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MODERN MECHANISMS FOR FINANCING SCIENTIFIC ACTIVITY IN HIGHER EDUCATION INSTITUTIONS

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In the context of contemporary globalization and digital transformation, the development of the higher education system is intrinsically linked not only to enhancing educational quality but also to ensuring the efficacy of research and development (R&D) activities. The intensification of competition in the global economy driven by knowledge, innovation, and advanced technologies is positioning higher education institutions (HEIs) as pivotal hubs for generating scientific knowledge, developing emerging technologies, and facilitating their practical implementation. Consequently, providing HEIs with adequate and sustained financial resources for scientific activities emerges as a priority direction of modern higher education policy.

The concept of financing scientific activity in higher education institutions encompasses providing financial resources for supporting the research endeavors of faculty and researchers, developing research laboratories, procuring modern equipment, executing research projects, publishing scientific outputs, and funding patenting and commercialization activities. The effective organization of this process enhances the scientific potential of universities, attracts young scholars to research pathways, and reinforces integration between higher education and industry.

Global experience demonstrates that in developed nations, the financing of research activities in higher education institutions relies not solely on state budget allocations. Alongside government grants, funding is drawn from universities' internal revenues, corporate R&D contracts, private sector investments,



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international grants, scientific foundation funds, venture capital, commercialization revenues, and other alternative financial sources. In particular, performance-based funding, competitive grants, and university-industry partnerships are widely deployed as modern mechanisms for supporting scientific endeavors.

In Uzbekistan, significant focus is directed toward modernizing the higher education and science systems, elevating research quality, and reinforcing the scientific potential of higher education institutions. The strategic importance of this domain is evidenced by measures implemented to provide grant-based funding for university research projects, increase the proportion of credentialed academic staff holding advanced degrees, support early-career researchers, upgrade scientific laboratories, and broaden international research collaboration. At the same time, certain challenges persist within the research financing system of higher education institutions. These notably include insufficient diversification of funding sources, incomplete frameworks for performance-based criteria in evaluating and funding research projects, low rates of scientific commercialization, underdeveloped industry-university partnerships, and constrained capital available for modernizing scientific infrastructure.

Addressing these challenges necessitates implementing modern financial mechanisms within higher education institutions. First and foremost, a results-oriented funding approach must be reinforced. Under this model, key performance metrics should prioritize tangible outputs—such as patented innovations, commercialized software and prototypes, high-impact scientific publications, and effective technology transfers rather than merely the volume of capital allocated.

Furthermore, it is essential to establish a multi-channel funding model for scientific activity in higher education institutions. While state budget allocations



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remain a primary source for supporting fundamental and strategic research, opportunities to fund applied research through corporate contracts, private investments, international grants, and venture financing must be expanded.

In addition, it is essential to digitize science financing processes, establish transparent mechanisms for selecting and monitoring grant projects, strengthen independent expert evaluation, and mitigate conflicts of interest. Tracking scientific projects from initial funding allocation to final outcome delivery within a unified digital monitoring system will ensure the optimal and efficient utilization of financial resources.

In summary, optimizing the financing of scientific activities within higher education institutions serves as a vital prerequisite not only for augmenting university research potential, but also for driving the innovative development of the national economy. From this perspective, refining modern funding mechanisms, diversifying financial streams, strengthening performance-based approaches, and advancing commercialization pathways underscore the profound relevance and urgency of this research direction.

Modernizing and refining financial mechanisms for scientific activity in higher education institutions stands as a critical prerequisite for fostering integration across science, education, and the economy. Higher education institutions serve not only as training grounds for highly qualified personnel, but also as primary engines for generating scientific knowledge, pioneering innovative technologies, and formulating applied solutions. Consequently, establishing an adequate, sustainable, and diversified financial ecosystem is of strategic importance for driving university research potential.

Based on the findings of this study, relying exclusively on state budget allocations to finance research activities in higher education institutions may prove insufficient for long-term sustainability and effectiveness. Therefore,



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diversifying financial resources must serve as a central strategic priority. Achieving this requires establishing an integrated synergy among various funding channels, including state budgetary support, competitive scientific grants, international foundations, foreign grant initiatives, private sector capital, corporate R&D contracts, universities' internal revenues, and commercialization proceeds.

Further developing a competitive grant system plays a vital role in funding scientific projects. In allocating grant funds, primary evaluation criteria must encompass project novelty, scientific and practical significance, anticipated socio-economic impact, innovative potential, commercialization viability, and alignment with national strategic priorities. This approach ensures the strategic steering of financial resources toward high-impact, transformative research endeavors.

Furthermore, it is necessary to implement a performance-based mechanism for financing scientific activities in higher education institutions. Under this approach, alongside monitoring the utilization of allocated capital, equal emphasis must be placed on evaluating the tangible scientific and practical outputs generated. Specifically, key performance indicators should incorporate metrics such as high-impact scientific publications, patents, emerging technologies, software products, functional prototypes, technology transfer agreements, licensing revenues, and commercialized projects.

Another modern mechanism for financing scientific activity in higher education institutions is the implementation of a phased (stage-gate) funding system. The progression of a research initiative from initial concept to fundamental research, applied development, experimental prototyping, and eventual commercialization must be supported through an integrated financial chain. This continuum



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mitigates the risk of scientific innovations stalling before reaching practical implementation.

Strengthening collaboration between higher education institutions and the private sector represents another critical and strategic priority. When enterprises issue R&D contracts targeted at solving specific technological and manufacturing challenges, they inject additional financial resources directly into university research ecosystems. Concurrently, it is necessary to bolster the operations of technology transfer centers, innovation hubs, startup incubators, and dedicated commercialization units within universities to bridge academia and market demand.

Effectively leveraging international funding sources substantially enhances the research capacity of higher education institutions. Participating in foreign grants and international scientific programs provides universities not only with supplementary financial capital, but also with access to advanced laboratory equipment, modern research methodologies, global academic networks, and cutting-edge research practices. Consequently, fostering competencies among faculty members and early-career researchers in designing and managing international grant projects remains vital.

Ensuring transparency and accountability throughout the funding process is paramount. Digitizing the stages of grant selection, peer evaluation, capital allocation, and post-project performance assessment minimizes corruption risks and enhances the efficiency of resource utilization. Independent expert evaluation, transparent scoring rubrics, and systematic project monitoring must form the core components of a modern grant administration system.

Furthermore, targeted support for early-career researchers must be prioritized within higher education financing frameworks. Expanding opportunities for young scientists through seed grants, startup funding, scientific mobility



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allowances, specialized laboratory research support, and participation in international collaborative projects ensures the continuous renewal and sustainable development of scientific human capital.

To maximize the effectiveness of the research financing system in higher education institutions, it is vital to synthesize the principles of diversification, competitiveness, performance-based evaluation, operational transparency, phased stage-gate funding, and commercialization into a unified structural framework. The practical implementation of these integrated mechanisms strengthens the financial sustainability of universities, elevates research quality, expands innovative outputs, and accelerates the transfer of scientific achievements into the real economy. Consequently, higher education institutions will emerge as primary drivers of the nation's scientific, technological, and innovative development.