



EUROPEAN CONFERENCE

Conference Proceedings

III International Science Conference
«Theories, thoughts, technologies:
the foundations of modern science»

September 15-17, 2025
Plovdiv, Bulgaria

THEORIES, THOUGHTS, TECHNOLOGIES: THE FOUNDATIONS OF MODERN SCIENCE

Abstracts of III International Scientific and Practical Conference

Plovdiv, Bulgaria
(September 15-17, 2025)

UDC 01.1

ISBN – 979-8-89814-233-9

The III International scientific and practical conference «Theories, thoughts, technologies: the foundations of modern science», September 15-17, 2025, Plovdiv, Bulgaria, 139 p.

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The recommended citation for this publication is: Nikolenko R.V. Piano performance art in the context of contemporary musicology. Abstracts of III International Scientific and Practical Conference. Plovdiv, Bulgaria. Pp. 27-28.

URL: <https://eu-conf.com/en/events/theories-thoughts-technologies-the-foundations-of-modern-science/>

9.	Fikret Khosrovlu ECONOMIC EFFECTS AND RISKS OF INTEGRATING ARTIFICIAL INTELLIGENCE INTO KNOWLEDGE MANAGEMENT	34
10.	Kravets D. MATHEMATICAL STATISTICS IN EVERYDAY LIFE: MORE THAN JUST NUMBERS	37
11.	Luhova V., Makov B. HUMAN CAPITAL RECOVERY IN UKRAINE THROUGH MIGRATION MANAGEMENT AND DIGITAL SOLUTIONS	40
12.	Колмакова В.М. АДАПТИВНЕ УПРАВЛІННЯ ПРИРОДООХОРОННИМИ ТЕРИТОРІЯМИ	44
13.	Скорнякова Ю.Б., Віноградова М.І. МЕТОДИЧНІ АСПЕКТИ ОРГАНІЗАЦІЇ ОБЛІКУ ВИТРАТ НА ВИКОНАННЯ РОБІТ (НАДАННЯ ПОСЛУГ)	47
JOURNALISM		
14.	Бологов Д. ОСОБЛИВОСТІ СТВОРЕННЯ КОНТЕНТУ ДЛЯ СОЦІАЛЬНИХ МЕРЕЖ У РЕСТОРАННОМУ БІЗНЕСІ УКРАЇНИ	52
JURISPRUDENCE		
15.	Вереша Р.В. ТЕРМІНОЛОГІЧНИЙ ІНСТРУМЕНТАРІЙ НОРМАТИВНОГО ВІДОБРАЖЕННЯ УМИСНОЇ ФОРМИ ВИНИ	57
16.	Франкова А.В. ПРАВО КОМПАНІЙ ЄС ТА ЙОГО ВПЛИВ НА ЗАКОНОДАВСТВО УКРАЇНИ	62
MANAGEMENT, MARKETING		
17.	Gaydash O. PROBLEMATIC ASPECTS OF REGULATORY AND LEGAL REGULATION OF PERSONNEL SECURITY IN UKRAINE	68

HUMAN CAPITAL RECOVERY IN UKRAINE THROUGH MIGRATION MANAGEMENT AND DIGITAL SOLUTIONS

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Human capital, encompassing the collective skills, knowledge, competencies, and experiences that individuals possess, represents a fundamental driver of national resilience and development. The ability of a nation to mobilize, retain, and expand its human capital underpins not only economic competitiveness but also the broader capacity for social cohesion, innovation, and adaptability in times of crisis. For Ukraine, the prolonged war has posed an unprecedented challenge to the preservation and enhancement of this vital resource. The destructive impacts of armed conflict manifest in both direct and indirect ways. Directly, human capital has been depleted through casualties, mass displacement, and the emigration of highly skilled professionals. Indirectly, the war has disrupted educational institutions, fragmented labor markets, and undermined health systems—all critical pillars for sustaining human capital accumulation. These dynamics have intensified migration risks and accelerated the outflow of professionals, including academics, researchers, and entrepreneurs, in search of safety and professional continuity abroad. Against this backdrop, the concept of “virtual return” has emerged as a promising, though still underexplored, strategy to harness the expertise and skills of the Ukrainian diaspora without requiring their immediate physical repatriation. This approach leverages digital technologies and remote collaboration mechanisms to integrate expatriates into Ukraine’s ongoing processes of economic recovery, social resilience, and institutional rebuilding.

The detrimental effects of armed conflict on human capital are widely documented in academic literature. Research shows that exposure to violence significantly undermines educational outcomes, health, and economic productivity. Galindo-Silva and Tchunte (2023), for example, found that Cameroon’s Anglophone conflict caused marked declines in test scores and higher dropout rates, evidencing how instability obstructs early human capital accumulation. Similarly, Vesco et al. (2025) synthesized global findings and identified nine dimensions of human development—including education, health, and income—negatively impacted by war. These dimensions resonate with Ukraine’s current challenges, as the ongoing war has disrupted schools, displaced educators, and jeopardized livelihoods. Migration further complicates the landscape. Studies by Bertè et al. (2023), using LinkedIn data, indicate a significant

rise in Ukrainian professionals relocating abroad. Such “brain drain” not only diminishes domestic innovation capacity but also delays post-war reconstruction. At the same time, Winogrodzka, Kyliushyk, and Chról (2025) conceptualized “mobility capital”—the skills and networks migrants acquire abroad—which could, if strategically mobilized, be redirected toward Ukraine’s recovery. This conceptualization demonstrates that migration should not be viewed exclusively as a loss but as a process that can create new opportunities if managed through deliberate policies.

In this regard, digitalization and the development of remote collaboration platforms are increasingly seen as tools that can counterbalance the negative consequences of migration. Zaloznova and Azmuk (2022) highlight the potential of digitalization in sustaining human capital, arguing that virtual participation allows the diaspora to bypass geographic and political constraints while continuing to contribute to Ukraine’s intellectual, educational, and technological advancement. Unlike traditional reintegration strategies, which rely on physical return, virtual return expands the range of possibilities for knowledge transfer, professional engagement, and innovation diffusion. It offers an immediate, cost-effective solution for tapping into the global dispersion of Ukrainian talent.

The analysis of Ukraine’s current situation reveals several key insights. First, the deterioration of educational systems is among the most urgent problems. The destruction of schools and universities, combined with the displacement of both students and faculty, has weakened the education system to a dangerous extent. While online and hybrid education has mitigated some losses, persistent connectivity gaps, psychological stress, and resource shortages continue to undermine the quality of learning. The long-term implications are severe: declining educational outcomes reduce the quality of the labor force and compromise the foundations of future economic development. Second, the conflict has caused significant disruptions in the labor market. High unemployment rates, widespread underemployment, and an increasing mismatch between available skills and job opportunities illustrate the scale of the problem. Entire industries, including IT, healthcare, and engineering, face shortages due to the mass emigration of professionals, while others are characterized by underutilization of existing talent. This duality undermines economic recovery and further reduces incentives for skilled workers to remain in the country. Third, migration risks and brain drain remain central concerns. The ongoing hostilities have intensified pressures to emigrate, leading to a substantial outflow of human capital. As Bertè et al. (2023) show, this trend represents a double loss for Ukraine: not only are immediate economic contributions forfeited, but long-term innovation potential is also diminished. Moreover, the likelihood of large-scale circular migration remains limited until security conditions stabilize and reintegration mechanisms are strengthened.

Amid these challenges, the concept of virtual return emerges as a viable alternative. Virtual return involves enabling Ukrainian expatriates to contribute digitally through research collaborations, online teaching, mentoring, remote entrepreneurship, and participation in innovation ecosystems. Unlike physical return, this strategy avoids the barriers of relocation while maximizing the benefits of diaspora engagement.

Zaloznova and Azmuk (2022) emphasize that digital tools can sustain knowledge transfer and professional ties, turning migration into a resource rather than a liability. However, virtual return is not without challenges. Reliable internet infrastructure, institutional recognition of remote contributions, and policies incentivizing diaspora involvement are prerequisites for its effectiveness. Governance structures must also be developed to formally integrate digital contributions into national development planning, ensuring that efforts are not isolated but coordinated with broader reconstruction strategies.

The conclusion of this study highlights both the scale of the problem and the promise of innovative solutions. The ongoing war has placed extraordinary pressure on Ukraine's human capital, manifesting in deteriorating educational systems, disrupted labor markets, and an intensified outflow of skilled professionals. These trends jeopardize Ukraine's capacity for resilience, innovation, and sustainable development in the post-war era. Yet, the concept of virtual return offers a promising mechanism to mitigate these losses. By engaging the diaspora digitally, Ukraine can transform migration from a factor of depletion into a source of reconstruction. Virtual return enables skilled professionals to contribute to education, healthcare, technological innovation, and cultural development without requiring immediate physical relocation.

Critically, the long-term success of this strategy depends on the creation of enabling conditions. Policymakers must prioritize infrastructure development, particularly ensuring universal, reliable digital connectivity across Ukraine. Institutional frameworks must be designed to recognize and value diaspora contributions, providing formal mechanisms to measure and reward engagement. Incentive programs and structured digital platforms for research, teaching, and entrepreneurship are required to connect expatriates with domestic actors. Moreover, virtual return must be integrated into broader recovery policies, including strategies for innovation, higher education, and economic revival, to avoid fragmentation and maximize synergies.

The broader implication is that Ukraine's post-war human capital recovery cannot rely solely on traditional repatriation or physical reintegration. While the return of migrants will be necessary in the long run, the realities of ongoing conflict and security uncertainty limit its feasibility in the short term. Virtual return provides an immediate, scalable, and cost-effective complement that can maintain professional ties, sustain knowledge flows, and catalyze innovation even amidst crisis. More importantly, it redefines the very notion of migration: instead of perceiving the diaspora as permanently lost, Ukraine can embrace its global dispersion as a unique strategic advantage. In doing so, the country has the potential to lay the foundation for a more resilient, networked, and digitally empowered model of human capital development, positioning itself strongly for post-war reconstruction and integration into the global knowledge economy.

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