

# Contemporary Challenges to the Personnel Training System for Open Science and Innovation *(based on the results of the ACUR analytical studies)*

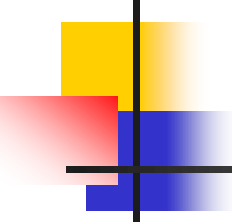
*Artur L. DEMCHUK,*

*Deputy Dean, Faculty of Political Science, Moscow State University,  
Expert, Association of the Classical Universities of Russia (ACUR),  
Member, Bologna Follow-Up Group of the Russian Federation*



**ФОНД  
ПРЕЗИДЕНТСКИХ  
ГРАНТОВ**






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Research has been carried out within the framework of the President of Russian Federation Grant for civil society development № 17-1-006957:

**“Developing modern patterns of research competencies for alumni of educational programs in fundamental spheres of higher education”**



**Objective:** find out the best experiences of research competence formation in the leading universities of the Russian Federation, European Union, USA, and China.

**Experts:** Experts are professors representing universities of Russia, European Union, USA, and China, carrying out research in the area of research competence formation of graduate students.



# Global Challenges (1)

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- I. Reduction of public expenditures for science and education (from 2008)
- II. Redistribution of investment in science between government and business (US – app. 70% in 2015) leads to problems:
  1. *Reduction of fundamental (basic) research – investing in technologies that provide for quick returns*
  2. *Research policies and priorities are defined by investors, not scientists*



## Global Challenges (2)

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3. *Cost-saving strategies in applied science lead to the reduction of investment in equipment*

4. *More intensive exploitation of personnel (e.g. post-doc)*

### III. Changes in the employment in science

- Temporary positions (“*precariat*”) – (about 75%)
- Job instability/insecurity
- Low salary growth
- Lower motivation for young researchers



## Global Challenges (3)

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IV. Globalization (internationalization) of science - uneven distribution of innovations “focal points” (centers). Research concentrates in “old centers”.

V. All of the above leads **to challenges for training:**

*1. Need for teaching both basic disciplines and practical skills, ability of independent self-guided training; networking and mobility; communication and management / entrepreneurship*

*2. Education as an institution of socialization*



## Global Challenges (4)

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### **Risks for the development of human capacity of contemporary science and personnel training:**

1. It is hard to forecast the demand for personnel in particular fields of science
2. Increasing “entry requirements” for new researchers
3. Motivation risks (due to unstable employment)
4. Strategic choices risks (due to competition and investors driven decision-making)



# Global Challenges (5)

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## Risks for the development of human capacity of contemporary science:

5. Commercialization of research (balance between basic and applied research)
6. International dimension of research (*open science vs. know-how*)





# Challenges in Russia (1)

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I. Governmental expenditures for science and education increase, private sector **does not** increase investment in science (drop from 33% to 28% in 15 years)

Relatively slow growth of patenting

II. Government runs into difficulties related to

- *former centralized management of science,*
- *equipment aging due to low financing*

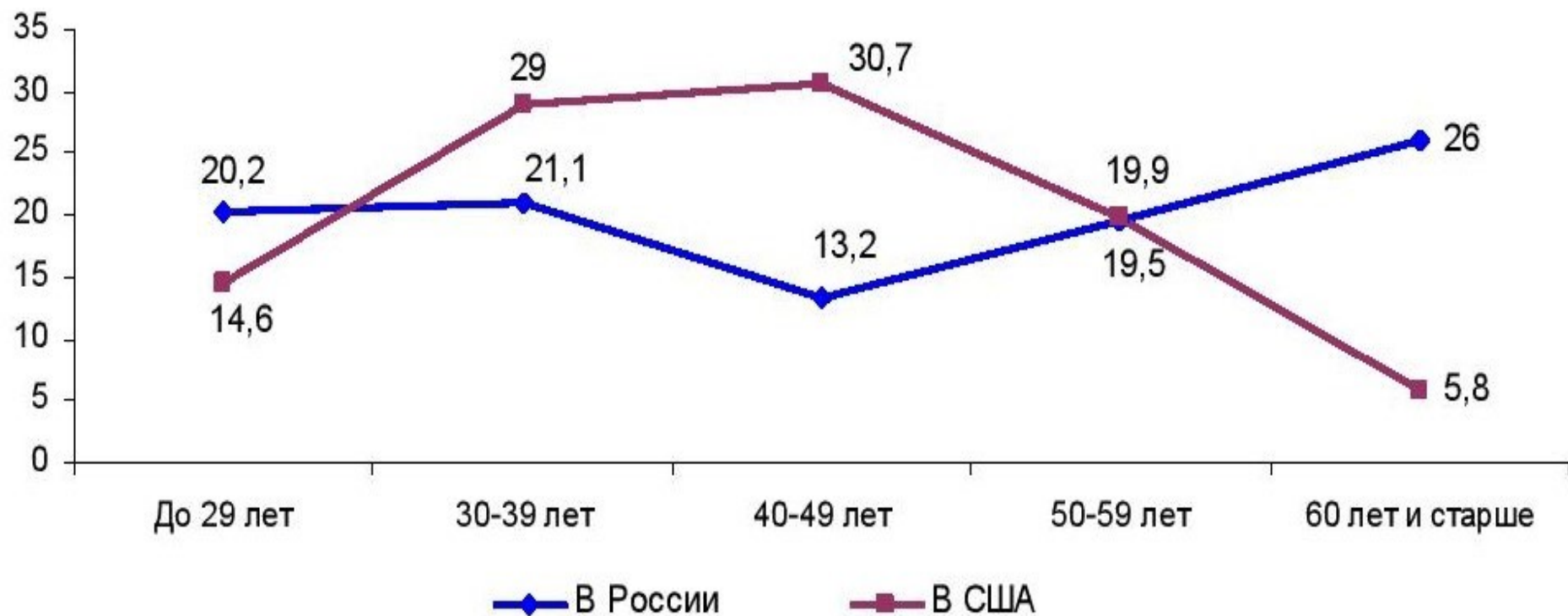


## Challenges in Russia (2)

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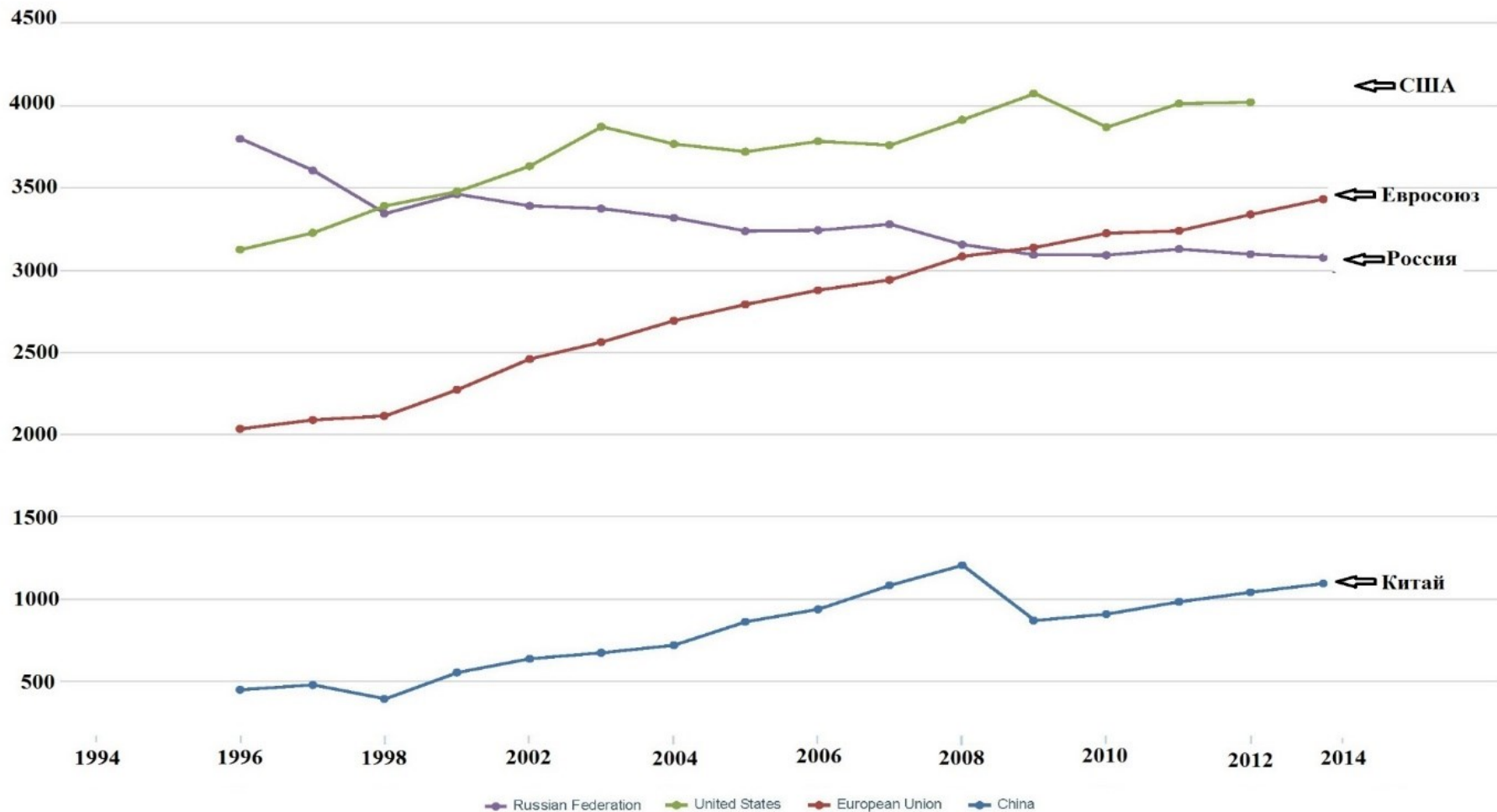
- III. Personnel aging (50% elder that 50 years)
- IV. Reduction of personnel (from 469 100 in 2007 to 440 600 in 2013) given increase of funding.
- V. “Brain drain” (emigration)
- VI. Relatively low funding per researcher (3 times less that world average, 5 times less that in the U.S. or in Germany)
- VII. Slow research personnel rotation at universities

# Personnel by age (average – 47)



# The number of researchers decreases

World Development Indicators World DataBank





## Challenges in Russia (3)

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**VIII.** Industrial R&D system was almost destroyed in 1990s. Partly recovered in military industry.

**IX.** Problems with supporting technical and auxiliary personnel (in 35% institutions)

**X.** Problems with researchers mobility.



## Challenges in Russia (4)

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### XI. System of researchers training is changing:

- *no early specialization and integration of students into research,*
- *PhD students may not get PhD degree (26%)*

### X. Lack of motivation

- *16,7% aimed at research career*
- *33% aimed at academic career*



# Specific issues of personnel training (1)

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## **Key competences formation (teaching technologies)**

– orientation to the future

- 1. Changes in ICT, “digital economy”, “big data”, etc.*
- 2. Increasing role of humanities*
- 3. Increasing social role of science (3 missions of universities – education, research and social) – “civic competences”.*
- 4. Pragmatic orientation of science – entrepreneurial skills*
- 5. Increasing role of scientific and humanitarian expertise – analytical skills*



## Specific issues of personnel training (2)

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**“Soft skills” development** (team work, project management, communication and leadership skills, ability to work independently)

Instrumental competences (logic, presentation skills, discussion, etc.)

Teaching (pedagogical) skills





# Specific issues of personnel training (3)

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## Teaching methods (technologies)

- Binary lectures (2 professors)
- Case methods
- Essay writing
- Interdisciplinary seminars (peer learning)
- Expert text analysis



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Thank you!

**arthur@leadnet.ru**