in physical exertion:
 - Very positive – 30% of respondents;
 - Positive – 30% of respondents;
 - Negative – 20% of respondents;
 - Difficult to answer – 20% of respondents.
4. Students noted the question that caused difficulties: "Name the factors, methods, rules, ways, and means that contribute to the implementation of a health-preserving system in the process of life and the presence of interest in physical activity?". Most of the respondents (70%) could not clearly answer these questions.

Based on the results of the ascertainment stage of the research, it was determined that:

- 60% of respondents are not sufficiently motivated to use health-preserving technologies, are not ready to implement health-preserving systems in the process of life, and are not interested in physical exertion;
- 58% of respondents have limited knowledge of methods and technologies for using healthcare technologies;
- 67% of future specialists are poorly versed in health-preserving technologies;
- 68% of respondents show no interest in physical improvement, are poorly versed in special methods of using health-preserving technologies, and weakly possess skills and knowledge under the condition of the initiative of the individual himself.

Let's analyze the research results obtained at the formative stage of the experiment.

At the beginning of the pedagogical experiment, only 13% of the respondents in the control group had a high level according to the motivational-target criterion, and at the end – 15% of the respondents and 25% of the students had an average level at the beginning of the experiment, at the end of the experiment – 28% of the respondents, a low level was at the beginning – 62% of respondents, at the end – 57% of respondents (Fig. 4).



Figure 4. Respondent Levels in Control Group Before and After Experiment.

At the beginning of the experiment, we observed (Fig. 5):

- The high level of 14% of respondents in the experimental group according to the motivational-target criterion, and at the end of the experiment, 40% of respondents;
- The average level at the beginning of the experiment was 14% of respondents, at the end of the experiment, it was 55% of respondents;
- The low level at the beginning of the study was 72% of students, at the end, it was 5% of respondents.

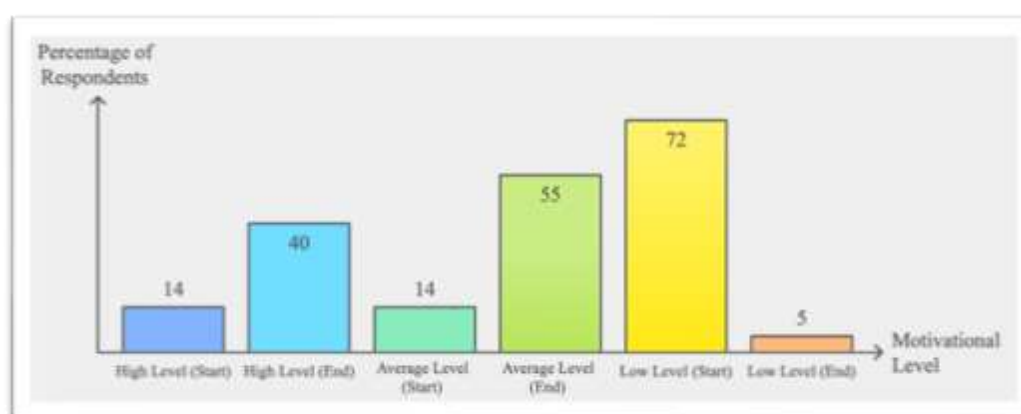


Figure 5. Changes in Motivational Levels Before and After Experiment.

We can see that in the experimental group, the number of respondents with a high level and an average level has significantly increased according to the motivational-target criterion, while in the control group, this increase is not significant. The number of respondents with a low level significantly decreased in the experimental group according to the motivational-target criterion, while in the control group, the changes were not significant.

Therefore, a comparative analysis of the levels of formation of the readiness to use health-preserving technologies and the readiness of students to implement a health-preserving system in the process of life and their interest in physical exertion according to the motivational and goal criteria at the beginning and the end of the experiment in the experimental group shows positive changes.

According to the cognitive-intellectual criterion, 8% of the respondents in the control group had a high level at the beginning of the experiment, and 9% of the students at the end of the experiment; the average level at the beginning was shown by 23% of respondents, at the end by 25% of respondents; 69% of respondents had a low level at the beginning, and 66% of respondents at the end.

According to the cognitive-intellectual criterion in the experimental group, 7% of respondents showed a high level at the beginning of the experiment, at the end – 36% of respondents had an average level at the beginning of the experiment – 20% of respondents, at the end – 60% of respondents; 73% of respondents had a low level at the beginning, and 4% of respondents at the end.

So, in the experimental group, the number of respondents with a high level increased significantly according to the cognitive-intellectual criterion, and in the control group, this indicator remained practically unchanged. The number of students in the experimental group with an average level according to the cognitive-intellectual criterion increased significantly, while the respondents in the control group remained practically at the same level. The situation is similar, with a low level of cognitive-intellectual criteria in the control group and the experimental group.

Therefore, a comparative analysis of the levels of readiness to use health-preserving technologies, students' readiness to implement health-preserving systems in the process of life, and their interest in physical exertion at the beginning and end of the experiment in the experimental group show positive changes.

As the results of the conducted experiment showed, there was a natural connection between the implementation of innovative health-preserving technologies in educational institutions and students' readiness to implement health-preserving systems in the process of life and their interest in physical activity. As a result of the study, we noted the weaknesses of the use of health-preserving technologies in educational institutions, in particular, we noted the issues and isolated difficulties experienced by students who could not clearly name the rules, methods, factors, means and ways that promote interest in physical exertion and the implementation of health care systems in the process of life. Therefore, the majority of students enrolled in institutions of higher education are not sufficiently motivated to use health-preserving technologies and are not ready to implement health-preserving systems in the process of life and are not interested in physical exertion; have limited knowledge of methods and technologies for using health-preserving technologies; poorly equipped with health-saving technologies; show little interest in physical improvement; do not have a good command of special methods, methods of using health-preserving technologies; weakly possess skills and knowledge under the condition of the initiative of the individual himself.

Having analyzed the results obtained, the conclusions drawn and their significance for educational practice, we note that the practical significance of the study consists in revealing the main approaches to the content of health-saving technologies and factors that affect the state of human health; components of the educational environment, functions performed by innovative health-saving technologies in the educational process; the development of methodological tips that are important when using art therapy in classes in educational institutions and the identification of the main web-oriented technologies for supporting the health-preserving training of education seekers; elucidation of effective types of Web 2.0 technologies in foreign practices of health-preserving education, which are important in the formation of health-preserving competence of student youth.

Conclusions

The main approaches to the interpretation of the definition of "health-preserving technologies" are revealed; the health-preserving components of the educational environment, which determine the content of health-preserving technologies and factors that affect the state of human health, are substantiated; the functions performed by innovative health-preserving technologies in the educational process are highlighted. The effectiveness of the implementation of innovative health-preserving technologies in educational institutions is shown; methodical advice is prescribed, which is important when using art therapy in classes in educational institutions. The main web orientations of technology support for health-preserving training of education seekers are described; the concept of digital health phenomenon is revealed. The main segments of web-oriented technologies for supporting health-preserving education of education seekers are described.

Emphasis is placed on effective types of Web 2.0 technologies in foreign practices of health care education, which are important in the formation of health care competence of student youth.

As shown by the results of the ascertaining stage of the pedagogical experiment, students do not pay much attention to health-preserving technologies in educational institutions and have a weak readiness to implement health-preserving systems in the process of life activities and a lack of interest in physical activity.

According to the results of the ascertainment stage of the study, it was determined that most respondents are not sufficiently motivated to use health-preserving technologies, are not ready to implement health-preserving systems in the process of life, and are not interested in physical exertion. According to the results of the formative stage of the study, we can see that in the experimental group, the number of respondents with a high level and an average level has significantly increased according to the motivational-target criterion, while in the control group, this increase is not significant. The number of respondents with a low level significantly decreased in the experimental group according to the motivational-target criterion, while in the control group, the changes were not significant.

A comparative analysis of the levels of readiness to use health-preserving technologies, students' readiness to implement a health-preserving system in the process of life, and their interest in physical exertion at the beginning and end of the experiment in the experimental group show positive changes. As the results of the conducted experiment showed, there was a natural connection between the implementation of innovative health-preserving technologies in educational institutions and students' readiness to implement health-preserving systems in the process of life and their interest in physical activity.

Consideration of the ways of applying innovative approaches to the formation of health-preserving competence of students of higher education requires further research.

The development of innovative technologies of health-preserving education in the education system will be more effective if it is based on a structural-functional model, the effectiveness of which will be ensured by pedagogical conditions: ensuring sustainable motivation for the development of health-preserving education of teachers; creation of a health-preserving environment for the continuous development of health-preserving education in the system of postgraduate pedagogical education; formation of subject-subject interaction between teacher and student by means of training technologies; ensuring the connection between theoretical knowledge and practical skills for their implementation in professional activity.

Bibliographic References

- Alnabulsi, M. M. (2022). Al-Jouf educational supervisors perceptions about handheld devices' importance in health education concepts' acquisition to students. *Amazonia Investiga*, 11(56), 210–223. <https://doi.org/10.34069/AI/2022.56.08.21>
- Chychuk, A., Oros, I., & Bida, O. (2023). Contents of health care competence of youth students. *Social Work and Social Education*, 2(11), 194–201. [https://doi.org/10.31499/2618-0715.2\(11\).2023.291896](https://doi.org/10.31499/2618-0715.2(11).2023.291896)
- Dubaseniuk, O. A. (2020). Factors affecting human health. In *Innovative health-preserving technologies in educational institutions: A collection of scientific and methodological works* (pp. 31–34). Zhytomyr: Ivan Franko State University. http://eprints.zu.edu.ua/31287/1/Макет_ЗБІРНИК_КОНФЕРЕНЦІЇ_%20ТЕХНОЛОГІЇ.pdf
- Dyachenko-Bohun, M. (2015). Main components of health-preserving technologies in the educational environment of a higher pedagogical educational institution. *Origins of Pedagogical Skills*, 16, 64–70. <http://dspace.pnpu.edu.ua/bitstream/123456789/5618/1/Dyachenko.pdf>
- Horiana, L. H. (2015). Trends of management by implementation of health protection technologies in institutions of postgraduate pedagogical education in Ukraine. *Scientific Journal "ScienceRise"*, 6/5(11), 45–50. <https://doi.org/10.15587/2313-8416.2015.44703>
- Kornilova, Ye. S., & Pavliuchenko, O. V. (2020). Features of tempering the young generation. In *Innovative health-preserving technologies in educational institutions: A collection of scientific and methodological works* (pp. 35–36). Zhytomyr: Ivan Franko State University. http://eprints.zu.edu.ua/31287/1/Макет_ЗБІРНИК_КОНФЕРЕНЦІЇ_%20ТЕХНОЛОГІЇ.pdf



- Kuchai, O., Hrechanyk, N., Pluhina, A., Chychuk, A., Biriuk, L., & Shevchuk I. (2022). World Experience in the Use of Multimedia Technologies and the Formation of Information Culture of the Future Primary School Teacher. *International Journal of Computer Science and Network Security*, 22(3), 760-768. <https://doi.org/10.22937/IJCSNS.2022.22.3.100>
- Lushchynskiy, Yu., & Shtompel, U. (2022). Problems of forming health care competence of students: Theoretical aspect. *New Learning Technologies*, (96), 120–124. <https://doi.org/10.52256/2710-3560.2022.96.16>
- Onishchenko, N. P., & Lykhovyd, E. R. (2016). Health-preserving technologies in the training of future teachers for innovative activities. *Young Scientist*, 9.1(36.1), 122–126. <http://molodyvcheny.in.ua/files/journal/2016/9/31.pdf>
- Puhach, S., Avramenko, K., Michalchenko, N., Chychuk, A., Kuchai, O., & Demchenko, I. (2021). Formation of Specialists' Legal Competence in the System of Life Long Education. *Romanian Magazine for Multidimensional Education*, 13(4), 91-112. <https://doi.org/10.18662/rrem/13.4/472>
- Romanova, I., Kudin, S., Rybak, O., Zavalevskiy, Y., & Pushkarova, T. (2022). Influence of digital technologies of distance education on the mental health of a child in the conditions of wartime realities. *Amazonia Investiga*, 11(56), 224–231. <https://doi.org/10.34069/AI/2022.56.08.22>
- Rybalko, L. M. (2019). Health-preserving technologies as a pedagogical and social problem. In *Health-preserving technologies in the educational environment: A collective monograph* (pp. 8-25). Ternopil: V. M. Osadtsa. <http://elcat.pnpu.edu.ua/docs/Здоров'язбережувальні2019.pdf>
- Rybalko, L., Permykov, O., Synytsya, T., Ostapov, A., & Yopa, T. (2020). Organization of a health education environment of an educational institution. *Pedagogy of Creative Personality Formation in Higher and Secondary Schools*, 69(3), 106–110. <https://doi.org/10.32840/1992-5786.2020.69.3.21>
- Shetelya, N., Oseredchuk, O., Cherkasov, V., Kravchuk, O., Yarova, L., & Kuchai, O. (2023). Competency approach in preparing professionals in an innovative educational environment in higher education. *Revista Conrado*, 19(S3), 298-307. <https://conrado.ucf.edu.cu/index.php/conrado/article/view/3512>
- Shuliak, A., Hedzyk, A., Tverezovska, N., Fenchak, L., Lalak, N., Ratsul, A., & Kuchai, O. (2022). Organization of Educational Space Using Cloud Computing in the Professional Training of Specialists. *International Journal of Computer Science and Network Security*, 22(9), 447-454. <https://doi.org/10.22937/IJCSNS.2022.22.9.58>
- Starubinska, I. V., & Tanska, V. V. (2020). Implementation of art techniques in the New Ukrainian school. In *Innovative health-preserving technologies in educational institutions: A collection of scientific and methodological works* (pp. 24-27). Zhytomyr: Ivan Franko State University. http://eprints.zu.edu.ua/31287/1/Макет_ЗБІРНИК_КОНФЕРЕНЦІЇ_%20ТЕХНОЛОГІЇ.pdf
- Sukhikh, A. S. (2018). *Health-preserving use of hardware and software tools by students of grades 5-9 in general secondary education institutions [Monograph]*. Theory and teaching methods of mathematics, physics, and informatics. Volume XVI, Issue 2(45): Special issue "Monograph in the journal". Kryvyi Rih: Publishing Department of Kryvyi Rih National University. <https://elibrary.kdpu.edu.ua/handle/123456789/3655>
- Yastrebov, M. M. (2016). Experimental research of the effectiveness of methods of training teachers to use web-oriented technologies in healthkeeping education of primary school students. *Pedagogical Sciences: Theory, History, Innovative Technologies*, 2, 138-147. http://nbuv.gov.ua/UJRN/pednauk_2016_2_19
- Yastrebov, M. M. (2019). Scientific and pedagogical principles of the web-based technologies use in the grade school student health-preserving education. In *Health-preserving technologies in the educational environment: A collective monograph* (pp. 309-344). Ternopil: V. M. Osadtsa. <http://elcat.pnpu.edu.ua/docs/Здоров'язбережувальні2019.pdf>

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The mask as a new means of communication: a multimodal analysis of its communicative value during the COVID-19 pandemic

Маска як засіб комунікації: мультимодальний аналіз її комунікативної значущості під час пандемії COVID-19

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Abstract

The COVID-19 pandemic (2020-2022) transformed the face mask from a medical device into a communicative tool. This study analyses the multimodal nature of community masks in the United States, demonstrating how their design elements convey political, social, and personal messages. Through a semiotic analysis of mask images, the research reveals the use of colors, patterns, slogans, and wordplay to express political affiliation (e.g., pro-Trump, pro-Biden), social stance (e.g., Black Lives Matter, vaccination status), and individual identity (e.g., mood, fashion). The findings highlight the mask's evolution into a platform for public expression, comparable to profile pictures and slogans on social media, contributing to our understanding of communication in the digital age. The study also underscores the interdiscursive nature of mask-wearing practices, intersecting with discourses on identity, politics, and public health.

Анотація

Протягом пандемії COVID-19 (2020–2022) захисна маска перетворилася з медичного предмета на засіб комунікації. У дослідженні подано аналіз мультимодальної природи тканинної маски в Сполучених Штатах Америки, який свідчить про те, що елементи дизайну цього аксесуара передають політичні, соціальні та особисті повідомлення. Семіотичний аналіз масок виявив те, як кольори, малюнки, слогани та мовна гра використовуються задля вираження політичних вподобань (наприклад, прихильності до Трампа чи Байдена), позиції щодо соціальних проблем (наприклад, підтримка Black Lives Matter, вакцинація) та особистої ідентичності (наприклад, настроїв, дотримання модних трендів). Результати дослідження свідчать про еволюційну трансформацію маски у платформу для публічного самовираження, схожу на візуальні елементи профілів чи слогани у соціальних мережах, що доповнює розуміння комунікації у цифровому світі. Дослідження також виявляє інтердискурсивну природу практик носіння маски, які перетинаються з дискурсами

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Keywords: mask, multimodality, message, verbal and nonverbal communication, communicative value.

ідентичності, політики та громадського здоров'я.

Ключові слова: маска, мультимодальність, повідомлення, вербальна та невербальна комунікація, комунікативна значущість.

Introduction

From 2020 to early 2022, the coronavirus pandemic kept the world under siege and interfered with all aspects of social life: education, economy, social life, etc. The policies adopted to curb the virus varied in their severity at different stages but most countries had to go through the stages of distancing, restrictions on travelling and even lockdowns. Despite differences in the measures taken to prevent the virus from spreading, the common feature of any public place was face masks, which sparked fierce reactions and brought to the surface cultural significance attributed to the human face, human life, human rights and freedom (Klepikova et al., 2021; Pevko et al., 2022). The introduction of this tiny piece of cloth as a compulsory accessory turned the piece into “a potent symbol of our changed reality” (Wong, 2021). Overall, alongside the coronavirus image and the flatten-the-curve graph, the face mask became iconic of the pandemic as much as generic, i.e., these three were adapted to numerous contexts of the crisis as visuals in their own right (Aiello et al., 2022, p. 313–314).

Though the mask started as a standardized medical item imposed almost globally, the seeming uniformity of mask-wearing was gradually undermined locally since mask-wearing appeared to be deeply connected to social and cultural practices (Martinelli et al., 2021, p. 1) and raised a few sociocultural, ethical and political issues because dress is “a situated bodily practice which is embedded with the social world and fundamental to micro-social level” (Entwistle, 2000, p. 66).

There appeared a trend to turn masks into fashion items or/and a surface to make a statement of various types, namely a fashion statement, a political statement or an identity claim. In fact, since there was no way to avoid face-covering, one could not help communicating one's attitude to the anti-corona policies, once one went out: the message was sent either by the choice of one's mask design or by the manner of wearing it.

The impact of the pandemic has been multifaceted and long-lasting. Experts estimate its effect on the USA gross domestic product as “twice the size of that of the Great Recession of 2007–2009”, “20 times greater than the economic costs of the 9/11 terrorist attacks and 40 times greater than the toll of any other disaster to befall the U.S. in the 21st century” (Hlávka & Rose, 2023). The pandemic has brought up issues of mental health treatment and vaccination as well as introduced new behavioural patterns (UAB News, 2022); the detrimental effect on the mortality, fertility rates and new migration policies of 2020–2022 will still be felt in 2026 (Tilstra et al., 2024); the new social reality has aggravated social inequality issues in the USA (Hu, 2022). There is ongoing research into social, psychological and cultural aspects of the pandemic (see, for example, (Aiello et al., 2022; Frosh & Georgiou, 2022; Manalastas, 2023)).

The article aims to analyse the transformation undergone by the surgical mask during the pandemic. The sections of the article are designed to answer the following questions:

- What transformation (if any) did the mask undergo during the pandemic?
- What communicative value did the mask acquire during the pandemic?
- What verbal and nonverbal means were used to deliver the meanings?

Hence, the research explores how, in the US context, the mask started as a protective object and ended up as a means of expressing the wearer's stance on issues of social, economic, political and personal nature.

Literature review

The analysis of the medical mask as a communicative means during the pandemic requires a brief overview of the history of and attitudes to face covering.

In the Middle Ages and later on, masks were worn by Europeans (mostly women) during pilgrimages and carnivals. At that time, the purpose of face-covering was to protect women from an evil eye and the sun or to hide the mask-wearer's identity (Phillips, 2022). The medical mask appeared in China during the 1910–1911 plague epidemic and came to the USA as obligatory protective equipment for medical workers at the time of the 1918 Spanish flu. Compulsory mask-wearing caused a wave of noncompliance among Americans who defied masks as an unconstitutional infringement of civil liberties (Navarro, 2020).

The recent studies into face-covering often adopt the comparative approach and focus on cultural hybridity. (Shirazi, 2003) is one of the first remarkable analyses offering an insight into the multiplicity of meanings and communicative effects of the veil in different discourses ranging from Persian poetry to American and Saudi advertising to Iranian and Indian films and government-funded posters. The veil is perceived differently in various cultural contexts and historical epochs. A similar research, though into the item of clothes, *shalwar*, was conducted in 2022 and revealed a similar multiplicity of its interpretation: the *shalwar* was perceived as a symbol of progressive gender neutrality in the West and as an epitome of traditionalism in the East (Celikkol, 2022).

A valuable observation is made by Jardim who notes that clothes play the critical role in “defining social interactions” (Jardim, 2019, p. 72). Jardim examines the corset in the West and the veil in Muslim cultures to argue that these clothes erase the marks of the subject and help enter social interactions as social roles rather than individuals (Jardim, 2019, p. 69). Thus, clothes “become a major social actor” (Jardim, 2019, p. 72) instrumental for “the complete con-formation to the rules and conventions of society, or its destruction” (Jardim, 2019, p. 72).

Mask-wearing during the 2020 pandemic encourages Jardim to compare semiotics of the niqab and the surgical mask. She notes that “the covering of the face is the rawest form of denying individual subjectivity and installing a (collective) role which, in its turn, is constructed around specific positions in the situation of communication” (Jardim, 2020, p. 169). Hence, the niqab marks the feminine role and corresponds to one narrative. The functions of the surgical mask are twofold: it both correlates a surgeon with the medical profession and sacralizes the surgeon's figure. However, when worn by a civilian during the pandemic, “the mask installs the role of *cooperator* with the maintenance of social order and collective health” (Jardim, 2020, p. 169). The narrative of civilian mask-wearers is that of compliance with the order to curb the virus. Moreover, the mask becomes an object that “promotes the preservation of the totality, the collective social organism of a Nation” (Jardim, 2020, p. 173), while the niqab helps maintain a social organism of the Ummah (Jardim, 2021, p. 173). Jardim concludes that the religious and the medical items produce similar thematic roles of the ‘complying citizen’ or the ‘believer’: they aim at preserving the social order. According to Jardim, “[t]he only difference seems to be the addresser one fears: the Government or God” (Jardim, 2021, p. 175).

Leone is among the first who published a comparative analysis of the interpretations given to the surgical mask in the East and the West. He also looks into how these meanings play out in different cultural contexts during the coronavirus pandemic. In (Leone, 2020), he puts forward the assumption of the “progressive ‘semiotisation’ of the medical face mask” that results in “the creation of local cultures, in which this facial medical device interacts with pre-existing cultures of the face and of the mask” (Leone, 2020, p. 47). While writing his article in 2020, Leone pointed out the “traumatic medicalization of the face” (Leone, 2020, p. 56) and insisted on the urgency of “a new semiotics of the medical face mask” (Leone, 2020, p. 57).

Leone grasps the inherent peculiarities of the medical mask and its paradoxical usages of that moment. In particular, he points out that the mask differs from, for example, a hat or a pair of sunglasses, in that it is not worn “for purposes of signification and communication” (Leone, 2020, p. 58). According to (Leone, 2020), for a Westerner, the denotation of the medical mask is a protective object, while its connotation is “inseparable from an idea of emergency, risk, and danger” (p. 58). Yet, the pandemic made the meaning of mask-wearing ambiguous: it became obscure who the mask protected – the mask-wearer or the people around or, as (Martinelli et al., 2021) put it, the pandemic brought about “a collapse between the status of *being at risk* and *being a risk*” (Martinelli et al., 2021, p. 613). In 2020, people wearing masks were seen as cautious and those who broke the rule presented a potential danger (Leone, 2020, p. 59–60).

Alongside the uniformity of the mask, studies argue for the connection between the mask and identity expression. (Martinelli et al., 2021) applied qualitative descriptive analysis to frame “the four dimensions of the societal and personal practices of wearing (or not wearing) face masks: individual perceptions of

infection risk, personal interpretations of responsibility and solidarity, cultural traditions and religious imprinting, and the need of expressing identity” (Martinelli et al., 2021, p. 606).

Interestingly, whereas in China, for example, mask-wearing was “mostly a public health issue rather than a political issue” and the mask became a moral symbol that “reduces wearers’ deviant behaviour by heightening their moral awareness” (Lu et al., 2022, p.1), the mask turned into a means of social positioning tightly bound with politics in the USA. In particular, examining the US discourse of powerful anti-masking movement that coincided with the 2020 presidential election, where the candidates, Joe Biden and Donald Trump, held the opposite views on COVID-related restrictive measures, Kahn distinguishes three metaphors used by US anti-maskers. The metaphor ‘Mask wearers are sheep’ suggests that mask-wearers obediently follow the herd and ‘are easily fleeced’. The metaphor also brings up the images of ‘wolves’ and ‘shepherds’ (Kahn, 2022, 2397). The metaphor ‘Masks are COVID-burqas’ draws on the idea of otherness and relates the surgical mask to *burqa* seen as a symbol of oppression and submission. The third metaphor, ‘Masks are an unfree act’, presents the mask as an item that strips people of their identity and is “incompatible to a democratic society” (Kahn, 2022, 2403).

The previous research has not yet targeted closely the communicative value of the mask in the years 2020–2022, so this study is relevant as it is aimed at exploring the mask from the perspective of the messages sent by its design.

Methodology

The research is a qualitative study that draws on Barthes’ idea of semiology of clothing as syntactic rather than lexical: the meaning of clothes comes not from items as such but rather from their functions and oppositions (Barthes, 2013, p. 28). In other words, just like a syntactical unit in a language acquires its meaning in a sentence, the meaning of the mask in 2020–2022 is contextualized and its communicative value may be understood only within its social and cultural environment. Thus, the standard semiotic method helps to explore the meanings expressed in the mask and embedded in broader social contexts.

The methodology of the study employs multimodal analysis developed by Kress & Van Leeuwen (Kress & Van Leeuwen, 1996; Kress & Van Leeuwen, 2001) that provides the tools to research multiple codes used in human communication (e.g., memes (How, 2022) and TikTokers’ posts (Popivniak et al., 2022)). In this research, the multimodal approach was applied to examine the contribution of verbal and visual means to the message conveyed by masks during the coronavirus pandemic.

The first stage of the research aimed at clarifying the nomenclature of face coverings and their nominations so as to identify the place of the medical mask among face-covering accessories. To achieve this objective, the study examined dictionary definitions, encyclopedias and reference sources such as the sites of the World Health Organization, the European Union Aviation Safety Agency, etc.

The second stage consisted of continuously collecting mask images from photos in English-language mass media online publications as well as from advertisements of masks offered for sale by online shops that emerged online in 2020–2022. The sampling yielded 83 images (21 photos accompanying mass media articles and 62 online shop advertisements).

The third stage involved employing multimodal analysis tools: the mask was approached as a multimodal text that performs ideational, textual and interpersonal metafunctions. Accordingly, the research viewed mask elements as units selected to represent ideas, arranged coherently and used to produce an effect on others. Thus, the communicative value of any mask was seen as an aggregate of its verbals and nonverbals and tightly bound to the political and social context of 2020–2022.

The approach and the design of the research entail certain limitations. First of all, employing the qualitative method presupposes the researcher’s subjectivity and, therefore, the possibility of other interpretations. Second, the size of the sample and the lack of information about the actual popularity of certain mask designs may be seen as a deficiency of the research.

Results and Discussion

'Medical mask' in the nomenclature of face covering

The umbrella term '*face covering*' that denotes the '*veil*' and tends to be associated nowadays with an accessory worn by women to cover their head and shoulders in Eastern countries ("Veil", Merriam-Webster, n. d. d) is the main nomination referring to a piece of cloth used to cover the lower part of the face. Its variants are '*burqa*' and '*niqab*'. Another type of '*face covering*' is '*face shield*' usually made of clear plastic ("Face shield", Merriam-Webster, n. d. c) (see Figure 1).



Figure 1. Face covering: burqa, niqab, face shield.

Source: *(Fluentes, 2014); ** (Al Shams Abayas, n.d.); *** (Amazon, n.d., c)

Approached from this perspective, '*mask*' is yet another type of '*face covering*' along with *veil* and *face shield*. The lexeme '*mask*' denotes a wide range of objects that are essentially a piece of cloth with a variety of functions. Besides the first meaning, i.e., "a protective covering for the face or part of the face" ("Face mask", Merriam-Webster, n. d., a), Merriam-Webster Dictionary offers other definitions: "a cover or a partial cover of the face used for disguise", "a figure of a face worn on the stage in antiquity to identify the character and project the voice", "a grotesque false face worn at carnivals or in rituals", etc. ("Mask", Merriam-Webster, n. d., b). Thus, masks are categorised into protective, ritual, festive and theatrical.

Subtleties of '*protective mask*' came to the fore in 2020. In their entries, dictionaries are careful to highlight the nuances of '*mask*', '*non-medical face mask (community mask)*' and '*medical face mask (surgical or procedural mask)*'. In particular, '*protective mask*', also known as '*non-medical face mask*' or '*community mask*', refers to "various forms of self-made and commercially available masks, including re-usable face covers made of cloth, other textiles and other disposable materials" (EASA, n. d.). These masks do not adhere to any standards and may not be used in hospitals by healthcare professionals.

The '*medical face mask (surgical or procedural mask)*' denotes an object that meets definite standards:

a medical face mask (also known as a surgical or procedural mask) is a medical device covering the mouth, nose and chin ensuring a barrier that limits the transition of an infective agent between the hospital staff and the patient. They are used to prevent large respiratory droplets and splashes from reaching the mouth and the nose of the wearer and help reduce and/or control at the source the spread of large respiratory droplets from the person wearing the face mask. Medical masks comply with the requirements defined in European Standard EN 14683:2019+AC2019 (EASA, n. d.).

Our research focuses primarily on the communicative value of the '*protective mask*', i.e., the study considers messages conveyed by '*community masks*' and '*medical masks*': both of them were acceptable due to the dire shortage of medical masks at the beginning of the pandemic even for frontline workers (medical staff) (World Health Organization, 2020), which made governments compromise the rigidity of the standard requirements and turned community masks into the most common protective item. In the northern Italian region of Lombardy, for example, the authorities enforced the legal obligation for everyone to wear a mask in public places and allowed to wear scarves to cover one's nose and mouth instead of

medical masks (Leone, 2020, p. 61). As a result, people had to resort to ‘community masks’, self-made or improvised masks (for example, ‘face scarves’ (see Figure 2):



Figure 2. Face covering scarf.
 Source: (Fridaze., n.d.)

Communicative value of the mask in politically charged settings

The mask as identity disguise

“The face is a fundamental interface of human interaction” (Leone, 2020, p. 65), and it is the face that tops the list of other biometrics along with fingerprints, retina, voice, etc. (Gillis, 2021). It is not surprising that medical masks have often been used in civil marches, demonstrations and protests whose participants wanted to remain unidentified. This is what happened in Kyiv, Ukraine, in December, 2013, in Hong Kong in June, 2019, all over the United States during the 2020 BLM demonstrations, in the US Capitol in January, 2021, or in Bogota, Colombia, in May, 2021 (see Figure 3). Moreover, the bans on wearing face covering imposed by the Ukrainian government in 2014 and by the Hong Kong government in 2019 immediately brought masked protesters into the streets. The people defied the governments’ intention to limit the ability to expose or conceal their faces (and, consequently, identities).



Figure 3. Masked protesters in Chicago, USA (Nam, 2020), and Bogota, Colombia (Agarita, 2021)

The community mask as a statement of political affiliation

At the beginning of the pandemic, when mask-wearing was made obligatory and medical masks were scarce, mask-manufacturing companies sprang up and started offering community masks of various designs. Since the target consumer was literally everybody, the manufacturers tried to adjust them to proponents of various

social trends popular at that moment. Hence, the plain surface of the mask was modified by adding a variety of non-verbal and verbal elements. As a result, community masks preserved their protective function and simultaneously turned into space for political statements.

May 2020 was marked not only by the gradual removal of the lockdown restrictions but also by the rise of the BLM movement, which immediately found its way onto the community mask surface. Figure 4 contains the masks that inform of the wearers' support to the BLM movement. Here, the nonverbals are the colours (black and white), the raised up clenched fist and, on one mask, the flag of the USA that localizes the protester. The verbals are the slogan "BLACK LIVES MATTER" and "I CAN'T BREATHE", the last words of George Floyd whose murder set off the protests. The "I can't breathe" mask is creative because it features the clenched fist instead of the pronoun 'I'.



Figure 4. Community masks with BLM-related slogans (Saris & Things, n.d.)

Another milestone of 2020 and early 2021 was the presidential race in the USA. Mask surfaces started displaying Americans' voting preferences and, therefore, their communicative value became that of an electioneering tool. Interestingly, there is an overwhelming disproportion between pro-Trump and pro-Biden masks, with the former outnumbering the latter by a 3 to 1 ratio.

Pro-Trump masks may be divided into two groups: one group is pro-Trump proper and the other is explicitly anti-Biden.

Figure 5 features the masks of the 'pro-Trump proper' type. On masks 1 and 2, one finds the pivotal slogan "MAKE AMERICA GREAT AGAIN" (or its MAGA abbreviation), based on the assonance of /ei/. The slogan of mask 3, "*Jesus is my savior. Trump is my president*", draws on syntactic parallelism (S + link verb + Predicative): Trump's core supporters (conservative Christians) recognize no other saviour but Jesus and, similarly, they do not see any alternative to Trump as the president. The slogan "I STAND WITH TRUMP" on mask 4 is a straightforward statement of political preferences. The masks are multimodal: their verbals are supported by meaningful choices of the colour (red is the colour of the US Republican party (masks 1 and 2)), the image of the US flag, and the heart that stands for U in 'Trump' and the pattern of the US flag, respectively.





Figure 5. Pro-Trump community masks (1 (Etsy, n.d., a); 2 (CapWholesalers, n.d.); 3 (myutopia, n.d.); 4 (Amazon, n.d., a))

The second group of masks designed for Trumpists is not straightforwardly pro-Trump but is blatantly anti-Biden. In Figure 6, for example, the slogan “*This mask is as useless as Joe Biden*” on mask 1 claims that mask-wearing policies supported by Biden and criticized by Trump are just as ineffective as the Democrats’ leader himself. The verbals on mask 2 imply the equivalence between being *pro-American* and being *anti-Biden*. The idea of equivalence is boosted by the structural (i.e., semi-suffix + proper noun) similarity of the words *Pro-America* and *Anti-Biden*. The verbal messages of the masks are complemented with the nonverbal elements: the patriotic *Pro-America* component features the colours of the American flag (the blue background, the white first two lines, the red third line), stars and stripes, which contrasts with the white monochromatic letters of the *Anti-Biden* word; the similarity of the hyphenated spelling of the two words suggests that they are synonyms.

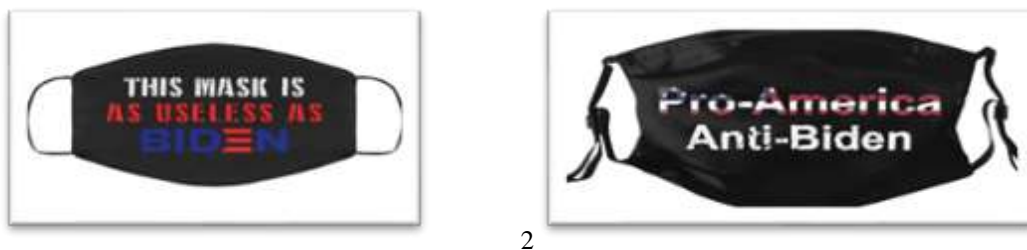


Figure 6. Anti-Biden pro-Trump community masks (1 (Etsy, n.d., b); 2 (Amazon, n.d., b))

As it has been mentioned, explicitly pro-Biden masks are few. The reason for the scarcity may be the fact that pro-Biden messages were sent by the masks propagating Biden’s policies (e.g., mask-wearing, vaccination, revisionism of colonization and interracial relations promoted by the BLM movement). The sample contains only one mask that sends an implicit anti-Trump and, therefore, pro-Biden message (see Figure 7), “*Make Politics Boring Again*”. The mask is red and white, there are no remarkable nonverbals but the text itself is memorable because it alludes to Trump’s “*Make America Great Again*” as well as to Trump’s bright and outspoken performance both as a showman and a politician.



Figure 7. Pro-Biden community mask (Redbubble, n.d., c)

The community mask as an instrument of social positioning

Social life during the Covid-19 pandemic was determined by the two policies: lockdown and obligatory vaccination.

The key slogan of early 2020 was “*Stay home, stay safe*”, the motto of the lockdown (Figure 8). On the surface, it is only logical that this catchphrase appeared on the mask that became iconic, yet, one can’t help noticing the paradoxical controversy of its purpose and slogan: one puts on the ‘stay-home’ mask right at the moment of leaving home.



Figure 8. Community mask with ‘STAY HOME’ slogan (Needen, n.d.)

Alongside the presidential election, the landmark of the second half of 2020 and the entire 2021 was the vaccination issue. Though there appeared several vaccines (Pfizer, Moderna, CoronaVac and AstraZeneca), it was the Pfizer vaccine that gained the status of the ‘elite’ one. People sought a Pfizer, bloggers boasted their Pfizer jabs and mocked the losers who had to do with anything but a Pfizer (Popivniak et al., 2022).

Masks provided people with an extra space to position themselves as vaccinated or unvaccinated. Interestingly, compared to other vaccines, Pfizer masks are more numerous and creative. Hence, one may argue that community mask producers reacted to the vaccination trend and made masks that helped their owners inform that they had been vaccinated. They could choose to be more specific and enhance their image by claiming access to the elite vaccine.

Figure 9 displays masks with neologisms coined during the pandemic. Obviously, the noun *Pfizer*, originally the name of a pharmaceutical company, was turned into a common noun to refer to a vaccine through a metonymic transfer in *I took PFIZER* (mask 1) and was further converted to the verb *to Pfizer* in *I’ve been PFIZERED* (mask 2). The consonant cluster *PF* uncommon for the English language evokes associations with the glamorous vaccine. This phonetic feature is used in the playful *I PFEEL PFINE* (mask 1). To draw attention to the similarity, the graphically highlighted words on the mask are those that start with *PF*. Two of the three masks in Figure 9 contain the image of a syringe, which makes it clear that out of the whole range of Pfizer’s products, it is the vaccine that is meant.



1



2



3

Figure 9. Pfizer-based community mask (1 (Redbubble, n.d., f); 2 (Redbubble, n.d., b); 3 (Redbubble, n.d., e))

Paradoxically, community masks were also used by anti-maskers to protest against mask-wearing, expressing the protest by verbalizing the 'sheep' metaphor on mask surfaces. Mask (1) in Figure 10 is multimodal: the sheep with the US-flag pattern specifies the location, the image of the animal combined with the text *The nation of sheep will beget a government of wolves* implies that people's obedient compliance with the masking policies will entail tyranny of authorities. Mask (2) is no less metaphorical. It does not name submissive mask-wearers 'sheep' but it features an image of a sheep and the verb *obey* suggesting that those who wear masks are obedient sheep.



1



2

Figure 10. Ani-mask community masks, 1 (Redbubble, n.d., a); 2 (Redbubble, n.d., d)

Another communicative value of the mask was the statement of prestige. Since masks became mandatory, fashionable clothes brands began including this accessory in their ensembles. The status claim was made by the logo of, for example, Louis Vuitton or Chanel (see Figure 11) that informed of their wearers' social status and purchasing power.



1



2

Figure 11. Louis Vuitton (eBay, n.d.) and Chanel (Rose, 2020) community mask.

The community mask as a means of personality expression

Along with providing surfaces for statements of political and social positioning, community masks could be designed and marketed as markers of their wearer's psychological state or self-perception. The connection between a personality type (or mood) and the pattern and colours of the mask was determined by the mask manufacturer that classified them as such with verbal labels. Figure 12 displays personality-based masks without any verbal components that are marketed under the labels of “creative”, “dramatic”, “romantic”, etc. (Davis, 2020). The marketing labels rely entirely on the stereotypes of visual (colours and patterns) representation of ‘creativity’ (abstract patterns and bright colours), ‘dramatism’ (black and white geometry with sharp angles), ‘romanticism’ (flowery pattern), ‘classicism’ (black and white polka dots) and ‘chic’ (the monochrome beige).



Figure 12. Personality- and mood-based community masks (Davis, 2020).

The masks functioned to specify the wearer's personality type and/or mood. Presumably, the choice of a mask was influenced not only by one's intuitive preferences for colours and patterns, but also by the producer's verbal labels accompanying each item.

Thus, the trajectory the *protective mask* made during the pandemic when it started as the rigidly standardized *medical mask* and ended up with a wide range of *community masks* shows how what set out as a homogeneous part of a professional uniform was modified, personalized and appropriated as soon as this item became a compulsory accessory of everybody's outdoor outfit.

The semiotics of the mask should be viewed ‘syntactically’ rather than ‘lexically’. In other words, the mask is not a ‘lexeme’ but a ‘syntagm’ whose meaning is the sum of its verbal and nonverbal elements. As Kress and Van Leeuwen (1996) argue, “not everything that can be realized in language can also be realized by means of images, or vice versa” (Kress & Van Leeuwen, 1996, p. 17). In the case of protective masks, nonverbals (colours, patterns and images) make the message ‘set the tune’ (for example, determine political affiliation, attitude or ‘mood’), whereas the verbals are elements that make the message more specific and add rhetorical sophistication.

The study into the mask during the pandemic brings up the issue of interdiscursivity and supports the statement that “discourses are linked to each other in various ways” (Reisigl & Wodak, 2017, p. 90): the mask-wearing practices overlap with discourses on fashion, on freedom and human rights, on social responsibility, on cultural, religious, professional and personal identity, etc. Making sense of different attitudes to mask-wearing in different social groups and geographical areas is impossible without considering historical and cultural peculiarities of these groups. Since the face is an important semiotic component of human communication, the ways the face is handled during interactions vary across cultural and political systems. Any new accessory or practice that modifies the face gets immediately noticed and assessed triggering instinctive reactions. The mask as a mandatory item sparked fierce debate and resistance

in the West because it undermined the conventions of Western society, which was aggravated by the perceived opposition to the Islamic tradition.

Communicative functions of the mask that evolved from a medical item into a meaningful element that informed of its wearer's ideology, political preferences, social status, personality and, in a way, even lifted the confidentiality of one's health record make it comparable to profile pictures on social media or accompanying slogans on Instagram and Telegram. One may also argue that masks turned into another element of linguistic landscapes and were used as space to transmit political or personal messages.

The findings of the research are by no means exhaustive due to the qualitative method where researchers' interpretations inevitably impact the study. This research attempted to overcome this limitation through co-authorship, where the co-authors tried to be aware of their subjectivity and to neutralise each other's bias. The limitation related to the sample, its size and lack of detailed information about the popularity of the mask designs in the United States in general and certain states (or cities, towns) in particular may be seen as potential issues for further investigation. However, street photographs in the sample may be seen as evidence of widely worn designs. On the other hand, it is impossible to clarify the demand for masks offered by e-shops, though some of the items were marked as sold out in early 2023, which may substantiate the assumption that the sample represents the mainstream trends in 2020–2022.

Conclusions

Introducing compulsory mask-wearing during the coronavirus pandemic brought about the transformation of both the protective mask and its function in everyday discourse. Initially, the meaning of the protective mask was primarily the medical mask that was an accessory of health care workers and, at times, their patients. Correspondingly, the medical mask was 'scientific', standardized and discursively unambiguous. As medical masks were scarce at the beginning of the pandemic, its substitute, the community mask, with all its variety, became an obligatory everyday item worn by everyone outside their home.

The semiotic analysis of the community masks worn during the coronavirus pandemic uncovers their communicative value provided by the multimodality of their design. In 2020–2022, the mask turned into the surface used to make public statements on the wearer's political, social and personal positioning.

Verbal and nonverbal elements of the masks convey meanings that form a 'syntagm' and shape the final message. The nonverbals such as colours, patterns, images tend to appeal to shared background knowledge (the colours and the pattern of the US flag evoke the idea of national belonging, the red colour refers to the Republican party, a syringe is a metonymy for medicine and vaccination, the flowery pattern stands for romantic mood, etc.).

The verbal elements in their turn make the message more specific, contextualize it, incorporate it into the current political and social discourse. The verbal components of the community masks contain syntactic parallelisms, metaphors, allusions, neologisms and word play, which attracts attention and makes the messages memorable.

This research is woven into modern communication studies. On the whole, the 'mask case' highlights the overwhelming trend towards multimodal interactions in the 21st century. In particular, it demonstrates that when the individuality of the face was replaced by the uniformity of the mask, it was mask surfaces that people started using to inform of their personal, social and political identity. In addition, the sample reveals the impact of digital communication on face-to-face interactions, namely the similarity between masks and social media profiles. Another important conclusion the research suggests is that, used to take a stand on political and social issues, the mask was conducive to developing participatory culture.

The current research may be furthered by a comparative study of mask-wearing practices and attitudes towards the mask in different cultures during the pandemic. Another potential field of study may be the evolution of the mask after the pandemic. Presumably, it has transformed into neck gaiters (or neck warmers) worn by activists to send political messages during the ongoing 2024 presidential race in the USA.

Bibliographic References

- Agarita, N. (2021). *Colombian demonstrators take to the streets in anti-government protests demanding the end to police violence and greater economic support as COVID-19 rages* [Photograph]. Aljazeera. Retrieved from: <https://www.aljazeera.com/news/2021/5/12/colombia-enters-third-week-of-anti-government-protests>
- Aiello, G., Kennedy, H., Anderson, C. W., & Mørk Røstvik, C. (2022). 'Generic visuals' of Covid-19 in the news: Invoking banal belonging through symbolic reiteration. *International Journal of Cultural Studies*, 25(3 – 4), 309-330. <http://doi.org/10.1177/13678779211061415>
- Al Shams Abayas. (n.d.). *Beda Half Niqab Navy 2*. [Photograph]. Retrieved from: https://www.shamswear.com/cdn/shop/products/BedaHalfNiqabNavy2_700x.jpg?v=1635348760
- Amazon (n.d., a). *Rqwaaed I Stand With Trump Face Mask Adjustable Breathable Balaclava With Filter* [Photograph]. Retrieved from: <https://www.amazon.com/Rqwaaed-Adjustable-Breathable-Balaclava-Filter/dp/B0D7Q4L56V>
- Amazon (n.d., b). *Pro America Anti Biden Face Mask with 2 Filter Adjustable Breathable Reusable Dust Mask* [Photograph]. Retrieved from: <https://www.amazon.com/America-Filter-Adjustable-Breathable-Reusable/dp/B09VFMM7NG>
- Amazon (n.d., c). *10pcs Safety Face Shield with Clear Adjustable Protective Visor Film, Anti-Saliva/Anti-Spitting Splash/Anti-Fog Facial Cover for Women Men, Resistant to External Intrusion*. [Photograph]. Retrieved from: <https://www.amazon.com/Adjustable-Protective-Anti-Saliva-Anti-Spitting-Resistant/dp/B086GVP8DP>
- Barthes, R. (2013). *The Language of Fashion*. Sydney: Bloomsbury.
- CapWholesalers. (n.d.). *Pre-Decorated MAGA Mask* [Photograph]. Retrieved from: <https://www.capwholesalers.com/pre-decorated-maga-mask-ships-approx-7-14-days>
- Celikkol, Y. (2022). Progressive in the West, backward in the East. Shalwar's trials with modernity. *International Journal of Cultural Studies*, 25(5), 518-535. <https://doi.org/10.1177/13678779221094058>
- Davis, N. (2020). *Facing Up To Face Masks*. MyPersonalStyle. Retrieved from <https://mypersonalstyle.co.uk/facing-up-to-face-masks>
- EASA. (n.d.). *What is meant by a "medical face mask"?* Retrieved from: <https://www.easa.europa.eu/en/faq/115286>
- eBay. (n.d.). *NEW LOUIS VUITTON Monogram Brown Knit Face Mask S00 M76747* [Photograph]. Retrieved from: <https://www.ebay.com/itm/186690614750>
- Entwistle, J. (2000). *The Fashioned Body: Fashion, Dress and Modern Social Theory*. Cambridge: Polity Press.
- Etsy (n.d., a). *Make America Great Again Mask Three Layer Cotton Reusable Washable Maga Face Mask Free Shipping within USA Trump 2020 Mask* [Photograph]. Retrieved from: <https://www.etsy.com/listing/846841875/make-america-great-again-mask-three>
- Etsy (n.d., b). *Useless Biden Face Mask - Sarcastic President Face Cover Trump Supporter* [Photograph]. Retrieved from: <https://www.etsy.com/listing/984330841/useless-biden-face-mask-sarcastic>
- Fluentes, G. (2014). *A woman wearing a burqa* [Photograph]. The Guardian. Retrieved from: <https://www.theguardian.com/world/2014/jul/01/france-burqa-ban-upheld-human-rights-court>
- Fridaze. (n.d.). *Silks by Fridaze Premium Face Masks Scarf – Coral Blocks* [Photograph]. Retrieved from <https://www.shopfridaze.com/products/silks-by-fridaze-premium-face-masks-scarf-orange-blocks>
- Frosh, P., & Georgiou, M. (2022). Covid-19: The cultural constructions of a global crisis. *International Journal of Cultural Studies*, 25(3–4), 233-252. <https://doi.org/10.1177/13678779221095106>
- Gillis, A.S. (2021). *Biometrics*. TechTarget. Retrieved from: <https://www.techtarget.com/searchsecurity/definition/biometrics>
- Hlávka, J., & Rose, A. (2023). *COVID-19's Total Cost to the U.S. Economy Will Reach \$14 Trillion by End of 2023*. USC Schaeffer. Retrieved from: <https://acortar.link/VuofTs>
- How, C. (2022). What do they Really "Meme"? A Multimodal Study on 'Siakap Langkawi' Memes as Tools for Humour and Marketing. *3 L: Language, Linguistics, Literature, The Southeast Asian Journal of English Language Studies*, 28(2), 160-180. <https://doi.org/10.17576/3L-2022-2802-11>
- Hu, E. (2022). *How COVID-19 Has Magnified Pre-existing Inequalities in the US*. Global Development Policy Center. Retrieved from: <https://acortar.link/xiiwic>
- Jardim, M. (2019). The corset and the veil as disruptive manifestations of clothing: the tightlaced and the Tuareg. *dObra[s]* 11(25), 54-74.
- Jardim, M. (2020). The Corset and the Hijab Absence and Presence in the 19th- and 20th-century Fashion System. *Actes Sémiotiques*, 123, 1-20, Available at: <https://research.uca.ac.uk/5439/>



- Jardim, M. (2021). On Niqabs and Surgical Masks: a Trajectory of Covered Faces. *Lexia. Semiotics Journal*, 37–38, 165-177. <http://doi.org/10.4399/97888255385338>
- Kahn, R. (2022). COVID Masks as Semiotic Expressions of Hate. *International Journal of the Semiotics of Law*, 35, 2391-2407. DOI: 10.1007/s11196-022-09885-7
- Klepikova, O., Kachuriner, V., Makoda, V., Kryvosheyina, I., & Popeliuk, V. (2021). Protection of public interests by narrowing private interests: where is the limit? *Amazonia Investiga*, 10(38), 148-157. <https://doi.org/10.34069/AI/2021.38.02.14>
- Kress, G., & Van Leeuwen, T. (1996). *Reading Images: The Grammar of Visual Design*. London: Routledge.
- Kress, G., & Van Leeuwen, T. (2001). *Multimodal discourse: The modes and media of contemporary communication*. London: Arnold Publishers.
- Leone, M. (2020). The Semiotics of the Medical Face Mask: East and West. *Signs & Media*, 1, 40-70. <http://doi.org/10.1163/25900323-12340004>
- Lu, J.G., Song, L.L., Zheng, Y., & Wang, L.C. (2022). Masks as a moral symbol: Masks reduce wearers' deviant behavior in China during COVID-19. *PANS* 119(41), 1-12. <https://doi.org/10.1073/pnas.2211144119>
- Manalastas, N. E. L. (2023). (De-)Monsterring COVID-19: a diachronic study of COVID-19 virus multimodal metaphors in Philippine editorial cartoons, 2019–2022. *Multimodal Communication*, 12(3), 207-222. <http://doi.org/10.1515/mc-2023-0015>
- Martinelli, L., Kopilaš, V., Vidmar, M., Heavin, C., Machado, H., Todorović, Z., Buzas, N., Pot, M., Prainsack, B., & Gajović, S. (2021). Face Masks During the COVID-19 Pandemic: A Simple Protection Tool with Many Meanings. *Frontiers in Public Health*, 8, 606-635. <http://doi.org/10.3389/fpubh.2020.606635>
- Merriam-Webster. (n.d., a). *Face mask*. In Merriam-Webster.com dictionary. Retrieved from: <https://www.merriam-webster.com/dictionary/face%20mask>
- Merriam-Webster. (n.d., b). *Mask*. In Merriam-Webster.com dictionary. Retrieved from: <https://www.merriam-webster.com/dictionary/mask>
- Merriam-Webster. (n.d., c). *Face shield*. In Merriam-Webster.com dictionary. Retrieved from: <https://www.merriam-webster.com/dictionary/face%20shield>
- Merriam-Webster. (n.d., d). *Veil*. In Merriam-Webster.com dictionary. Retrieved from: <https://www.merriam-webster.com/dictionary/veil>
- Myutopia. (n.d.). *Jesus is my Savior - Trump Is My President Fitted Face Mask w. Adjustable Ear Loops* [Photograph]. Retrieved from: <https://www.myutopiashoutout.com/products/jesus-is-my-savior-trump-is-my-president-fitted-face-mask-w-adjustable-ear-loops>
- Nam, Y. H. (2020). *Protesters in Chicago on Saturday* [Photograph]. Los Angeles Times. Retrieved from: <https://acortar.link/G7kQ1w>
- Navarro, J. A. (2020). *Mask Resistance During a Pandemic Isn't New – in 1918 Many Americans Were 'Slackers'*. The Conversation. Available at: <https://acortar.link/PPKiDu>
- Needen. (n.d.). *Stay Home Mask* [Photograph]. Retrieved from: <https://www.needeen.cz/blank-apparel-accessories-c37029/masks-s41906>
- Pevko, S., Romaniuk, V., Perekopskyi, S., Khan, O., & Shaituro, O. (2022). Legality of restrictions on human rights and freedoms in a Covid-19 Pandemic: The experience of Ukraine. *Amazonia Investiga*, 11(53), 122-131. <https://doi.org/10.34069/AI/2022.53.05.12>
- Phillips, B. (2022). *In 1500s Europe, masks were fashionable – and scandalous*. National Geographic. Available at: <https://acortar.link/1gq6se>
- Popivniak, O., Torosian, O., & Pavlichenko, L. (2022). Shaping the status trend of Covid vaccines on TikTok: Critical Discourse Analysis of bloggers' videos. *Current issues of Ukrainian linguistics: theory and practice*, 47(3), 93-99. <https://doi.org/10.24919/2308-4863/47-3-15>
- Redbubble (n.d., a). *A nation of sheep mask* [Photograph]. Retrieved from: <https://www.redbubble.com/i/mask/A-nation-of-sheep-by-jeremyspokenin/39385341.9G0D8>
- Redbubble (n.d., b). *I've been Pfizered* [Photograph]. Retrieved from: <https://www.redbubble.com/i/mask/I-ve-been-Pfizered-II-by-flevin/76020321.9G0D8>
- Redbubble (n.d., c). *Make politics boring agagin mask* [Photograph]. Retrieved from: <https://acortar.link/ZC49a1>
- Redbubble (n.d., d). *Obey Sheep Mask* [Photograph]. Retrieved from: <https://www.redbubble.com/i/mask/Obey-Sheep-by-SteveGrime/48658694.9G0D8>
- Redbubble (n.d., e). *Peace Love Vaccinate Mask* [Photograph]. Retrieved from: <https://www.redbubble.com/i/mask/Peace-Love-Vaccinate-by-medbdj/90616039.9G0D8>

- Redbubble (n.d., f). *Pfizer face masks for sale* [Photograph]. Retrieved from: https://ih1.redbubble.net/image.2359976425.3106/ur,mask_flatlay_front,product,600x600.u4.jpg
- Reisigl, M., & Wodak, R. (2017). The Discourse-Historical Approach (DHA). In Ruth Wodak & Michael Meyer (eds.), *Methods of Critical Discourse Analysis*, 87,121. SAGE Publications, Ltd. <http://doi.org/10.4135/9780857028020>
- Rose, A. (2020). *A Paris Fashion Week attendee wears a Chanel mask* [Photograph]. Footwear. Retrieved from: <https://footwearnews.com/business/business/chanel-coronavirus-relief-efforts-1202956417/>
- Saris & Things. (n.d.). *4 Pk BLM Black Lives Matter Face Mask Reusable I Can't Breathe Face Cover* [Photograph]. Retrieved from: <https://acortar.link/o9Lzdc>
- Shirazi, F. (2003). *The veil unveiled: the hijab in modern culture*. Gainesville: University Press of Florida.
- Tilstra, A.M., Polizzi, A., Wagner, S., & Akimova, E.T. (2024). Projecting the long-term effects of the COVID-19 pandemic on U.S. population structure. *Nature Communications*, 15, 2409. <https://doi.org/10.1038/s41467-024-46582-4>
- UAB News. (2022). *How the COVID-19 pandemic changed society*. Retrieved from: <https://www.uab.edu/news/youcanuse/item/12697-how-the-covid-19-pandemic-changed-society>
- Wong, J.C. (2021). *The people who want to keep making: 'It's like invisibility cloak'*. The Guardian. Retrieved from: <https://acortar.link/NstZE1>
- World Health Organization. (2020). *Shortage of personal protective equipment endangering health workers worldwide*. Retrieved from: <https://acortar.link/blGoRm>



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Current socio-economic issues of migration regulation: Ukrainian realities and global trends

Актуальні соціально-економічні проблеми міграційного регулювання:
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Abstract

The article discusses migration processes in the first quarter of the 21st century, which have become a characteristic feature of global development and emerged as a global challenge for the future of humanity. One of the factors influencing these processes has been the Russian-Ukrainian war, initiated by the Russian Federation against Ukraine in 2014. Until 2022, this war was perceived by the international community as a localized conflict; however, during this period, it triggered large-scale displacements of people forced to leave their homes due to ethnic cleansing, discrimination, and brutal violations of human rights.

As a result of the large-scale war initiated by Russia against Ukraine, external migration of Ukrainians has reached unprecedented levels,

Анотація

У статті розглянуті міграційні процеси в першій чверті XXI століття, що стали характерною ознакою світового розвитку й вийшли на рівень глобального виклику у подальшому розвитку людства. Одним із чинників, що вплинув на ці процеси, стала російсько-українська війна, розв'язана у 2014 році Російською Федерацією проти України. Ця війна у сприйнятті світової спільноти до 2022 року мала локальний характер, однак уже в цей період вона спровокувала масштабні переміщення людей, які змушені були покинути свої домівки внаслідок етніциду, дискримінації, бруталного порушення прав людини.

Внаслідок широкомасштабної війни, розв'язаної Росією проти України, зовнішня

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particularly in the countries of the European Union. This situation has come as a surprise both to the state leadership and to many Ukrainians who were unprepared for such a turn of events. Ukraine lacked sufficient experience in managing issues related to mass migration, making it extremely difficult to determine the quantitative and qualitative parameters of migration flows under these extraordinary circumstances. This presents challenges not only for the state but also for international organizations trying to provide assistance and support to Ukrainians who have left their homes.

In such conditions, it is crucial to develop effective strategies to support refugees, integrate them into new societies and cultures, and address the social and economic consequences of this migration.

Keywords: migration processes, forced migration, voluntary migration, academic migration, migrants, migration policy.

міграція українців досягла безпрецедентних масштабів, особливо в країнах Європейського Союзу. Ця ситуація стала несподіванкою як для державного керівництва, так і для багатьох українців, які не були готові до такого розвитку подій. Україна не мала достатнього досвіду в управлінні проблемами масової міграції, тому визначити кількісні та якісні параметри міграційних потоків у цих надзвичайних умовах виявилось надзвичайно складно. Це створює виклики не лише для держави, а й для міжнародних організацій, які намагаються надати допомогу та підтримку українцям, що покинули свої домівки.

У таких умовах важливо розробити ефективні стратегії для підтримки біженців, інтеграції їх у нові суспільства, культури та вирішити соціальні та економічні наслідки цієї міграції.

Ключові слова: міграційні процеси, вимушена міграція, добровільна міграція, академічна міграція, мігранти, міграційна політика.

Introduction

Migration processes are a fundamental aspect of human development. Since the early twentieth century, they have become a pervasive phenomenon, affecting almost every country globally. The movement of populations from one region to another triggers significant socio-economic, political, cultural, religious, and demographic transformations. The primary determinants of migration include:

- ✓ Economic factors (such as the pursuit of better living conditions and employment opportunities),
- ✓ Socio-political drivers (including local and global conflicts, wars, discrimination, and persecution),
- ✓ Natural causes (such as natural disasters).

Consequently, migration can be categorized into voluntary and forced types. Economic motivations typically drive voluntary migration, whereas forced migration is often a result of political persecution, military conflicts, or natural disasters, representing a crucial means of ensuring human survival and development. «The ongoing war between Russia and Ukraine is not merely a contemporary geopolitical struggle; it is a complex narrative woven with historical threads that extend deep into the annals of time. Amidst the modern dynamics of this war, a peculiar dimension surfaces –Russia's deliberate ascription of certain narratives from Ukrainian history, particularly those rooted in the ancient past. This strategic incorporation of historical narratives adds a layer of complexity to the conflict, highlighting the interplay between history, geopolitics, and national identity. Therefore, the modern Russian-Ukrainian war is not merely a clash of military forces on the battlefield; it is a manifestation of historical grievances, territorial disputes, and competing geopolitical ambitions» (Derviş, 2024).

Moreover, migration is influenced by both uncontrollable and controllable factors. Uncontrollable factors encompass natural conditions and geographical locations, whereas controllable factors include demographic attributes like population growth, age and gender composition, and the ethnic makeup of indigenous populations and migrants. Socio-psychological factors also play a

role, including the intensity of social interactions, living conditions, and the level of communication development.

Despite advancements in international cooperation and the establishment of organizations aimed at maintaining global peace and security, armed conflicts persist in various regions such as Libya, Syria, Mali, Israel, Iran, and Ukraine (due to Russia's war of aggression against the Ukrainian people), perpetuating substantial refugee flows worldwide. Migrants' reception varies globally. For instance, the United States, Israel, and Hungary enforce stringent legislative controls over migration processes; Australia and Canada adopt a balanced approach with entry questionnaires; and the United Arab Emirates regulates labor migration with specific policies that restrict the permanency of residence for workers from countries like Pakistan, Malaysia, and India. Conversely, many European countries are experiencing challenges due to increasing migrant inflows from Africa, Asia, and other regions, significantly altering the continent's economic, demographic, religious, and ethnic landscapes and frequently catalyzing various scales and types of conflicts.

The article consists of an introduction, three sections, conclusions and a list of references. The article is one of the first systematic attempts to investigate the pace of migration from Ukraine since 2022. The article focuses attention on the reasons and scope of migration, which will allow further research to determine the ways of re-emigration.

Literature Review

Migration processes are one of the characteristic features of modern societal development. Scientific literature primarily focuses on statistical data related to migration. However, as M. Kasyanova points out, quantitative indicators vary significantly because they depend on many factors, including state statistical agencies, migration services, and others. The war complicates trust in data obtained under unusual circumstances. This study utilizes data provided by the UN, which states that Ukraine ranks among the top ten countries in the world with the highest number of international migrants.

The research emphasizes that this wave of migration is uneven, fluid, and difficult to track. This is due to the fact that people who left at the beginning of the war have already returned, while others have left without registering with consulates. Additionally, some remain in European countries in transit, waiting for visas to the USA and Canada. The study of migration processes continues as the war persists, making it impossible to assess the demographic situation or make predictions. Another pressing issue is the need to develop reintegration strategies, which should be implemented immediately after the cessation of hostilities.

Europe has not experienced such intensity of migration since the Second World War. A survey by the UNHCR reveals that 87% of migrants are women with children, and 65% of these women are of working age, between 18 to 59 years old. Furthermore, approximately 70% of the migrants surveyed possess a university degree (Pyshnyi, 2022). These statistics reflect that migrants are not an economic burden for European countries; rather, they represent a substantial social and human capital. During the nine months following the onset of the full-scale war in Ukraine, migrants have provided significant economic impetus to Europe. Firstly, Ukrainian spending abroad has surged notably. According to the National Bank of Ukraine (NBU), the volume of imports of services under the travel item increased dramatically in 2022, reaching up to \$2 billion per month. Secondly, from March to October, over eight months, Ukrainians spent more than \$15 billion abroad (Pyshnyi, 2022).

Ukrainian sociologists have noted that the war has significantly complicated the credibility of sociological data collected under unusual conditions. They caution that, given the "extremely short distance of observation in 2022, the reliability of judgements and statements is constantly

in doubt due to the high dynamics of the extraordinary situation." As a result, they argue that "the true cognitive status of confirmation or refutation of reliability will be revealed only later" (Dembitskyi et al., 2022, p. 20). This skepticism underlines the challenges of conducting and interpreting sociological research in contexts disrupted by rapid and profound changes, suggesting that conclusions drawn from such data are provisional and subject to future validation.

A. Suprunovskiy, who expresses a similar judgement, specifies the reasons for this and draws attention to the need to observe chronological sequence in recording quantitative indicators of migration: 'Despite the existing scale of forced migration in Ukraine under martial law, information on the volume of such movements is rather relative. This is understandable, as the characteristics of the composition and directions of migration are constantly changing. The hostilities are ongoing, which means that civilians continue to evacuate or leave of their own free will from dangerous regions of the country. At the same time, the liberation of some of the previously occupied territories by the Ukrainian Armed Forces and the reduction of panic have enabled some displaced persons to return to their homes. This requires that each time the statistical indicators of forced migration are assessed, the date of their formation should be taken into account' (Suprunovskiy, 2022, p. 475).

The number of Ukrainian migrants has significantly exceeded any predictions. It is impossible to hold those making such predictions accountable, as none of the developed scenarios by migration specialists could foresee the full-scale Russian invasion of Ukraine, and consequently, the large-scale migration of the population from Ukraine. In this regard, I. Malik notes: "In the lives of Ukrainians, there is only a conditional 'before.' There is no conditional 'after.' The quantitative and qualitative social changes are so enormous that it is practically impossible to outline their characteristics and calculate the consequences" (Malik, 2022). According to Ukrainian researchers from the Cedos analytical center, 3.6 million people left Ukraine within the first month of the war (Filipchuk et al., 2022). As stated by the authors Krasnodemska, I., Savitskaya, M., Berezan, V., Tovstukha, O., and Rodchenko, L., the war in Ukraine has created a significant need for psychological support and assistance for citizens. According to a study conducted by the International Organization for Migration, more than 15 million Ukrainians have reported a deterioration in their mental well-being since the start of the full-scale invasion, and almost one in four Ukrainians (23%) are in need of psychological and psychosocial assistance (Krasnodemska et al., 2023).

The situation is complicated by the fact that millions of Ukrainian refugees have found themselves outside the country due to military aggression. Currently, there are various expert estimates regarding how many of them will return to their homeland after the war ends. Many specialists believe that a significant portion of those who have managed to adapt will choose to remain abroad. «It should be noted that it is unlikely that the creators of the «Marshall Plan for Ukraine» will establish economic conditions and offer salary levels that are more attractive than those in Eastern and Central European countries where Ukrainian workers are employed» (UGSPL, 2022).

Therefore, it is quite probable that we will face the paradox of millions of Ukrainians working abroad despite a severe shortage of labor resources, while international recruitment agencies will be bringing a large number of labor immigrants from developing countries to Ukraine.»

Identification of previously unresolved parts of the overall problem. The large-scale war unleashed by Russia against Ukraine has precipitated a surge in the external migration of the Ukrainian population, reaching unprecedented levels, particularly within the European Union. This situation underscores Ukraine's lack of experience in handling large-scale external migration. The extraordinary circumstances of war complicate the recording of quantitative and qualitative parameters of migration. Even in relatively calm periods, problems with statistical data on departures from Ukraine were evident. M. M. Kasyanova highlights these issues, noting, "Identification of quantitative indicators of Ukrainian migration is complicated by internal statistics of individual state institutions, whose data usually vary significantly. The

main source of knowledge about migration is its current accounting, which is carried out by the State Statistics Service of Ukraine based on data on registration and deregistration of persons at the place of residence by processing arrival/departure sheets filled in at the time of registration at the units of the State Migration Service" (Kasyanova, 2017, p. 228). Clearly, the war has exacerbated these challenges, making it nearly impossible to expect people to officially apply for a change of residence.

According to the UN Refugee Agency, in 2022 alone, 9.7 million people left Ukraine, 5.9 million became internally displaced, 3.7 million returned, and 5 to 15 million lost their jobs. These figures are staggering, representing nearly a third of Ukraine's population. Is it too early to discuss the return of our citizens to their homeland? While there is no definitive answer yet, several conditions for return can be identified: first, ensuring safety for life; second, providing suitable living and educational conditions; third, developing programs to stimulate the national and regional labor markets; and fourth, crafting a long-term migration policy that draws on the experience of other countries while effectively adapting it to the unique challenges and realities of Ukraine.

Purpose. The purpose of this study is to determine the extent and consequences of forced migration from Ukraine, with a particular focus on the impacts awaiting Ukrainian society, including socio-economic, political, cultural, and nation-building consequences.

To achieve this objective, the study delineates the following research tasks:

1. Assess the impact of human and intellectual capital loss: investigate how the emigration of highly skilled professionals in search of better working conditions and prospects abroad contributes to personnel shortages in key sectors, complicating the socio-economic landscape in Ukraine.
2. Examine displacement dynamics: identify the challenges posed by both internal and external displacements due to military conflicts, focusing on the government's response in providing adequate protection and assistance to migrants and facilitating their integration into new socio-economic environments.
3. Analyze economic impacts: study both the positive and negative effects of migration processes on Ukraine's economy. this includes examining how migrants contribute to economic development through labor activity and innovation, as well as the issues arising from irregular migration and inadequate integration, such as underemployment and social conflicts.

Given the current global increase in migration triggered by shifts in economic, political, and environmental conditions, this research underscores the need for international cooperation to address the integration challenges faced by developed countries and the loss of skilled labor in less developed nations.

Methodology

The study employs a combination of philosophical, general, and specialized scientific methods:

- Metaphysical method: utilized to elucidate the mental foundations of migration processes, providing insights into the underlying perceptions and attitudes towards migration.
- Dialectical method: applied to identify and analyze social contradictions that emerge from migration and their repercussions on societal development.
- Sociological methods: these methods are crucial for assessing the scale and dynamics of migration processes, allowing for a detailed understanding of migrant demographics and movements.
- Economic analysis: focuses on the impact of migration on the labor market, economic growth, and other economic facets, offering a comprehensive view of how migration influences economic structures.
- Statistical analysis: involves the scrutiny of migration data, including the number of migrants, their professional qualifications, and their countries of origin and destination, to discern patterns and trends in migration flows.
- Ethnographic methods: these methods are key to exploring the cultural aspects of migration, such as the preservation of migrants' traditions, their interactions with new cultures, and the evolution of their identities.
- For a comprehensive study, it is essential to use both quantitative and qualitative methods. The primary focus of qualitative methods is to uncover the motivational aspects of respondents' reactions, their value orientations, personal expectations, and perceptions, including behavioral stereotypes.

Qualitative methods are extremely informative when examining socially significant concepts such as migration and enculturation, as they do not limit the research to predefined answer options but allow respondents to articulate their thoughts on the issues at hand. Additionally, qualitative methods help avoid socially desirable responses, as respondents are asked to justify their opinions and explain the causal relationships behind their decisions. Among the qualitative methods, the most relevant for our research objectives are expert interviews with opinion leaders (public activists, political scientists, psychologists, representatives of culture and education) to address the posed questions by involving professionals and specialists who have valuable experience in this field for a general assessment of the current situation, identifying the most pressing issues, and exploring potential solutions.

- The research utilizes statistical data from the analytical center Cedos, as well as analytics from the State Border Guard Service of Ukraine and UNHCR. The war in Ukraine is still ongoing, making it difficult to assess the scale of migration. Fluctuations in quantitative indicators are linked to the uncertain prospects of the war. The number of migrants continues to grow, although it is fair to note that this process has significantly slowed down. For evaluating the situation, empirical studies on migration processes since the beginning of the full-scale invasion have drawn on the research of Dembirskeyi, Zlobina, Kostenko, Filippchuk, Syrbu, Kabanyts, and others. A. Suprunovskyi's study emphasizes the reasons and clear sequence in the documentation of quantitative indicators. All data indicate that Ukraine is currently one of the leaders in the number of external migrants. I. Malyk highlights that the quantitative and qualitative social changes are immense, making it practically impossible to identify their characteristics and assess the consequences.
- Qualitative research has helped to define the profile of the average forced migrant, particularly in the works of Akinina. These studies also laid the foundation for the classification of migrants. Conventionally, three groups of migrants can be distinguished: the first group consists of refugees, the second group includes individuals seeking asylum, and the third group encompasses those in need of temporary protection. All surveys are conducted anonymously, with no personal data provided; instead of names, codes and numbers are used for identification, preserving anonymity. This method is particularly important for sensitive topics where respondents may feel fear or shame regarding their answers.

Results and discussion

Since the onset of Russia's military invasion, Ukraine has experienced unprecedented levels of external migration. Initially characterized by spontaneous and urgent departures in search of safety, the majority of those fleeing the country have been women and children. The fluid nature of this migration wave makes accurate recording challenging, as some individuals who left at the conflict's start have since returned, while others continue to leave. Most internally displaced persons (IDPs) have relocated to European countries via Poland or remained within Ukraine. Notably, some migrants have not registered with their consulates, while others remain in transit across various European nations, awaiting visas to further destinations such as the United States and Canada.

The massive influx of migrants has necessitated that governments of recipient countries undertake complex daily decisions concerning legal, political, psychological, managerial, social, and medical aspects. Early in March 2022, the Council of the European Union anticipated the challenges stemming from the forced migration of the Ukrainian population, particularly noting the strain on its eastern borders due to the conflict. It was estimated that half of the Ukrainians arriving in the Union, benefiting from visa-free travel for short stays, would either join family members or seek employment within the Union, while the other half would apply for international protection. Predictions suggested that 2.5 million to 6.5 million people could be displaced due to the armed conflict, with 1.2 to 3.2 million potentially seeking international protection. In a worst-case scenario, as per UNHCR data, about 4 million people could leave Ukraine (European Union, 2022).

In response to this crisis, the European Union swiftly enacted the Temporary Protection Directive on March 4, 2022, marking the first such implementation in its history. This Directive was designed to manage the substantial influx of displaced persons and to provide temporary protection to those fleeing the war in Ukraine, with the European Commission coordinating the efforts of EU countries in this regard (European Union, 2022).

Sociological research and surveys shed light on the demographic profile of the average IDP from Ukraine: typically, a woman aged 30 to 39, who left Ukraine in March with higher or incomplete higher education.

This individual is likely a qualified specialist, manager, entrepreneur, or housewife, originally residing in a city rather than a village, and hailing from Kyiv or one of the southern, eastern, or central regions of Ukraine. Most often, she is abroad with her children, and less frequently with her parents, husband, or other relatives (Akinina, 2022).

The status of Ukrainians abroad primarily falls into three categories: refugees, asylum-seekers, and persons in need of temporary protection. The heterogeneity of the Ukrainian migrants' strategies and tactics is notable. Some are actively adapting to the host country's labor market and learning the language with intentions to stay, while others, overcoming initial stress and fear, plan to return to Ukraine. A third group passively awaits developments in and around Ukraine, content with the minimal support provided by the host authorities and communities (Dembitskyi et al., 2022, p. 237).

According to the UNHCR's report for March-December 2022, approximately 7.9 million refugees left Ukraine and sought protection across Europe, with over 4 million granted access to temporary protection or a similar status by the end of the year (UNHCR, 2023).

The extensive migration from Ukraine, prompted by Russia's large-scale invasion, has led to a substantial number of Ukrainians seeking refuge across Europe and beyond. A summary by the Ministry of Foreign Affairs of Ukraine and various statistical sources provides an overview of the displacement and current status of Ukrainian refugees in individual countries as of December 2022 and early 2023:

- Bulgaria: More than 977,000 refugees have crossed into Bulgaria, with approximately 149,000 receiving temporary protection. By the end of December 2022, about 50,200 remained in the country.
- Czech Republic: As of December 2022, 473,216 Ukrainian refugees had been granted temporary protection.
- Hungary: The country witnessed over 3.9 million border crossings, including 2 million directly from Ukraine and 1.9 million via the Romanian border. Notably, 176,083 temporary residence cards and over 25,000 residence permits were issued, with approximately 33,200 people registered for temporary protection.
- Moldova: Initially, over 750,000 people fled to Moldova, with more than 102,000 remaining by the end of 2022.
- Poland: Over 1.5 million refugees registered for temporary protection, with 1,508,338 applying for a Polish unique registration number (PESEL).
- Romania: The country saw over 2.2 million border crossings, hosting 106,268 refugees from Ukraine by year-end, with over 101,000 granted temporary protection.
- Slovakia: More than a million crossed into Slovakia seeking protection, with 104,764 applying for temporary protection by the end of 2022.

As of the first anniversary of the invasion, the total number of Ukrainians living abroad was estimated at 7,989,027. Significant host countries include Poland, Germany, the USA, and the Czech Republic, among others.

Further data from Statista highlight the broader scale of movement across the Ukrainian border from 24 February 2022 to 7 March 2023, with 19,293,161 people having left Ukraine and 10,823,841 returning.

These statistics underscore the widespread impact of the conflict on Ukrainian migration, illustrating both the vast scale of displacement and the dynamic nature of migration patterns. The ongoing situation necessitates continued international cooperation and support to manage the complex needs of displaced Ukrainians effectively.

Table 1.

The number of citizens who left and returned to Ukraine between February 24, 2022, and March 27, 2023.

Country	Crossed the border from Ukraine, people (thousands)	Crossed the border to Ukraine, people (thousands)
Poland	10,452.01	8,179.87
Russia	2,852.4	-
Hungary	2,414.91	-
Romania	2,153.9	1,759.55
Slovakia	1,266.79	997.85
Moldova	795.59	427.18
Belarus	16.71	-

Additional notes: Russia as of 3 October 2022, Belarus as of 14 February 2023, Romania as of 26 March 2023, Moldova as of 26 March 2023; border crossing data with Ukraine is not available for Russia, Hungary and Belarus; Belarus and Russia are countries not included in the Refugee Response Plan (Statista Research Department, 3 April 2023).

It is important to understand that all statistics on refugees from Ukraine contain errors, including the quantitative indicators from UNHCR. In particular, their official website draws attention to the following objective reasons:

- 1) The figure 'Refugees from Ukraine registered for temporary protection or similar national protection schemes in Europe' may include multiple registrations of the same person in two or more EU+ countries; there are registrations that remain incomplete for various reasons, as well as registrations of refugees who have moved on, including outside Europe;
- 2) Statistics are compiled mainly on the basis of data provided by the authorities, but subsequently, after verification of all statistical information, there are amendments, including retroactive ones.

As of 4 April 2023, according to The Operational Data Portal (ODP) enables UNHCR's institutional responsibility to provide an information and data sharing platform to facilitate coordination of refugee emergencies. This was achieved using independent 'situation views' covering major emergencies such as the Syria situation or the Central African Republic emergency, among others. UNHCR's Rapid Data Platform (<https://data.unhcr.org/en/situations/ukraine>), 8,163,268 refugees from Ukraine were recorded across Europe, with 5,027,182 registered for temporary protection or similar national protection schemes in Europe. The platform also contains statistics for 44 countries. First of all, information is provided on the countries listed in the Refugee Response Plan, then on all other countries, and Russia and Belarus are separately highlighted. The statistics include the number of people: who crossed the border from and to Ukraine; who are registered in the country; who have been granted temporary protection (in EU countries) or similar protected status.

Table 2.

Statistics reflecting the number of individuals who crossed the border into and out of Ukraine; those registered in the country; and those who received temporary protection (in EU countries) or a similar protected status.

Country	Data Date	Refugees from Ukraine registered for Temporary Protection or similar national protection schemes	Refugees from Ukraine recorded in	Border crossings from Ukraine	Border crossings to Ukraine
Poland	03.04.2023	1 581 148	1 581 148	10 606 537	8 388 808
Czech Republic	02.04.2023	504 107	504 352	Not applicable	Not applicable
Slovakia	02.04.2023	113 253	113 253	1 281 690	1 015 740
Romania	02.04.2023	125 316	107 706	2 185 338	1 791 599
Republic of Moldova	03.04.2023	Not applicable	106 634	798 223	427 178
Lithuania	31.03.2023	76 309	76 309	Not applicable	Not applicable
Estonia	03.04.2023	44 588	68 930	Data not available	Data not available

Bulgaria	04.04.2023	155 883	48 974	Not applicable	Not applicable
Hungary	03.04.2023	34 248	34 248	2 448 937	Data not available
Latvia	03.04.2023	46 976	32 488	Data not available	Data not available

Determine the title and authorship of each graph, image, figure presented in the article.

Table 3.

Statistics reflecting the number of individuals who crossed the border between Ukraine and Russia, as well as between Ukraine and Belarus.

Country	Data Date	Refugees from Ukraine registered for Temporary Protection or similar national protection schemes	Refugees from Ukraine recorded in country	Border crossings from Ukraine	Border crossings to Ukraine
Russian Federation	03.10.2022	Not applicable	2 852 395	2 852 395	Data not available
Belarus	28.03.2023	Not applicable	22 168	16 705	Data not available

Table 4.

Statistics on the response of other countries to refugees from Ukraine.

Country	Data Date	Refugees from Ukraine registered for Temporary Protection or similar national protection schemes	Refugees from Ukraine recorded in country
Germany	25.03.2023	922 657	1 056 628
United Kingdom	28.03.2023	198 700	198 700
Italy	17.03.2023	173 213	173 213
Spain	03.04.2023	172 682	172 682
France	31.10.2022	118 994	118 994
Türkiye	26.01.2023	Not applicable	95 874
Austria	20.03.2023	94 984	94 984
Netherlands	10.02.2023	89 730	89 730
Ireland	19.03.2023	78 025	78 462
Belgium	03.04.2023	69 557	70 307
Switzerland	31.03.2023	83 428	65 818
Portugal	26.02.2023	58 242	58 242
Sweden	30.03.2023	53 755	53 755
Finland	27.03.2023	52 790	47 067
Norway	03.04.2023	44 798	44 798
Denmark	02.04.2023	39 338	41 419
Montenegro	03.04.2023	8 298	31 770
Georgia	31.01.2023	Not applicable	24 658
Croatia	20.03.2023	21 352	21 352
Greece	06.12.2022	20 955	20 955
Cyprus	12.03.2023	21 842	16 281
Slovenia	02.04.2023	8 990	9 222
Luxembourg	25.10.2022	6 756	6 756
North Macedonia	03.04.2023	Not applicable	6 562
Azerbaijan	13.03.2023	Not applicable	5 031
Serbia and Kosovo: S/RES/1244 (1999)	03.04.2023	1 286	3 096
Albania	23.03.2023	28	2 758
Iceland	28.02.2023	2 674	2 674
Malta	19.02.2023	1 744	1 744
Armenia	28.03.2023	Not applicable	553
Liechtenstein	18.01.2023	536	410
Bosnia and Herzegovina	26.03.2023	Not applicable	168

The statistics highlight Poland's prominent role in accommodating Ukrainian refugees, a trend driven by several factors. Poland has maintained strong diplomatic relationships with Ukraine, which have been consistently affirmed by both nations' leaders despite historical complexities. This has established a foundation of goodwill and cooperation. Subjectively, Poland is strategically positioned on the European Union's external border, focusing both national and international efforts on managing mass migration effectively. Moreover, Poland's migration policies are deliberately designed to create favorable conditions for Ukrainians, aligning with its strategic goal of improving the demographic situation within its own borders (Kukuruz, 2023). Consequently, many Ukrainians prefer Poland as a destination over other countries.

According to Ukrainian sociologists, while some external migrants have returned to Ukraine, others are ready to return if the security situation improves. However, about 10% of external migrants believe their departure from Ukraine is permanent. The prospect of Ukrainians returning remains fraught with uncertainties. «When evaluating the prospects for the return to Ukraine of those who left after February 24, 2022, it is important not to ignore the division into two vastly unequal groups: the majority consists of those who left Ukraine in search of safety, while a much smaller group comprises those who chose to take the opportunity to move to a more developed and prosperous country. It is not advisable to attempt to bring back people from the second group, as they have chosen this path for themselves. Instead, it is essential to strive for the maximum return of mothers with children, rather than facing a mass emigration of their husbands after the war» (Libanova et al., 2022). The Ukrainian Helsinki Human Rights Union (UHHRU), with the support of the European Union, conducted focus group research across 12 EU countries, revealing that most respondents intend to return to Ukraine post-conflict. Yet, immediate return is hindered by factors such as lack of physical security, destruction of housing, and the ongoing occupation of their territories by the Russian Federation (Potapenko et al., 2023).

R. Vynnychuk and N. Rubakha suggest that, based on the experience of previous refugee crises, some individuals who flee war choose to stay permanently in host countries, particularly when entire families migrate, and in this case, primarily women with children (Vynnychuk & Rubakha, 2022). The ongoing conflict and Ukraine's uncertain economic future make it challenging to predict the full scale of migration and the likelihood of return.

Conclusions

Summarizing the situation, it is evident that the continuation of the Russian-Ukrainian war significantly impacts the Ukrainian economy and increases the likelihood that a substantial portion of the population may not return, thereby affecting the country's demographic potential. It is imperative, even before the conflict concludes, to develop methodologies to accurately assess the scale and dynamics of Ukrainian migration abroad. This includes reconciling discrepancies in data regarding border crossings provided by Ukrainian and international organizations, clarifying terminology for different groups of displaced Ukrainians, and enhancing mechanisms for registering Ukrainian citizens abroad, including improvements to the consular registration system.

As Ukraine continues to integrate into European structures, its migration policy should align with EU standards, particularly regarding the basic principles of EU migration policy. There should be a state-level program to encourage the return of migrants, which could involve attracting investment to Ukraine and incentivizing businesses to create jobs, thereby leveraging opportunities for bilateral economic cooperation.

Currently, the pace of emigration abroad has slowed down. However, the continuation of the war may lead to further migration of the Ukrainian population abroad. The intensity and direction of this migration will depend on many factors, including: the expansion or contraction of the combat zone; progress in the de-occupation of the remaining temporarily occupied territories; the resilience of local critical infrastructure; direct shelling of populated areas by Russian forces; the emergence of crisis phenomena of a technological or natural nature; the level of socio-economic recovery in liberated territories; and changes in the labor market and economic structure of different regions.

In future research, it is important to focus on measures related to the cultural integration of migrants in their host areas, as they have found themselves in unfamiliar social and cultural conditions due to forced migration. Targeted cultural efforts are needed to familiarize migrants with the historical and cultural traditions of the host area and to promote mutual understanding with local residents. Establishing such

initiatives with financial support from the Ukrainian Cultural Foundation and the organizational involvement of local authorities will help mitigate the socio-psychological consequences of forced migration and facilitate their inclusion in the socio-economic life of the recipient regions and communities.

Bibliographic References

- Akinina, A. (2022, December 23). *Scientists have predicted what the population of Ukraine will be in 2023*. Myvin.com.ua. <https://acortar.link/qbG9yv>
- Derviş, L. (2024). Analysis of the dynamics of the modern Russian-Ukrainian war: historical roots of geopolitical ambitions. *Amazonia Investiga*, 13(77), 123-134. <https://doi.org/10.34069/AI/2024.77.05.9>
- Dembitskyi, S., Zlobina, O., & Kostenko, N. (2022). Ukrainian society in the conditions of war. 2022. Collective monograph (E. Holovakha & S. Makeev, Eds.). *Institute of Sociology of the National Academy of Sciences of Ukraine*, 410 p. <https://i-soc.com.ua/assets/files/monitoring/maket-vijna...2022dlya-tipografiivse.pdf>
- European Union (2022). *Council Implementing Decision (EU) establishing the existence of a mass influx of displaced persons from Ukraine within the meaning of Article 5 of Directive 2001/55/EC, and having the effect of introducing temporary protection 2022/382* (2022, 4 March). <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022D0382>
- Filipchuk, L., Lomonosova, N., Syrbu, O., & Kabanets, Yu. (2022). *Forced migration and war in Ukraine* (February 24 - March 24, 2022). Monitoring. Cedoss. <https://cedos.org.ua/wp-content/uploads/vymushena-migracziya-ta-vijna-v-ukraïni.docx-1.pdf>
- Kasyanova, M. M. (2017). *Ukrainians in the migration processes of Eastern Europe in the conditions of post-bipolar transformation of the international system*: monograph. Central processing unit "Document Print". (In Ukrainian)
- Krasnodemska, I., Savitskaya, M., Berezan, V., Tovstukha, O., & Rodchenko, L. (2023). Psychological consequences of warfare for combatants: ways of social reintegration and support in Ukraine. *Amazonia Investiga*, 12(70), 78-87. <https://doi.org/10.34069/AI/2023.70.10.7>
- Kukuruz, O. V. (2023). Strategic priorities of Poland's migration policy during the Russian-Ukrainian war. *Rule of Law*, (34), 704-710. (In Ukrainian)
- Libanova, E. M., Pozniak, O. V., & Tsymbal, O. I. (2022). Scales and consequences of the forced migration of the population of Ukraine as a result of the armed aggression of the Russian Federation. *Demography and Social Economy*, 48(2), 37-57. <https://doi.org/10.15407/dse2022.02.037>
- Malik, I. (2022). Migration challenges for EU countries in 2022 through the prism of migration forecasts. In T. Astramovich-Leik, Ya. Turchyn, O. Horbach, & O. Tsebenko (Eds.). *The security architecture of European and Euro-Atlantic spaces*: scientific monograph (pp. 179-191). "Baltija Publishing".
- Pyshnyi, A. (2022). *Ukrainian migrants in Europe are not a burden, but valuable human capital*. Ukrainian Pravda. <https://www.epravda.com.ua/columns/2022/12/15/695056/>
- Potapenko, A. G., & Valevskyi, O. (2023). *The impact of migration on the socio-economic situation in Ukraine: analyst*. Kyiv: NISD. <https://doi.org/10.53679/NISS-analytrep.2023.01>
- Suprunovskiy, A. I. (2022). Forced migration of Ukrainian citizens under the conditions of the Russian invasion of Ukraine. *Legal Scientific Electronic Journal*, 7, 475-479. DOI <https://doi.org/10.32782/2524-0374/2022-7/115>
- Statista Research Department. (2023, 3 April). *Number of border crossings between Ukraine and Central and Eastern European (CEE) countries after Russia's invasion of Ukraine from February 24 to March 27, 2023, by selected country*. <https://www.statista.com/statistics/1293403/cee-ukrainian-refugees-by-country/>
- UNHCR. (2023, 28 March). *2022 Final Report. Regional Refugee Response Plan for the Ukraine Situation March – December 2022*. <https://data.unhcr.org/en/documents/details/99791>
- Vynnychuk, R. O., & Rubakha, N. V. (2022). External migration in Ukraine as a result of the Russian-Ukrainian war 2014-2022: migration trends, legal regulation and integration challenges. In *The Russian-Ukrainian war (2014-2022): historical, political, cultural-educational, religious, economic, and legal aspects: Scientific monograph*. (pp. 37-46). "Baltija Publishing". <https://baltijapublishing.lv/omp/index.php/bp/catalog/download/237/6405/13257-1?inline=1>

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The impact of video on military engineering learning in wartime

Вплив відео на підготовку офіцерів інженерних спеціальностей під час війни

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Abstract


Video technologies have become a powerful tool in the system of professional training of future officers, and the research is oriented towards the revealing the potential of video may contribute to the improvement of cadets' learning outcomes during wartime significantly. Besides, the article investigates the integration of video technologies in the military engineering classroom and describes interactive video-based learning environment. A quasi-experiment with intervention and control groups was used to answer the research questions. The findings demonstrated the significance of using video in engineering education and the calculation of difference-in-differences value proved the positive impact of videos on cadets' learning outcomes. The experiment revealed eighteen teaching strategies for integrating video in the military engineering classroom. Also, we provided a detailed classification of characteristics typical for video content in military engineering education. In addition, an interactive video-based learning environment was defined. Regarding the formation of professional competence among future military engineering officers, an interactive video-based learning environment was described through certain


Анотація


Відео технології стали потужним інструментом у системі професійної підготовки майбутніх офіцерів, а дослідження, спрямовані на розкриття потенціалу відео, можуть суттєво сприяти покращенню результатів навчання курсантів під час війни. Крім того, у статті досліджено інтеграцію відео технологій у процесі вивчення військово-інженерних дисциплін та описано інтерактивне навчальне середовище на основі відео. Під час дослідження було використано квазі-експеримент із експериментальною та контрольною групами. Результати довели важливість використання відео в інженерній освіті, а розрахунок значення різниці у відмінностях довів позитивний вплив відео на результати навчання курсантів. Експеримент виявив вісімнадцять стратегій навчання для інтеграції відео під час аудиторної роботи. Також ми надали детальну класифікацію характеристик відеоконтенту, що застосовується в інженерній освіті. Крім того, було описано інтерактивне навчальне середовище на основі відео. Щодо формування професійної компетентності у майбутніх офіцерів інженерних спеціальностей, то

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requirements. The research results can be used to improve the curriculum for future military engineering officers. Also, the findings may contribute to the design of professional training programs for military educators.

Keywords: video technologies, personalized video, interactive learning environment, video lecture, video-based games.

таке середовище було досліджене через певні вимоги. Результати дослідження можуть бути використані для вдосконалення навчальної програми підготовки майбутніх офіцерів-інженерів. Також отримані дані можуть сприяти розробці програм професійної підготовки військових педагогів.

Ключові слова: відео технології, персоналізоване відео, інтерактивне навчальне середовище, відео лекція, відео ігри.

Introduction

Today, engineering is described as the solution to emerging challenges because it offers innovation to overcome serious issues and contribute to a more sustainable world. Engineering knowledge is especially important during emergencies; its forward-thinking has the potential to combat crises in impactful ways (Barabino, 2021). In this context, engineering education is an integral component of professional development that equips with the skills to build innovative technologies and infrastructure addressing critical challenges. Certain scholars view the cultivation of future engineers' professional competencies as a necessity (Buckley et al., 2021). However, there is an increasing pressure to improve the quality of engineers' training since it is often criticized for being conservative and outdated (Gumaelius et al., 2024; Teplická et al., 2022). Besides, institution-based education lacks practical projects due to its orientation towards standardized curricula (Ismail et al., 2024). In Ukraine, educational programs prioritize theoretical knowledge, leaving limited opportunities for learners (Lucenko et al., 2023). Ukrainian higher military educational institutions (HMEIs) concentrate on conventional teaching because the educational process follows the established protocols (Maistrenko et al., 2020). HMEIs are significantly challenged by the ongoing war facing the inability to maintain a regular schedule (Lavrysh et al., 2022). Also, there is a need to adapt curricula through incorporation of battlefield experiences (Bhinder, 2019).

Engineering training involves understanding complex concepts that are often abstract or multi-dimensional. That requires the use of visualization of technical processes (Bhardwaj & Gupta, 2023). Specific teaching strategies must be developed on the basis of audiovisual technologies, including laboratory experiment videos and interactive short videos (Afkar et al., 2023), video lectures (Bhardwaj & Gupta, 2023), video games (Núñez-Pacheco et al., 2023), and tutorials (Lee et al., 2018). Besides, video is a powerful self-learning tool (Bhardwaj & Gupta, 2023). In Ukraine, video technologies are used to conduct the pedagogical and psychological transformation of the educational process (Danilyan et al., 2023). Besides, Ukrainian authors paid the special attention towards the educational process in the context of large-scale military aggression (Lavrysh et al., 2022). At the same time, the use of video in military engineering education during wartime has not been sufficiently studied; this is particularly relevant for the improvement of learning outcomes of future engineers, the impact of videos on learners' engagement and their preparation to perform service functions in emergencies. While the potential of video has been theoretically recognized, there is limited empirical research on integrating video at the HMEIs. The pedagogical research on the potential of video in military engineering education seeks to address the problem of integrating video technologies in the classroom and creating an interactive video-based learning environment.

The research aim is to reveal the potentials of video in military engineering education, particularly for the improvement of learning outcomes.

The research questions answered by our work are the following:

- 1) How does video affect future officers' learning outcomes compared to traditional teaching methods?
- 2) How are video technologies integrated into the MEC?
- 3) What are the requirements for an interactive video-based learning environment at the HMEIs?

Therefore, this research explores how video content enhances learning outcomes in military engineering education during wartime, addressing specific challenges faced by students in HMEIs; and it offers original comprehension of the potential of video technology to bridge knowledge gaps and support the resilience of future military engineers when traditional methods are disrupted by war.

Literature Review

Being an important component of the educational process, video is integrated into classroom activities and blended courses; and it is widely used in online learning (Brame, 2016; Mamedova et al., 2023). Desai and Kulkarni (2022) explained educational video as visual and auditory material designed to enhance the level of conceptual understanding and to achieve the desired learning outcomes. Some authors emphasize that video technology presents educational information in a dynamic visual and auditory content flow (Noetel et al., 2021). There are several types of videos used within the educational process. Bhardwaj and Gupta (2023) differentiated video lectures that provide theoretical knowledge. Some authors described laboratory experiment videos (Afkar et al., 2023) and interactive videos (Desai & Kulkarni, 2022). Instructional videos are especially important for engineering education since they are focused on safety procedures (La Torre & Désiron, 2024). Other types include video games (Núñez-Pacheco et al., 2023), tutorials (Lee et al., 2018), simulation videos (Singh et al., 2020), and project-based videos (Bhinder & Protsenko, 2022).

A number of recent works explain the advantages that video brings to the engineering classroom. Bhardwaj and Gupta (2023) insisted that video complements traditional lectures reinforcing students' understanding of engineering concepts through visualizations. According to Zhu et al. (2022), video creates an immersive learning environment. Certain findings demonstrate that the use of video improves students' motivation (Lu, 2023). Self-paced online courses apply video to enhance the efficiency of the learning environment and increase students' autonomy (Jiang et al., 2019). The recent Ukrainian studies are devoted to the creation of a video-based learning environment during war. For example, video is found to be an effective tool to ensure the continuity of the educational process, particularly when the schedule is unpredictable (Lavrysh et al., 2022).

In this context, it is necessary to mention clip thinking which is a form of information perception that appears under the influence of social networks and artificial intelligence (AI) (Bushuyev, Murzabekova et al., 2024). It is characterized by information fragmentation, where preference is given to short and visually informative messages. According to Bushuyev, Korchova et al. (2024), clip thinking is determined by a short-term perspective, and a lack of analysis skills. Students having clip thinking quickly switch between different topics, perceiving information in the form of short, unrelated "clips." Some authors express worries that clip thinking causes the erosion of critical thinking skills and the creation of filter bubbles (Bushuyev, Murzabekova et al., 2024). When planning a lesson, it is important to consider clip thinking because it causes students' attention deficit, inability to concentrate for long, and loss of desire for new knowledge (Kornuta et al., 2017).

Many authors explained the role of video in increasing communication and foreign language competence (Bhinder, 2022; Kamentsev et al., 2022; Snigdha & Akter, 2023) as well as teaching the humanities (Ribeiro et al., 2016; Yildirim, 2018). At the same time, military engineering subjects require specific methodologies to prepare future officers to perform their professional functions. The findings demonstrated that the integration of video technologies occurs through various teaching strategies impacting specific engineering skills among learners. These strategies include flipped classroom (Etemi et al., 2024), blended learning (Ożadowicz, 2020), peer learning (Polkowski et al., 2020), and collaborative learning (Otoum & Alzoubi, 2024). Besides, video lectures (Bhardwaj & Gupta, 2023; Lu, 2023), project-based learning (Bhinder & Protsenko, 2022), tutorials (Lee et al., 2018), and case study (Gumaelius et al., 2024) are widely used. Some scholars insist that simulation (Feijoo-Garcia et al., 2024) and lab exercises (Onyeaka et al., 2023; Stefanova, 2014) contribute to formation of professional competence among future engineers significantly. The special attention is paid towards the use of video-based games (Núñez-Pacheco et al., 2023).

The analysis of literature indicated that video content characteristics concern high-quality visuals and interactive elements (Madariaga et al., 2021; Tretko et al., 2023). Some scholars stated that educational videos are usually clear and concise (Fyfield et al., 2019). Other findings show that video content requires contextual relevance (Nonthamand, 2024). Besides, effective video-based exercises are followed by assessment (Abdul-Rahaman & Tindam, 2024; Desai & Kulkarni, 2022). Brame (2016) stressed that cognitive load and active learning are necessary to incorporate an effective educational video. Moreover, personalized video was investigated in the works of Lee et al. (2018) and Stefanova (2014). It contributes to differentiation in teaching (Jiang et al., 2019) and building individual educational trajectories (Ralph et al., 2022).

In this regard, exploring the peculiarities of video-based learning environment is relevant. According to Nonthamand (2024), a video-based learning environment refers to the use of videos creating learners' engagement and interaction. Also, this environment as an educational landscape where videos are introduced as the primary medium for delivering instructional content (Seago & Knotts, 2021). This approach is responsible for integrating videos within the educational process and improving an engaging learning experience when training future professionals (Gumaelius et al., 2024). The video-based learning environment in engineering education incorporates instructional videos, tutorials, recorded lectures, simulations, and demonstrations of engineering processes (La Torre & Désiron, 2024; Ueki & Guaita Martínez, 2019). Some scholars agree that this environment facilitates the formation of professional competencies among future engineers (Desai & Kulkarni, 2022). All this indicates the importance of researching the potential of using video within the educational process at the HMEIs, particularly during wartime. Since video technologies reinforce learners' understanding of engineering concepts, they develop the skills necessary to perform future professional duties, and ensure the continuity of the educational process in challenging situations.

The analysis of scientific literature revealed that video-based learning serves as an important tool for maintaining educational continuity and engagement among future military engineers during war. The recent studies highlight that video content enhances knowledge retention, provides flexible access to essential information, and supports practical skills development, especially when in-person instruction is not available. Additionally, the review indicates the requirements to educational videos and attracts attention towards clip thinking when selecting video content. The description of video-based learning environment may contribute to the enhancement of educational process at the HMEIs. Overall, the literature suggests that video technology not only improve learning outcomes under adverse conditions but also adapts to the unique needs of military engineering education in wartime.

Methodology

Research design

The research design used a quasi-experiment with intervention (IG) and control groups (CG). It involved the assessment of the impact of pedagogical phenomenon on non-randomly selected participants (Gopalan et al., 2020). Besides, a quasi-experiment is characterized by causality (Široťová et al., 2021) referring to the relationship between an intervention (the integration of video) and the observed results (improved learning outcomes). The quasi-experiment design was chosen because it was unrealistic to conduct a randomized controlled trial at the HMEI since the existing groups (platoons) were already formed, making random selection challenging. Moreover, the HMEIs need to reflect real-life conditions as closely as possible. The quasi-experiment was useful because it was conducted in natural settings and allowed to observe the effect of educational interventions in the environment where cadets are actually trained. The IG participants were taught in the classroom where video was widely integrated, and the CG participants were involved in the traditional teaching methodology. The results were assessed based on pre- and post-test. Figure 1 shows the stages of research design based on quasi-experiment.

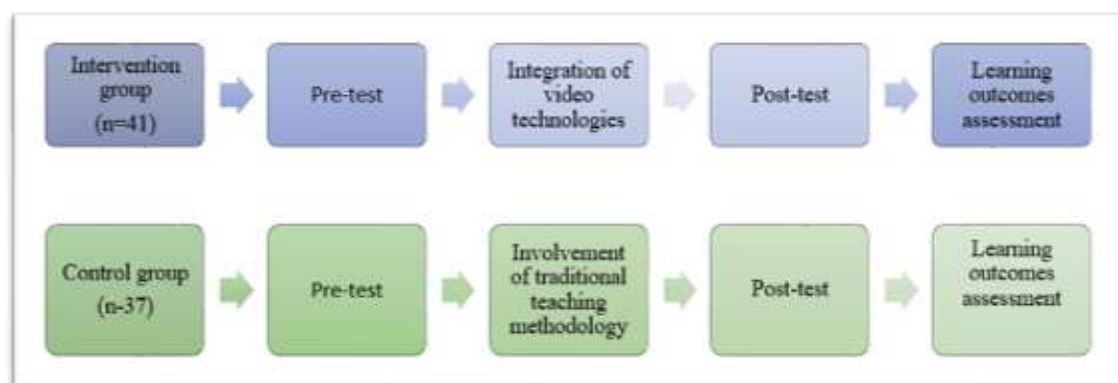


Figure 1. Research design of quasi-experiment.

Source: authors' own development.

Sample and participants

The experiment involved 78 cadets from five study units from the Faculty of Support of Operational and Service Activity at Bohdan Khmelnytskyi National Academy of the State Border Guard Service of Ukraine. The IG involved 41 cadets, and the CG – 37. The socio-demographic results regarded the following: educational background, service level, field of specialization, level of clip thinking, learning style preferences, experience with video technologies, technological literacy, and career goals. Besides, 21 instructors of Bohdan Khmelnytskyi National Academy of the State Border Guard Service of Ukraine participated in the post-test questionnaire to provide feedback on intervention. The socio-demographic results of instructors included educational background, teaching experience duration, technological proficiency, military background, teaching style preferences, and frequency of using video.

Instrument and Procedures

To evaluate cadets' learning outcomes pre- and post-tests were used. The test consisted of 12 blocks regarding the components of future military engineers' professional competences, and valued 5 points each. The program on evaluation of the impact of video was executed in three stages: pre-test, intervention, and post-test. Pre-testing was organized on the 15 – 23rd of December, 2023. The cadets answered the questions orally, and all the results were protocolled. The intervention stage lasted between the 11th of January, 2024 and the 30th of May, 2024. During this stage, for the IG video was integrated into the classroom through different teaching strategies which were selected according to methodological guidance documents of the Department of Engineering and Technical Support. In the CG the teaching was delivered through traditional methods, such as lecture-based instruction, demonstration, field training exercises, seminars, simulation, group work, and lab learning. Table 1 shows a detailed analysis of the intervention stage. The post-test took place between the 3rd and the 5th of June, 2024. Its results provided information about the effectiveness of video and its impact on the improvement of learning outcomes of future military officers. Also, the post-test enabled to reveal the specific gaps in the structure of professional competence, and it contributed to the enhancement of the efficiency of future lessons at the HMEI during wartime.

Table 1.
The program of intervention stage

Period	Teaching strategies
11.01-24.01.2024	Video lectures
	Virtual field trip
	Interactive pause-and-discuss
25.01-7.02.2024	Simulation
	Safety protocols
8.02-21.02.2024	Lab exercises
22.02-6.03.2024	Tutorials
	Map reading
7.03-20.03.2024	Collaborative learning
	Video-based games
21.03-3.04.2024	Flipped classroom
	Annotation
4.04-17.04.2024	Blended learning
	Post-video role-playing
18.04-01.05.2024	Project-based learning
	Engineering design
2.05-15.05.2024	Case study
	Peer learning
16.05.-30.05.2024	Blended learning

Source: authors' own development.

Data Analysis

The data was analyzed using the difference-in-differences (DID) approach that provided an overview of the standard two-by-two design and examined the changes in outcomes over time between a treated and an unaffected group (Corral & Yang, 2024). We calculated the difference in outcomes before and after the integration of video in the MEC for both groups. Then these differences were compared and the effect of video was estimated. To calculate the DID value, the following formula was applied:

$$DID = (Post\text{-}test_{intervention} - Pre\text{-}test_{intervention}) - (Post\text{-}test_{control} - Pre\text{-}test_{control})$$

Then, we paid attention towards the possible assumptions and threats to results validity that can occur within the HMEI, such as simultaneous shock, group composition change, and interference between IG and CG. To avoid this, we carefully controlled for external shocks and group composition changes. We used the existing structural barriers (geographical and organizational) that reduce interaction between both groups to minimize the interference between IG and CG.

Results and Discussion

Video impact on future officers' learning outcomes compared to traditional teaching methods

Considering the previous findings, it was decided that video enables the visualization of technical processes (Afkar et al., 2023), and enhances engagement (Feijoo-Garcia et al., 2024). Additionally, video contributes to flexible, self-paced learning and improves knowledge transfer (Jiang et al., 2019). Its potential to make the educational process more engaging provides many benefits over traditional classroom (Dehne & Gröschner, 2023; Núñez-Pacheco et al., 2023). Video supplements instruction and, therefore, increases comprehension, retention, and discovery in engineering education (Lee et al., 2018). According to Stefanova (2014), video in engineers' training illustrates the explanation with examples and presents real-life experiences. In the Ukrainian context, video technologies maintain the continuity of the educational process during emergencies (Lavrysh et al., 2022; Mamedova et al., 2023).

Similarly, the experiment demonstrated the significance of using video in military engineering education, and the calculation of the DID value proved that videos affect cadets' learning outcomes differently. For example, LO₉ and LO₁₂ showed the most significant changes when video was integrated. LO₁, LO₆, LO₇, and LO₁₀ revealed slightly lower results, but DID proved that the use of video had a high potential for the enhancement of training. LO₂, LO₃, LO₄, LO₅, LO₈, LO₁₁ achieved comparatively small increases, but they demonstrated that even infrequent use of video leads to positive changes. Therefore, answering the first research question, the findings proved that video positively impacts future officers' training and provides real-life simulations. Also, video equips future engineers with practical skills and they are prepared to perform complex tasks in high-pressure situations. Table 2 analyzes the impact of using video upon future officers' learning outcomes in comparison with traditional teaching approaches.

Table 2.
Impact of using video on learning outcomes

Code	Learning outcome	IG			CG			DID
		Pre-test	Post-test	Change	Pre-test	Post-test	Change	
LO ₁	Technical expertise	3,457	3,721	+0,264	3,381	3,208	-0,173	0,437
LO ₂	Military infrastructure design	4,006	4,309	+0,303	3,978	4,103	+0,125	0,178
LO ₃	Explosives and demolition proficiency	4,382	4,769	+0,387	4,405	4,555	+0,150	0,237
LO ₄	Combat engineering skills	3,897	4,236	+0,339	3,247	3,389	+0,142	0,197
LO ₅	Project management	2,389	3,314	+0,925	2,509	3,116	+0,607	0,318
LO ₆	Leadership	3,451	4,119	+0,668	3,489	3,582	+0,093	0,575
LO ₇	Engineering reconnaissance	2,087	2,975	+0,888	2,431	2,889	+0,458	0,430
LO ₈	Logistics support	3,153	3,808	+0,655	2,786	3,215	+0,429	0,226
LO ₉	Use of military equipment	3,476	4,879	+1,403	2,601	2,907	+0,306	1,097
LO ₁₀	Risk and safety management	2,677	3,585	+0,908	3,012	3,344	+0,332	0,576
LO ₁₁	Communication skills	3,865	4,603	+0,738	3,456	3,897	+0,441	0,297
LO ₁₂	Technology integration	3,008	3,962	+0,954	3,238	3,256	+0,018	0,936
LO _̄	Average value	3,319	4,023	+0,704	3,211	3,455	+0,244	0,460
LO _Σ	Summary value	39,839	48,280	+8,441	38,533	41,461	+2,928	5,513

Source: authors' own development.

Integration of video technologies into the MEC

Previously, we found that in engineering education, video technologies are used in flipped classroom (Deng et al., 2024) and blended learning (Ożadowicz, 2020). Other teaching strategies include video lectures (Bhardwaj & Gupta, 2023), project-based learning (Bhinder & Protsenko, 2022), tutorials (Ueki & Guaita Martínez, 2019), simulation (Feijoo-Garcia et al., 2024), and lab exercises (Onyeaka et al., 2023). Gumaelius et al. (2024) mentioned that the integration of video in case studies contributes to the reinforcement of students' technical skills. Recent sources describe collaborative learning and peer learning (Polkowski et al., 2020). A number of researchers investigated video-based games (Núñez-Pacheco et al., 2023). For comparison, the experiment revealed eighteen teaching strategies used to integrate video in the MEC. Accordingly, twelve characteristics of video content were selected. The findings revealed that TS₁ is mainly characterized by high-quality visuals, conciseness, contextual relevance, and cognitive load management, TS₂ – real-life examples, and high-quality visuals, TS₃ – the use of interactive elements. TS₄, TS₁₀ and TS₁₁ required interactive elements, TS₅ and TS₈ – high-quality visuals and clear materials, TS₇ – narration quality. TS₉ is effective when the video is clear and allows assessment. TS₁₂ and TS₁₄ required contextual relevance. At the same time, TS₁₃ was characterized by conciseness, TS₁₅ – feedback. Also, the results showed that TS₁₆, TS₁₇, TS₁₈ need contextually relevant video, rapid feedback and objective assessment. Table 3 shows the cumulative results on teaching strategies used to integrate video.

Table 3.
Teaching strategies used to integrate video

Code	Teaching strategies	Instructors' responses											
		Interactivity	Real-life examples	Personalization	High-quality visuals	Clarity	Conciseness	Contextual relevance	Feedback	Assessment	Narration quality	Microlearning	Cognitive load management
TS ₁	Interactive video lectures	11	7	4	21	20	16	18	3	12	17	9	16
TS ₂	Virtual field trip	1	21	0	19	12	2	7	2	1	12	0	5
TS ₃	Pause-and-discuss	19	6	11	3	4	6	8	17	13	0	4	2
TS ₄	Simulation videos	16	15	11	13	12	9	6	7	8	2	9	5
TS ₅	Safety protocols	3	20	3	18	17	15	8	14	3	16	1	3
TS ₆	Lab exercises	2	14	5	6	9	11	18	11	16	2	2	5
TS ₇	Tutorials	6	11	12	10	12	16	11	10	18	21	0	12
TS ₈	Map reading	3	10	14	18	13	2	12	9	17	12	9	3
TS ₉	Collaborative learning	14	6	17	13	18	12	17	8	16	11	2	11
TS ₁₀	Video-based games	19	17	15	12	14	17	12	5	15	9	4	5
TS ₁₁	Flipped classroom	18	9	8	16	11	16	16	12	14	6	13	8
TS ₁₂	Annotation	1	2	9	15	10	15	20	13	17	19	15	19
TS ₁₃	Blended learning	11	6	10	12	9	19	15	16	17	13	17	13
TS ₁₄	Post-video role-playing	2	13	13	10	5	11	18	6	8	14	4	3
TS ₁₅	Project-based learning	8	11	6	7	3	17	19	19	17	11	5	8
TS ₁₆	Engineering design	6	10	17	13	14	19	21	18	19	18	13	17
TS ₁₇	Case study	12	7	14	15	12	18	17	15	18	7	7	14
TS ₁₈	Peer learning	3	5	7	11	17	21	16	12	11	13	9	6

Source: authors' own development.

The requirements for an interactive video-based learning environment at the HMEIs

Many scientific works are devoted to video-based learning environment. It was found that the main characteristic of this environment is its ability to combine video with interactive elements (Desai & Kulkarni, 2022; Madariaga et al., 2021). An interactive video-based learning environment offers real-life simulations and practical exercises on professional situations (Lowe et al., 2024). Obviously, an interactive video-based learning environment improves learning outcomes and facilitates the formation of professional competencies among future engineers (Desai & Kulkarni, 2022).

The post-test results demonstrated that an interactive video-based learning environment refers to an organizational and pedagogical setting where videos are combined with interactive components. The environment encourages active learning and allows cadets to test their knowledge or skills through incorporated assessment mechanisms, and explore military engineering concepts. Moreover, an interactive video-based learning environment suggests engagement, enhanced attention, development of specific engineering skills, and develops multitasking among future officers. Also, this environment simulates realistic military scenarios, real-life in-unit cooperation and interoperability. Table 4 presents the requirements for the creation of an efficient interactive video-based learning environment and its contribution to the formation of professional competencies among future officers.

Table 4.
Requirements for interactive video-based learning environment

Requirements	Formation of professional competencies	Instructors' responses
Interactive elements and game-based learning	1) Active engagement.	14
	2) Simulation of tactical decisions.	16
	3) Development of critical thinking.	19
	4) Increased motivation.	20
Personalization	1) Adaptation to cadets' individual needs and learning styles.	15
	2) Enhanced problem-solving skills.	17
	3) Active involvement.	16
	4) Use of learner-centered content.	8
High-quality audio and visuals	1) Increased attention to technical details.	12
	2) Experience of near-real conditions.	16
	3) Increased retention.	19
Collaboration activities	1) Teamwork and communication skills.	20
	2) Enhancement of problem-solving and critical thinking.	17
	3) Simulation of real-life in-unit cooperation and interoperability.	16
	4) Increased engagement and motivation.	14
	5) Development of leadership.	18
Real-life scenarios	1) Applying theoretical knowledge in practical situations.	20
	2) Improved decision-making.	16
	3) Preparation for unpredictable circumstances.	17
	4) Improved military engineering project management.	19
Problem-based learning	1) Critical thinking and problem solving.	16
	2) Involvement in realistic military scenarios.	14
	3) Enhanced collaboration.	19
	4) Promotion of active learning.	18
War-time training	1) Engagement in realistic, war-time scenarios.	19
	2) Adaptation to combat situations.	18
	3) Experiencing the physical and emotional challenges.	17
	4) Training of specific war-time engineering tasks.	20
Clip thinking considering	1) Enhanced focus and knowledge retention.	16
	2) Efficient use of time.	17
	3) Increased engagement in the classroom.	11
	4) Stress management.	14
	5) Realistic visualization of military engineering tasks.	15
Cognitive load reduction	1) Focus on the most critical information.	13
	2) Prevention of mental burnout.	15
	3) Multitasking in war-time operations.	14

Source: authors' own development.

Therefore, the experiment proved that the correct use of video has a great potential for improvement of cadets' learning outcomes. The IG demonstrated that the incorporation of video technologies within the

educational process has a positive impact and enhances practical skills necessary for carrying out engineering tasks during combat and non-combat operations. To make video a powerful educational tool, it is important to integrate video-based activities through specific teaching strategies. Besides, video content should possess certain characteristics to maximize the educational process. At the same time, specific attention should be paid to creating an interactive video-based learning environment at the HMEI.

The findings can be used to improve the curriculum oriented towards training of future military engineering officers to incorporate video technologies within the educational process during war more effectively. The experiment results can also be considered when developing the courseware and methodological materials at the engineering departments of the HMEIs. In addition, the research outcomes can be applied to design professional training programs for military educators to equip them with the technological and pedagogical skills.

Conclusions

The research found that the use of video has a significant impact upon the improvement of learning outcomes in military engineering education through the visualization of engineering concepts and technical processes, enhancement of cadets' engagement, and presentation of real-life experience. It was found that the formation of professional competence among future military officers with the use of educational video requires the implementation of specific teaching strategies in the MEC. To unlock the potential of video it should possess certain characteristics, such as interactive elements, real-life examples, personalization, high-quality visuals, clarity, conciseness, contextual relevance, feedback, assessment mechanisms, narration quality, microteaching, and cognitive load management. Besides, it was concluded that it is important to create an interactive video-based learning environment that enables future military engineers to engage with the educational materials actively and to enhance the cultivation of military engineering skills necessary to carry out professional tasks under high-pressure conditions.

The research contributed to the detailed examination of the support of video technologies for the educational needs of future military engineering officers during war. When focused on the adaptability and accessibility of video as an effective educational tool, the study provides unique information on the potential of video to enhance learners' engagement, their knowledge retention, and the development of technical skills even when traditional learning environment is disrupted. The study further emphasizes the advantages of integrating video into the curriculum, such as the creation of access to educational materials, and simulating practical experiences that are important for building future military engineers' professional competence. Besides, this research stresses upon the transformative role of video in military engineering learning during wartime, demonstrating its impact on sustaining learning outcomes during emergencies. The study highlights the importance of effectively integrating video into the curricula of HMEI to ensure continuity, resilience, and adaptability of the educational process. The quasi-experiment exploring the enhancement of learning outcomes through in military engineering education during wartime, addresses specific challenges faced by students in HMEIs. Besides, it offers original comprehension of the potential of video technology to maintain the training of future military engineers when traditional methods are disrupted by war.

Despite the article explaining the potential of video to improve learning outcomes in military engineering education, it has several limitations. Firstly, the findings are influenced by the specific context – the State Border Guard Service of Ukraine, and they may not be fully applicable for other HMEIs since they are oriented toward different military missions set by various branches of the Armed Forces. Secondly, the improvement of practical skills of future officers was slightly challenging because professional military engineering tasks are rapidly changing due to combat and non-combat conditions. As a result, educational videos should be constantly updated to consider the battlefield experience.

The study offers the practical applications that can significantly enhance both curriculum design and the training of military educators. For curriculum design, the study recommends incorporating video content that cover essential engineering concepts, operational procedures, and simulations of real-life scenarios. For instance, recorded tutorials and interactive demonstrations can be integrated into the lesson plans, and, as a result, learners have the possibility to revisit complex material at their own pace, that if very important during interruptions caused by wartime circumstances. Additionally, different teaching strategies can be used to create an interactive video-based learning environment that encourages cadets to participate in the classroom.

The findings support preparing instructors to use video technology as an effective teaching tool and a means of engagement. Educators can be trained to create high-quality video content that guide future military engineers through various simulated tasks. For example, a military engineering course could use videos to illustrate machinery maintenance to explore each machine component interactively. The study emphasizes that video-based learning contributes to form critical skills among learners and deliver practical instruction, providing a possibility for HMEIs to enhance the continuity of educational process through effective video integration.

Future research can be aimed at comparative studies between traditional teaching methods and video-based learning to evaluate their relative effectiveness in different military engineering disciplines. Besides, it is important to investigate the impact of personalized video on the learning outcomes of individual cadets in military engineering education.

Bibliographic references

- Abdul-Rahaman, A.-M., & Tindam, T. N. (2024). Assessing the effectiveness of science, technology, engineering, and mathematics (STEM) education on students' achievement in secondary schools. *EIKI Journal of Effective Teaching Methods*, 2(2). <https://doi.org/10.59652/jetm.v2i2.179>
- Afkar, M., Karimi, P., Gavagsaz-Ghoachani, R., Phattanasak, M., & Sethakul, P. (2023). Revolutionizing engineering education: Exploring experimental video-on-demand for learning. *International Journal of Engineering Pedagogy*, 13(7), 96–115. <https://doi.org/10.3991/ijep.v13i7.41683>
- Barabino, G. A. (2021). Engineering solutions to COVID-19 and racial and ethnic health disparities. *Journal of racial and ethnic health disparities*, 8(2), 277–279. <https://doi.org/10.1007/s40615-020-00953-x>
- Bhardwaj, A., & Gupta, A. (2023). Role of video lectures in engineering education. *International Journal of Educational Reform*, 32(2), 208–229. <https://doi.org/10.1177/10567879221142548>
- Bhinder, N. (2022). The reshaping of professional discourse among young military leaders during the COVID-19 pandemic in Ukraine. *Arab World English Journal*, 2, 85–103. <https://dx.doi.org/10.24093/awej/covid2.6>
- Bhinder, N. V. (2019). Professional training of border guards in Ukraine: Challenges and opportunities related to emerging security threats. *Educational Process: International Journal*, 8(1), 72–84. <http://dx.doi.org/10.22521/edupij.2019.81.5>
- Bhinder, N., & Protsenko, P. (2022). Implementation of project-based learning technology within the educational process of higher military institutions. *ScienceRise: Pedagogical Education*, 4(49), 59–63. <https://doi.org/10.15587/2519-4984.2022.262064>
- Brame, C. J. (2016). Effective educational videos: Principles and guidelines for maximizing student learning from video content. *CBE life sciences education*, 15(4). <https://doi.org/10.1187/cbe.16-03-0125>
- Buckley, J., Trevelyan, J., & Winberg, C. (2021). Perspectives on engineering education from the world of practice. *European Journal of Engineering Education*, 47(1), 1–7. <https://doi.org/10.1080/03043797.2021.2000694>
- Bushuyev, S., Korchova, H., Krasyl'nyk, Y., Rudenko, M., & Kozyr, B. (2024). Development of clip thinking of higher education students in information environment. *Information Technologies and Learning Tools*, 99(1), 76–94. <https://doi.org/10.33407/itlt.v99i1.5376>
- Bushuyev, S., Murzabekova, S., Khusainova, M., & Chernysh, O. (2024). Clip thinking in the digital age: complementary or contradictory. *Procedia Computer Science*, 231, 317–322. <https://doi.org/10.1016/j.procs.2023.12.210>
- Corral, D., & Yang, M. (2024). An introduction to the difference-in-differences design in education policy research. *Asia Pacific Education Review*, 25, 663–672. <https://doi.org/10.1007/s12564-024-09959-0>
- Danilyan, O. G., Dzebanb, O. P., Kalynovskyi, Y. Y., Pavlichenko, O. O., & Serhieieva, H. A. (2023). Applying information technologies at higher military education institutions of Ukraine in the current context: Pedagogical and psychological aspects. *Academia y Virtualidad*, 16(1), 149–164. <https://doi.org/10.18359/ravi.6303>
- Dehne, M., & Gröschner, A. (2023). Utility-value change and the role of emotional cost in video-based learning: a matter of student teachers' interpretation of experience. *Frontiers in psychology*, 14. <https://doi.org/10.3389/fpsyg.2023.1166921>

- Deng, R., Feng, S., & Shen, S. (2024). Improving the effectiveness of video-based flipped classrooms with question-embedding. *Education and Information Technologies*, 29, 12677–12702. <https://doi.org/10.1007/s10639-023-12303-5>
- Desai T. S., & Kulkarni, D. C. (2022). Assessment of interactive video to enhance learning experience: A case study. *Journal of Engineering Education Transformations*, 35(1), 74–80. <https://doi.org/10.16920/jeet/2022/v35is1/22011>
- Etemi, B. P., Uzunboylu, H., Latifi, S., & Abdigapbarova, U. (2024). The effect of the flipped learning approach on engineering students' technology acceptance and self-directed learning perception. *Sustainability*, 16(2). <https://doi.org/10.3390/su16020774>
- Feijoo-Garcia, M. A., Holstrom, M. S., Magana, A. J., & Newell, B. A. (2024). Simulation-based learning and argumentation to promote informed design decision-making processes within a first-year engineering technology course. *Sustainability*, 16(7). <https://doi.org/10.3390/su16072633>
- Fyfield, M., Henderson, M., Heinrich, E., & Redmond, P. (2019). Videos in higher education: Making the most of a good thing. *Australasian Journal of Educational Technology*, 35(5), 1–7. <https://doi.org/10.14742/ajet.5930>
- Gopalan, M., Rosinger, K., & Ahn, J. B. (2020). Use of quasi-experimental research designs in education research: Growth, promise, and challenges. *Review of Research in Education*, 44(1), 218–243. <https://doi.org/10.3102/0091732X20903302>
- Gumaelius, L., Skogh, I. B., Matthíasdóttir, Á., & Pantzos, P. (2024). Engineering education in change. A case study on the impact of digital transformation on content and teaching methods in different engineering disciplines. *European Journal of Engineering Education*, 49(1), 70–93. <https://doi.org/10.1080/03043797.2023.2285794>
- Ismail, Y., Okwan, P., Khalifa, F., Lawson, A., & Lacy, F. (2024). Improving the practical skills of STEM students at a historically black college and university (HBCU). *Journal of Infrastructure, Policy and Development*, 8(6), 3507. <http://dx.doi.org/10.24294/jipd.v8i6.3507>
- Jiang, J., Vauras, M., Volet, S., Salo, A.-E., & Kajamies, A. (2019). Autonomy-supportive and controlling teaching in the classroom: A video-based case study. *Education Sciences*, 9(3). <https://doi.org/10.3390/educsci9030229>
- Kamentsev, D., Havryshkiv, O., Kukharska, L., Romashko, O., & Baybakova, I. (2022). Learning english through YouTube as a self-development factor for future officers. *Amazonia Investiga*, 11(55), 132–142. <https://doi.org/10.34069/AI/2022.55.07.14>
- Kornuta, O., Pryhorovska, T., & Potiomkina, N. (2017). Clip thinking and clip perception: Teaching methods aspect. *Open educational e-environment of Modern University*, (3), 75–79. <https://doi.org/10.28925/2414-0325.2017.3.7579>
- La Torre, S., & Désiron, J. C. (2024). From research to practice: Are multimedia principles present in instructional videos used by teachers in science and history?. *Technology, Knowledge and Learning*. Springer. <https://doi.org/10.1007/s10758-024-09753-2>
- Lavrysh, Y., Lytovchenko, I., Lukianenko, V., & Golub, T. (2022). Teaching during the wartime: Experience from Ukraine. *Educational Philosophy and Theory*, 1–8. <https://doi.org/10.1080/00131857.2022.2098714>
- Lee, L., Estrada, H., & Khazaeli, M. (2018). Effective engineering video tutorials. *Journal of Online Engineering Education*, 9(2). <https://scholarlycommons.pacific.edu/soecs-facarticles/280>
- Lu, J. C.-C. (2023). Creating effective educational videos on YouTube in higher education. *Engineering Proceedings*, 38(1). <https://doi.org/10.3390/engproc2023038032>
- Lucenko, G., Lutsenko, O., Tiulpa, T., Sosnenko, O., & Nazarenko, O. (2023). Online – Education and training in higher educational institutions of Ukraine: Challenges and benefits. *International Journal of Educational Research Open*, 4. <https://doi.org/10.1016/j.ijedro.2023.100231>
- Lowe, D., Tilley, E., Willey, K., & Roach, K. (2024). Student reactions to the development of professional engineering competencies. *European Journal of Engineering Education*, 1–17. <https://doi.org/10.1080/03043797.2024.2354240>
- Madariaga, L., Nussbaum, M., Gutiérrez, I., Barahona, C., & Meneses, A. (2021). Assessment of user experience in video-based learning environments: From design guidelines to final product. *Computers & Education*, 167. <https://doi.org/10.1016/j.compedu.2021.104176>
- Maistrenko, O. V., Bubenshchikov, R. V., & Stetsiv, S. V. (2020). The use of simulation modelling tools in a practical training for the prospective officers of the Armed Forces of Ukraine. *Information Technologies and Learning Tools*, 75(1), 186–201. <https://doi.org/10.33407/itlt.v75i1.2676>
- Mamedova, L., Rukovich, A., Likhousova, T., & Vorona-Slivinskaya, L. (2023). Online education of engineering students: Educational platforms and their influence on the level of academic performance.



- Education and Information Technologies*, 28, 15173–15187. <https://doi.org/10.1007/s10639-023-11822-5>
- Noetel, M., Griffith, S., Delaney, O., Sanders, T., Parker, P., del Pozo Cruz, B., & Lonsdale, C. (2021). Video improves learning in higher education: A systematic review. *Review of Educational Research*, 91(2), 204–236. <https://doi.org/10.3102/0034654321990713>
- Nonthamand, N. (2024). Designing the video-based learning environments using workflow and scaffolding to enhance self-instructional video production ability of pre-service teacher. *Contemporary Educational Technology*, 16(1). <https://doi.org/10.30935/cedtech/14102>
- Núñez-Pacheco, R., Espinoza-Montoya, C., Yucra-Quispe, L., Turpo-Gebera, O., & Aguaded, I. (2023). Serious video games in engineering education: A scoping review. *Journal of Technology and Science Education*, 13(2), 446–460. <https://doi.org/10.3926/jotse.1743>
- Onyeaka, H., Passaretti, P., Miri, T., Hart, A., Favero, C., Anumudu, C. K., & Robbins, P. (2023). Pre-lab video demonstrations to enhance students' laboratory experience in a first-year chemical engineering class. *Biochemistry and molecular biology education*, 51(1), 29–38. <https://doi.org/10.1002/bmb.21688>
- Otoum, N., & Alzoubi, A. M. (2024). Improving algebraic thinking and productive desire among a training program based on (TPACK) model in Jordan. *EIKI Journal of Effective Teaching Methods*, 2(2). <https://doi.org/10.59652/jetm.v2i2.172>
- Ożadowicz, A. (2020). Modified blended learning in engineering higher education during the COVID-19 lockdown – Building automation courses case study. *Education Sciences*, 10(10). <https://doi.org/10.3390/educsci10100292>
- Polkowski, Z., Jadeja, R., & Dutta, N. (2020). Peer learning in technical education and it's worthiness: Some facts based on implementation. *Procedia Computer Science*, 172, 247–252. <https://doi.org/10.1016/j.procs.2020.05.039>
- Ralph, B. J., Woschank, M., Pacher, C., & Murphy, M. (2022). Evidence-based redesign of engineering education lectures: theoretical framework and preliminary empirical evidence. *European Journal of Engineering Education*, 47(4), 636–663. <https://doi.org/10.1080/03043797.2021.2025341>
- Ribeiro, G. R. P., Bonini, L. M., Franco, F. C., & Prados, R. M. N. (2016) Education, culture and heritage: A proposal for use of YouTube videos in high school. *Creative Education*, 7(17), 2640–2651. <https://doi.org/10.4236/ce.2016.717248>
- Seago, N., & Knotts, A. (2021). Impact of the design of an asynchronous video-based learning environment on teacher noticing and mathematical knowledge. *Journal of Higher Education Theory and Practice*, 21(4). <https://doi.org/10.33423/jhetp.v21i4.4218>
- Singh, A., Ferry, D., Ramakrishnan, A., & Balasubramanian, S. (2020). Using virtual reality in biomedical Engineering Education. *Journal of biomechanical engineering*, 142(11). <https://doi.org/10.1115/1.4048005>
- Sirotová, M., Michvocíková, V., & Rubacha, K. (2021). Quasi-experiment in the educational reality. *Journal of Education Culture and Society*, 12(1), 189–201. <https://doi.org/10.15503/jecs2021.1.189.201>
- Snigdha, S. S., & Akter, M. (2023). Effectiveness of audio-visual materials in teaching reading for young EFL learners in Bangladesh: An experimental study. *EIKI Journal of Effective Teaching Methods*, 1(4). <https://doi.org/10.59652/jetm.v1i4.84>
- Stefanova, T. A. (2014). Using of training video films in the engineering education. *Procedia – Social and Behavioral Sciences*, 116, 1181–1186. <https://doi.org/10.1016/j.sbspro.2014.01.366>
- Teplická, K., Kádárová, J., & Hurná, S. (2022). The new model of the engineering education using digitalization and innovative methods. *Management Systems in Production Engineering*, 30(3), 207–213. <https://doi.org/10.2478/mspe-2022-0026>
- Tretko, V., Vasiutina T., Kolomiets, I., Ievliev, O., & Kramar, V. (2023). Functions and principles of creating quality information support for the educational space of higher education institution. *Amazonia Investiga*, 12(69), 51–60. <https://doi.org/10.34069/AI/2023.69.09.4>
- Ueki, Y., & Guaita Martínez, J. M. (2019). The impact of engineers' skills and problem-solving abilities on process innovation. *Economic Research-Ekonomska Istraživanja*, 33(1), 2018–2037. <https://doi.org/10.1080/1331677X.2019.1596826>
- Yildirim, S. (2018). The effect of educational videos used in history education on academic success. *Journal of Education and E-Learning Research*, 5(3), 193–207. <https://doi.org/10.20448/journal.509.2018.53.193.207>
- Zhu, J., Yuan, H., Zhang, Q., Huang, P. H., Wang, Y., Duan, S., ... & Song, P. (2022). The impact of short videos on student performance in an online-flipped college engineering course. *Humanities & social sciences communications*, 9(1), 1–10. <https://doi.org/10.1057/s41599-022-01355-6>



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