

# Science in Ukraine: survive, transform, take the lead

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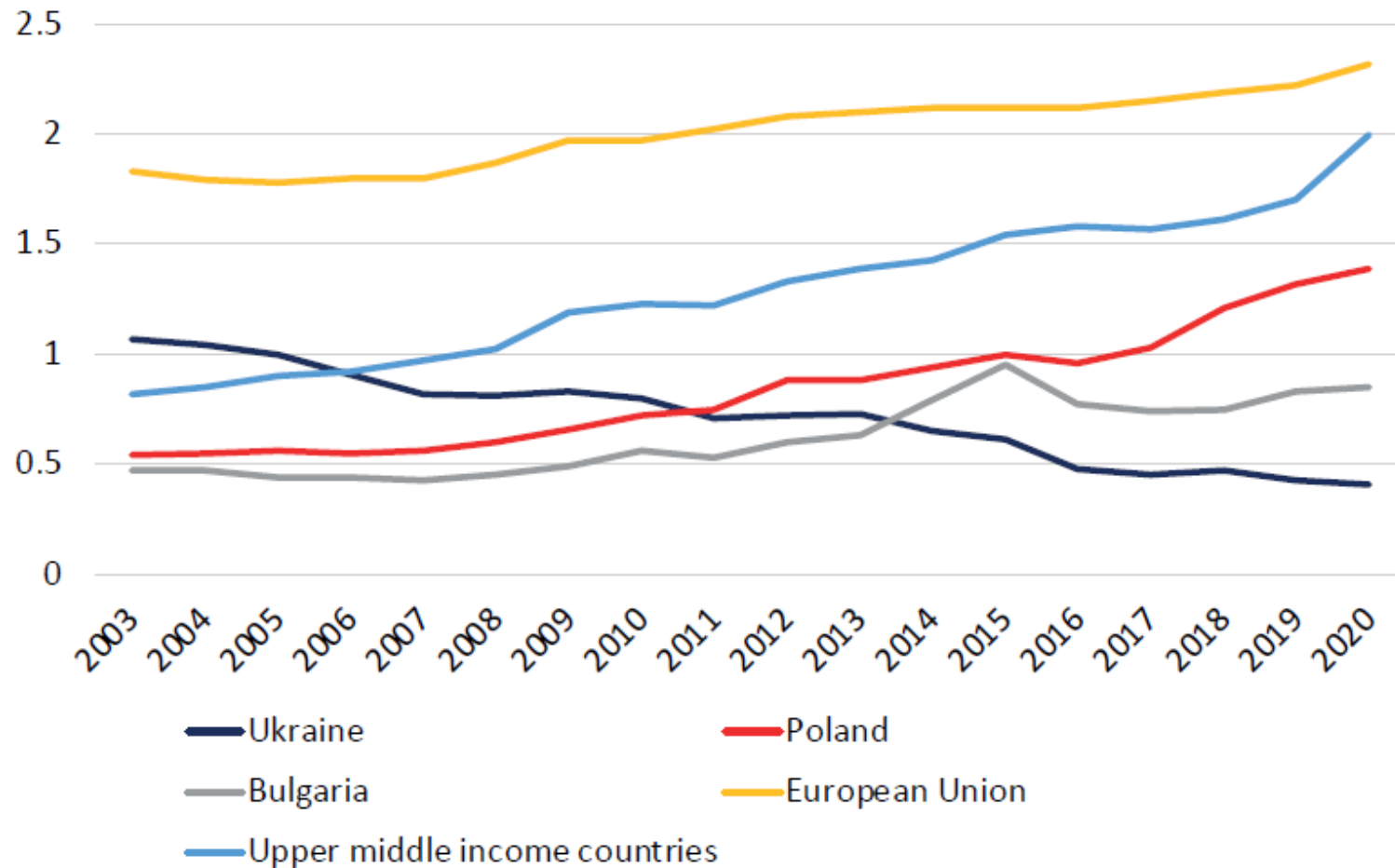
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# Outline

- **R&D sector of Ukraine before the full-scale war**
- **War challenges**
- **Postwar goals**
- **Short-term measures: survival**
- **Long-term measures: sustainability and development**

**R&D sector before the full-scale war:  
steady systemic decline**

# R&D expenditure (% of GDP)



# Number of researchers per million people

	EU average	Poland	Bulgaria	Ukraine
2006	2691	1553	1354	1475
2020	4257	3288	2402	846

# Systemic challenges

- **Lack of vision and development strategy**
  - science viewed as “art” with limited practical value, no priority
  - no continuity of state policy
  - lack of trust between main stakeholders
- **Weak connection between science and the economy**
  - low-tech economy -> limited demand for R&D
  - no incentives for private investment

# Systemic challenges

- **Problems of governance and policymaking**
  - legacy post-Soviet organization (self-sufficient Academies of Sciences with a rigid hierarchy, decoupled education and research)
  - outdated & contradictory legal framework
  - lack of policy development capacity, no data-driven policy
  - policy development, its implementation, funding, evaluation, legislative initiative concentrated at the Ministry for Education and Science (MES)

# Systemic challenges

- **Problems with human capital**

- career paths based on legacy “scientific titles”, false priorities stimulate imitation of science, violations of academic integrity
- low salaries/prestige, low mobility, isolated academic job market
- deterioration of education level
- brain drain, negative selection

- **Research infrastructure problems**

- outdated infrastructure (from equipment to buildings), zero investment in modernization
- no data on existing infrastructure, no development strategy



# Systemic challenges

- **Problems with funding instruments**
  - very limited set of funding opportunities
  - not tailored to specific needs of different types of research
- **Problems of international cooperation and integration into the global and European research space**
  - low level of English proficiency, low academic mobility, detachment from the global science
  - no state strategy for internationalization of science
  - incompatible legislation puts barriers to cooperation

# Previous reforms

- **New legislation on science (2016):** two new institutions
  - *National Research Foundation of Ukraine* (independently governed, competitive grant funding, international experts)
  - *National Council on Science and Technology Development* (advisory body for the government, ½ are independently elected scientists, ½ are government managers, head = PM)
- **Limited impact so far**
  - only the Scientific Committee of the NCST is active
  - independence of NRFU under constant attack, limited budget

# War challenges

- Direct damage to ~15% of research infrastructure
- Indirect: disruption of research (materials, internet, electricity, etc.)
- Displaced researchers/educators/students (7-15% fled Ukraine, 30% moved inside Ukraine), broken research teams
- Budget cuts, freeze of funding for ongoing projects, job cuts → very limited funding and career opportunities
- Psychological impact (survey: 73% unable to perform research)
- Travel restriction for men 18-60 limits international cooperation

# Postwar goals

- Post-war reconstruction, along with the EU accession, poses modernization challenges for Ukraine: shift from carbon-intensive low-tech industry to knowledge-based economy
- No other way but embracing R&I as the driving force of this modernization. Ukraine with weak science = weak Ukraine.

# Basic principles of postwar reconstruction

- Ensure that science, technology, innovation are at the core of the overall strategy for reconstruction; it is advisable that the platform/agency coordinating the donor help has a dedicated supervision team for the R&D sector
- Aim at systemic reforms
- Ensure that human capital is preserved and developed during the reconstruction

Short-term measures: survival

# Short-term measures

- Primary goal to support of **researchers inside Ukraine** (~85%)
- Focus on enabling researchers (selected by merit) to remain in science, even if they are limited in their ability to perform research
- Continue supporting Ukrainian **researchers outside Ukraine**, but emphasize perspectives of their **re-integration** (e.g., include opportunities to cooperate with Ukrainian teams to preserve research groups and increase funding chances)
- Support **integration of UA science** into European networks

# Short-term measures

- **A national system of researcher fellowships:** merit-based individual support, not project-bound, based on track records for the last 5–10 years, awarded for 1–2 years w/renewal, support best 10% of researchers
- **Support for competitive project funding via the NRFU:** ensure that the NRFU remains an active funding channel supporting excellent science and mission-oriented projects.
- **EU programme to integrate UA science into ERA:**
  - 1<sup>st</sup> stage: support for **research networks**, integration into existing activities, “outsourcing” research, joint proposals, **remote jobs/fellowships**
  - 2<sup>nd</sup> stage: support for **joint doctoral schools** - seeds for establishing **Centers of Excellence** (3<sup>rd</sup> stage)



# Short-term measures

- **Support matchmaking for the international transfer of expertise:**  
development of digital instruments e.g. within the National Electronic System of Scientific and Research Information (URIS)
- **Support capacity building for developing reforms in the R&D sector:**
  - establishing a Science and Technology Policy Office as a support team for the National Council on Science and Technology
  - training instruments for MESU and other government personnel

Long-term measures: transform & lead

# Long-term measures

- **Introduce a performance-based funding system & increase overall R&D spending**
- **Transformation of state governance in science**
  - decouple functions of policy development (MESU) and policy implementation (funding distribution, advising, evaluation ...)
  - improve horizontal coordination; support advisory role of the National Council on Science and Technology by a capable back office
- **Strengthen the role of scientific expertise in decision-making**  
main challenge is to build trust; need independent actors  
National Council on Science and Technology, professional associations

# Long-term measures

- **Build a multilayer system of funding instruments:** targeting different types of research, TRLs, career stages
- **Transform national academies of sciences:** provide separate organizational and funding structures for (i) basic research (ii) applied science (iii) defence-related projects, with increased financial autonomy and responsibility, with integrated research and education;
- **Quality assurance system** both for institutional and project funding; evaluation at the level of *research group*;
- **Make STEM education a priority** at all levels, funding instruments of youth engagement, popularization of science

# Long-term measures

- **Strategy for internationalization**

- use instruments of pre-accession assistance, involve SMEs, harness the potential of scientific diaspora
- international joint labs/centers of excellence/infrastructure
- create incentives for “outsourcing” R&D tasks to Ukraine

- **Support integration of research and education**

- joint appointments, doctoral schools, and labs across research institutes and universities

- **Involvement of domestic business/industry**

- provide grants for R&D directly to SMEs
- tax incentives & cofunding schemes to stimulate private investment into R&D

# Instead of the Summary

- “**Research and innovation** should be embraced as a core pillar of a sustainable economic recovery and future growth of a knowledge-based economy, that harnesses the power of Ukraine’s human capital, and requires a **major policy shift** and fundamental transformations in this sector. It is thus advisable that the **platform/agency coordinating the donor help has a dedicated supervision team** for this sector.”
- “In the **short term**, donor help in the research and innovation sphere should be focused on retention and development of human capital (e.g., via supporting researchers, embedding them into ongoing activities via **non-residential fellowships**), deepening global integration of Ukrainian science via support of **international research networks** and **doctoral schools**, and strengthening ties between research and business. **Longer-term** support should flow into **new structures and instruments** that will define the vector of transformation, such as **joint centres of excellence** and innovation hubs.”

*Recommendations of the G7 Expert Conference (Berlin 25.10.22)*