STRATEGIC DEVELOPMENT OF THE RESILIENCE ECOSYSTEM IN UKRAINIAN HIGHER EDUCATION AMIDST A PROLONGED SECURITY CRISIS

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In a modern world characterized by global turbulence, higher education has ceased to be merely an institution for knowledge transmission, transforming instead into a strategic resource for national security and societal resilience. For the national higher education system of Ukraine, the category of "crisis" has evolved from a theoretical construct or a time-limited phase into a permanent operational constant. The current state of the sector is defined as a prolonged security crisis spanning a retrospective period of over six years (2020–2026). The genesis of this crisis is linked to the COVID-19 pandemic, which forced an immediate transition to distance learning technologies. However, contrary to global stabilization trends, for Ukraine, this stage escalated into a phase of full-scale military aggression by Putin's Russia against independent Ukraine, initiated in February 2022. Consequently, the academic community has faced the cumulative impact of chronic stress, the destruction of the physical infrastructure of Higher Education Institutions (HEIs), and a critical level of strategic uncertainty.

Under these extreme conditions, the institutionalization of the resilience ecosystem of higher education has taken place. We define it as a dynamic, self-organizing complex that integrates human capital, digital infrastructure solutions, and mechanisms of institutional adaptability. The key characteristics of this ecosystem include: the hybridity of the educational space, which possesses the capacity for instantaneous process reconfiguration (transitioning between offline, online, and shelter-based formats) without loss of educational continuity; decentralized autonomy and grassroots initiative, which shifts decision-making centers to the departmental level and ensures rapid response to local threats; continuous process improvement maintained despite the crisis, where the system demonstrates the capacity for internal audit and optimization of managerial and didactic cycles by implementing innovative quality control methods and document digitalization; the development of academic solidarity as a specific type of social capital based on synergy, mutual support, and horizontal ties between all participants of the educational process (administration, faculty, and students), serving as a primary antidote to the destructive impact of security risks; and value-based reorientation, transforming education into an instrument of intellectual resistance and a mechanism for preserving national identity.

Between 2022 and 2026, a significant evolution of the system has been observed: from a strategy of physical survival and asset relocation in the initial stage to a phase

of dynamic adaptation. As of 2026, the resilience ecosystem demonstrates a transition toward proactive development, involving the modernization of educational content, intensification of digital innovation, and deeper integration into the European Higher Education Area (EHEA) despite prolonged security challenges. This trajectory from reactive survival to proactive future modeling necessitates the scientific conceptualization of accumulated experience. The realization that the security crisis has acquired a prolonged character dictates the need to transition from temporary adaptation measures to the formation of a stable, long-term strategy for the sustainable development of the higher education system. Accordingly, the aim of this study is to provide a comprehensive analysis of the viability mechanisms of the academic community and to present a strategy for the development of the resilience ecosystem that ensures the modernization and integration of Ukrainian higher education into the European space under conditions of constant security threats.

To objectively understand the environment in which the national resilience ecosystem of higher education functions, it is necessary to examine verified statistical indicators describing the scale of challenges as of 2026. The most profound impact is the loss of human capital within the educational environment, where an unprecedented erosion of staffing potential is observed. Expert estimates and statistical reports indicate the loss of approximately 40,000 research and teaching staff due to migration processes and professional burnout under conditions of prolonged stress (Cedos, 2025; UNESCO, 2026). Infrastructure losses are equally significant; over six years of cumulative crisis (pandemic and war), more than 4,500 educational institutions in Ukraine have been affected, with over 420 completely destroyed and approximately 4,000 suffering substantial damage from systematic shelling (Ministry of Education and Science of Ukraine, 2026). These destructions encompass not only teaching areas but also unique scientific laboratories and digital infrastructure hubs. Forced relocation has also significantly impacted the sector, with over 40 leading HEIs compelled to undergo full relocation while maintaining their status as educational entities and providing access to learning for residents of temporarily occupied territories (Institute of Educational Analytics, 2025). According to the World Bank and its partners, total direct damages to the education and science sector reach $13.9 billion, while the projected financing needs for recovery and modernization over the next decade are estimated at $33.5 billion (World Bank et al., 2025). Despite critical threat levels, approximately 70% of educational activities have been stabilized in hybrid or face-to-face formats by 2026 through the implementation of hybrid technologies and the creation of a network of safe educational environments, specifically properly equipped shelters (Ministry of Education and Science of Ukraine, 2026).

The analysis of the six-year experience of Ukrainian higher education functioning amidst continuous challenges proves that the existing resilience of the system is not accidental. It is based on the capacity of educational process participants for self-organization and rapid adaptation. However, to transition from a model of "heroic survival" to "sustainable development," it is necessary to formalize this spontaneous experience into specific strategic directions. The proposed priorities are

formulated based on a reflection upon three critical components of our ecosystem: the lessons of the pandemic, which laid the foundation for digital flexibility; the realities of martial law, which revealed the critical role of local leadership; and the necessity of EU integration, which demands compliance with international quality standards. This synergistic approach has allowed for the identification of the following strategic landmarks for the development of the higher education system.

The first priority is digital architecture and cyber-resilience of the educational space, involving the creation of robust "cloud" infrastructure for HEIs capable of functioning amidst energy crises and cyber threats, ensuring process continuity regardless of physical location. The second priority is crisis-oriented educational leadership and institutional autonomy, focusing on developing the managerial competencies of a new generation of academic leaders and strengthening the subjectivity of departments and program working groups as independent centers of responsibility. The third priority centers on academic solidarity and the preservation of human capital, transforming internal competition into a model of network interaction to retain intellectual potential within the national ecosystem. The fourth priority encompasses adaptive governance and quality management through the implementation of agile, data-driven management models, deregulation of procedures, and constant process audits to maintain efficiency even during peak security crises. The fifth priority is defined as international subjectivity and integration into the European Higher Education and Research Area, facilitating a transition to an equal partnership model by exporting Ukraine's unique resilience experience and integrating Ukrainian HEIs into EU research chains as innovation drivers.

The functioning of Ukrainian higher education between 2020 and 2026 proves that in a prolonged security crisis, the viability of the system is determined primarily by the internal capacity to form a resilience ecosystem. This path from reactive management to proactive design confirms that a prolonged crisis can catalyze institutional renewal when guided by a clear strategy. The resilience ecosystem has proven its effectiveness through the combination of decentralized autonomy and academic solidarity, where educational leadership at the HEI and departmental levels became the key factor in maintaining the integrity of the scientific community. Furthermore, this strategy offers the global academic community a field-tested model for functioning amidst global turbulence. Thus, the integration of Ukrainian higher education into the European space should be viewed as a mutually beneficial exchange of unique resilience expertise, creating a foundation for transforming Ukrainian universities into powerful centers of recovery and innovative development within the future security architecture of Europe.

Keywords: Ukrainian higher education, resilience ecosystem, prolonged security crisis, institutional adaptability, university resilience, human capital, academic solidarity, hybrid educational space, strategic development, digital transformation.

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