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Viktoriia KYRYLENKO

*PhD student, Department of Business Economics and Entrepreneurship,
Kyiv National Economic University named after Vadym Hetman*

Liudmyla PETRENKO

*Dr. of Economics, professor of Business Economics
and Entrepreneurship Department of KNEU*

Вікторія КИРИЛЕНКО

*аспірантка, кафедра бізнес-економіки та підприємництва,
Київський національний економічний університет імені Вадима Гетьмана*

Людмила ПЕТРЕНКО

д.е.н., проф. кафедри бізнес-економіки та підприємництва КНЕУ

INNOVATIONS IN ADVERSITY: UKRAINE'S LIFE SCIENCES AND HEALTHCARE

ІННОВАЦІЇ В УМОВАХ ВИКЛИКІВ: НАУКИ ПРО ЖИТТЯ ТА ОХОРОНА ЗДОРОВ'Я В УКРАЇНІ

Abstract. The paper examines the current conditions in Ukraine's bioscience and healthcare sector, specifically addressing the disruptions caused by the ongoing conflict and initiatives aimed at digital transformation of the industry. It reviews key government strategies, particularly the recently introduced MedTech strategy, which targets advancements in bionic prosthetics, skin regeneration technologies, burn therapies, mental healthcare, and medical applications of artificial intelligence. A significant focus is placed on the Lab2Market MedTech accelerator, initiated by Ukraine's IP Office, designed to transition scientific research in medical technologies into commercial products.

Keywords: life sciences; healthcare; medical technologies; innovation; startups; Ukraine.

Анотація. У статті проаналізовано поточний стан сектору біонаук та охорони здоров'я в Україні, зокрема порушення, спричинені триваючим конфліктом, а також ініціативи, спрямовані на цифрову трансформацію галузі. Розглянуто основні урядові стратегії, зокрема нещодавно впроваджену MedTech-стратегію, що охоплює розвиток біонічного протезування, технологій регенерації шкіри, лікування опіків, ментального здоров'я та застосування штучного інтелекту в медицині. Значну увагу приділено акселератору Lab2Market MedTech, започаткованому Офісом інтелектуальної власності України, який спрямований на перетворення наукових медичних розробок на комерційні продукти.

Ключові слова: біонауки; охорона здоров'я; медичні технології; інновації; стартапи; Україна.

Introduction. Life Sciences and Healthcare in Ukraine: The Lab2Market MedTech Accelerator Program

Ukraine's healthcare sector had a strong pre-war foundation, with a 2024 budget of ~\$6 billion and over 23,000 registered providers (hospitals, clinics, pharmacies) integrated into a national eHealth system. However, the 2022 invasion caused massive disruption. By 2025, more than 2,000 medical facilities had been damaged or destroyed and the WHO recorded 2,254 attacks on healthcare, leading to severe personnel shortages and broken supply chains. Wartime needs have shifted dramatically: battlefield injuries (trauma, burns, amputations) surged and nearly half of Ukrainians reported war-related mental health issues by late 2024. Demand for physical rehabilitation and psychological care (PTSD treatment, counseling) skyrocketed, while chronic and infectious diseases (e.g. tuberculosis) worsened due to interrupted services. The crisis has galvanized reforms and innovation. In 2023 the government introduced a national MedTech

development strategy, aligning with EU integration goals, to incorporate advanced technologies into medicine. This strategy explicitly prioritizes areas amplified by war – scaling up domestic bionic prosthetics, developing regenerative skin and burn therapies, digital mental health solutions, and AI-driven diagnostics. Concurrently, the Ukrainian IP Office established a National Innovation Hub for research commercialization. Under this initiative, it launched the Lab2Market MedTech accelerator – a flagship program designed to translate medical R&D into commercial products.

Lab2Market MedTech is a government-supported, entrepreneur-focused acceleration program for medical innovations. Initiated in late 2024 by the Ukrainian National IP Office (in partnership with the ISE Group), its purpose is to bridge the gap from laboratory research to market-ready medical technologies. The program aims to support both early-stage teams and existing startups in the med-tech field: participants receive training to refine their business models, secure intellectual property, and attract investment. The first Lab2Market cohort began on 17 February 2025 and ran for about 1.5–2 months. Participation was free (funded by government support and sponsors) and competitive, with over 20 teams selected from universities, research institutes, startups, and hospitals across Ukraine. The accelerator’s curriculum is intensive and mentorship-driven: structured sprints and workshops cover business development, market research, regulatory and ethical requirements, intellectual property rights, and pitching to investors. For example, an early workshop focused on legal protection of IP in healthcare. Each team is paired with experienced mentors (entrepreneurs, patent advisors, clinicians, industry experts) who guide project development. The program concludes with a demo day where teams present their progress to potential investors and healthcare stakeholders.

The inaugural cohort encompassed 22 projects spanning diverse medical fields, reflecting Ukraine’s urgent health priorities. Many innovations directly target war-related needs. Key areas include:

- Medical devices and diagnostics: Advanced solutions for trauma care (e.g. carbon-fiber wound dressings for burns, smart crutch tips, lightweight exoskeletons, 3D-printed prosthetic limbs) and diagnostic tools (AI-powered imaging systems for early cancer or TB detection, portable point-of-care tests).
- Digital health and telemedicine: AI-driven platforms and telehealth services (such as remote monitoring apps and symptom-checkers) that leverage Ukraine’s strong IT sector to improve access and efficiency.
- Mental health technologies: Software and hardware interventions for PTSD and stress (e.g. virtual reality exposure therapy systems, mobile apps for stress relief and psychoeducation, AI chatbots) to address widespread psychological trauma.
- Regenerative medicine and biotech: Cutting-edge therapies (e.g. probiotic-based treatments targeting the gut–brain axis for PTSD, novel immunotherapies for cancer, spray-on cellular skin grafts for burn victims) that reflect ongoing biomedical research being pushed toward clinical application.

Each project’s Technology Readiness Level varies (from concept to near-market prototype) and many combine hardware, software, and biological innovation. Together, these ventures demonstrate how Ukrainian scientists and engineers are channeling research into practical solutions for current healthcare challenges.

Lab2Market MedTech represents a significant shift in Ukraine’s medical innovation ecosystem. Previously, much high-quality research “remained on the shelf” due to a lack of commercialization pathways; Lab2Market directly addresses this gap. By providing structured entrepreneurship training and mentoring, the program helps transform scientists into startup founders. Early evidence of impact is promising: for instance, teams like ComeBack Mobility (smart crutch-sensor rehabilitation device) and Raccoon.Recovery (gamified physical therapy platform) have already developed functional prototypes and attracted external investment. These successes suggest that the accelerator is catalyzing real marketable products. Another key benefit is the strengthened network among academia, healthcare, industry, and government. During the

program, participants interact closely with clinicians who validate practical needs, IP attorneys who guide patenting, and business mentors who align projects with market demands. This interdisciplinary approach ensures that innovations are not only technically feasible but also compliant with regulatory standards (e.g. future CE marking or FDA approval). Since the IP Office runs Lab2Market, participants receive specialized support in patent search and filing, which is crucial in med-tech for securing investment and protecting innovations. In the longer term, Lab2Market startups could contribute directly to Ukraine's healthcare recovery. Solutions like telemedicine platforms and portable diagnostics are immediately useful for providing care in regions where hospitals were destroyed. Rehabilitation devices and low-cost prosthetics will remain in high demand given the large number of injured veterans. By fostering domestic production, Ukraine can reduce reliance on imports and build self-sufficiency in critical medical supplies. Moreover, a thriving med-tech sector can create high-skill jobs and stimulate economic growth in the post-war period. Nevertheless, challenges remain. Scaling prototypes into widespread products requires significant funding, yet venture capital in Ukraine is constrained by war-related risks. Some public grants (EU Horizon, USAID, national Startup Fund) provide support, but broader investment and international partnerships will be needed to advance clinical trials and global market entry. Regulatory hurdles are also non-trivial: many innovations (especially in biotech and AI) will require rigorous clinical testing and approval by health authorities. Lab2Market's curriculum raises early awareness of these issues, but continued support—through follow-on incubators, pilot programs in hospitals, and policy facilitation—will be important for long-term success. Talent retention is another concern. Prolonged conflict risks brain drain of scientists and engineers. Programs like Lab2Market help mitigate this by offering a pathway for impactful careers at home. Participants report that working on urgent national problems provides a strong sense of purpose, and early success stories can inspire more researchers to pursue entrepreneurship in Ukraine. Overall, the Lab2Market experience underscores the importance of mentorship, business education, and networking in translating research to innovation. Even in a low-resource, crisis setting, structured support has enabled medical scientists to generate viable technology prototypes. By extending such accelerator models (and potentially applying them to other bioscience fields), Ukraine can amplify its research productivity and innovation capacity.

In summary, Ukraine's Lab2Market MedTech accelerator has emerged as a timely catalyst for medical innovation. Its first cohort of 22 projects – spanning diagnostics, AI healthcare platforms, novel therapies, and assistive devices – directly addresses the country's highest health priorities. Early outcomes are encouraging: some teams have already delivered products to patients and attracted investment, demonstrating the model's effectiveness. These initiatives align closely with national goals (improving trauma care, mental health services, and medical infrastructure) and lay a foundation for integrating home-grown technologies into Ukraine's healthcare system. Lab2Market's successes illustrate a broader lesson: targeted accelerators can turn scientific potential into practical solutions, even under crisis conditions. By embedding entrepreneurship training, IP support, and stakeholder collaboration into the research pipeline, Ukraine is not only addressing urgent war-time health challenges but also planting seeds for a resilient, innovation-driven med-tech industry. With continued backing, these home-grown technologies may improve care for Ukrainians and expand into global markets, showcasing Ukraine's contributions to medical science.

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