

Dear Colleague

I am pleased to share the summary from workshop convened by the U.S. National Academy of Sciences which identifies approaches for rebuilding research, education, and innovation in Ukraine. The central message, informed by experts from the U.S., Europe, and Ukraine, is the critical importance of science, innovation, and education to Ukraine's present and future as a sovereign, secure and economically successful country. Experts highlighted ways to help by comparing best practices in managing national research systems from a wide range of countries. Four focus areas: scientific research, higher education, technological innovation, and research funding, are deeply interconnected and linked to the economic and national security success of Ukraine.

Below are the major key points that were highlighted and repeated throughout the workshop:

- *Science, technology, and innovation are an integral part of Ukraine's strategy for reconstruction and modernization.* Ukrainian participants noted that this is not widely recognized by the Ukrainian government, and there is very little institutional capacity to design and implement S&T policies and reforms. Speakers from the Estonian and Polish academies stressed the importance of getting the government to understand the connection between scientific research and the country's interests. We know from experience with the "Asian Tigers" (South Korea, Hong Kong, Taiwan, Singapore) and countries such as Estonia and Israel, that sustained and focused investments in S&T have been critical to their economic growth and national security prowess. Such examples provide an established path for Ukraine going forward.
- *It is essential to preserve human capital during the war and develop it during the post-war rebuilding.* Human capital was repeatedly highlighted as one of the most critical aspects of rebuilding Ukraine's science and education systems. Bolstering human capital in this context involves preserving the workforce in scientific research and education, as well as developing this workforce's skillset in the areas of management and financial accountability. This includes supporting Ukrainian researchers inside and outside Ukraine, with the goal of eventual re-integration. Many speakers stressed the importance of keeping researchers in Ukraine and re-integrating those that have left. Another critical aspect of maintaining human capital is educating and cultivating the next generation of scientists and educators, which requires adapting universities for proper training.
- *Mechanisms for funding need to be adapted to include competitive, merit-based selection for research grants as well as rigorous core funding for universities and institutes.* Speakers from former-Soviet academies in European countries noted that following their independence, they restructured their funding systems based on the principles of quality and importance for the country, which ensured that the most important research fields and best researchers were supported, and corrupt practices were weeded out. The President of the Estonian Academy of Sciences noted that separating research management and research implementation was a critical component of Estonia's reform process. The Director of the National Research Foundation of Ukraine pointed out that international guidance for how to implement these funding mechanisms would be helpful.

- *International collaboration and guidance are critical for supporting Ukraine's rebuilding.* Ukrainian speakers noted that international collaboration has already helped the reform process, such as Ukraine's membership in the Horizon 2020 program in 2016 and the creation of the National Research Foundation of Ukraine, which has been active since 2020. The President of the Polish Academy of Sciences noted the importance of Ukraine's integration into European scientific consortia (i.e. Marie Skłodowska-Curie Actions, European Research Council).

We recognize that the devastation of the war in Ukraine will make rebuilding particularly difficult, and humanitarian aid will remain a top priority for a long time. Even under these conditions, it is critical that the policy community in the United States and internationally develop approaches and dedicate funding to the rebuilding of science and technology in Ukraine. The national and economic security of the country in the near and long term will depend on that. The U.S. National Academy of Sciences, established under a congressional charter signed by President Abraham Lincoln in 1863 to provide advice to the nation, stands ready to work with you and your colleagues in the U.S. government and our partners in Ukraine and throughout the world to assist in this noble and critical effort.