



STI PERFORMANCE IN THE BLACK SEA REGION

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BLACK SEA
HORIZON



Bi-regional STI Dialogue

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BSEC at glance

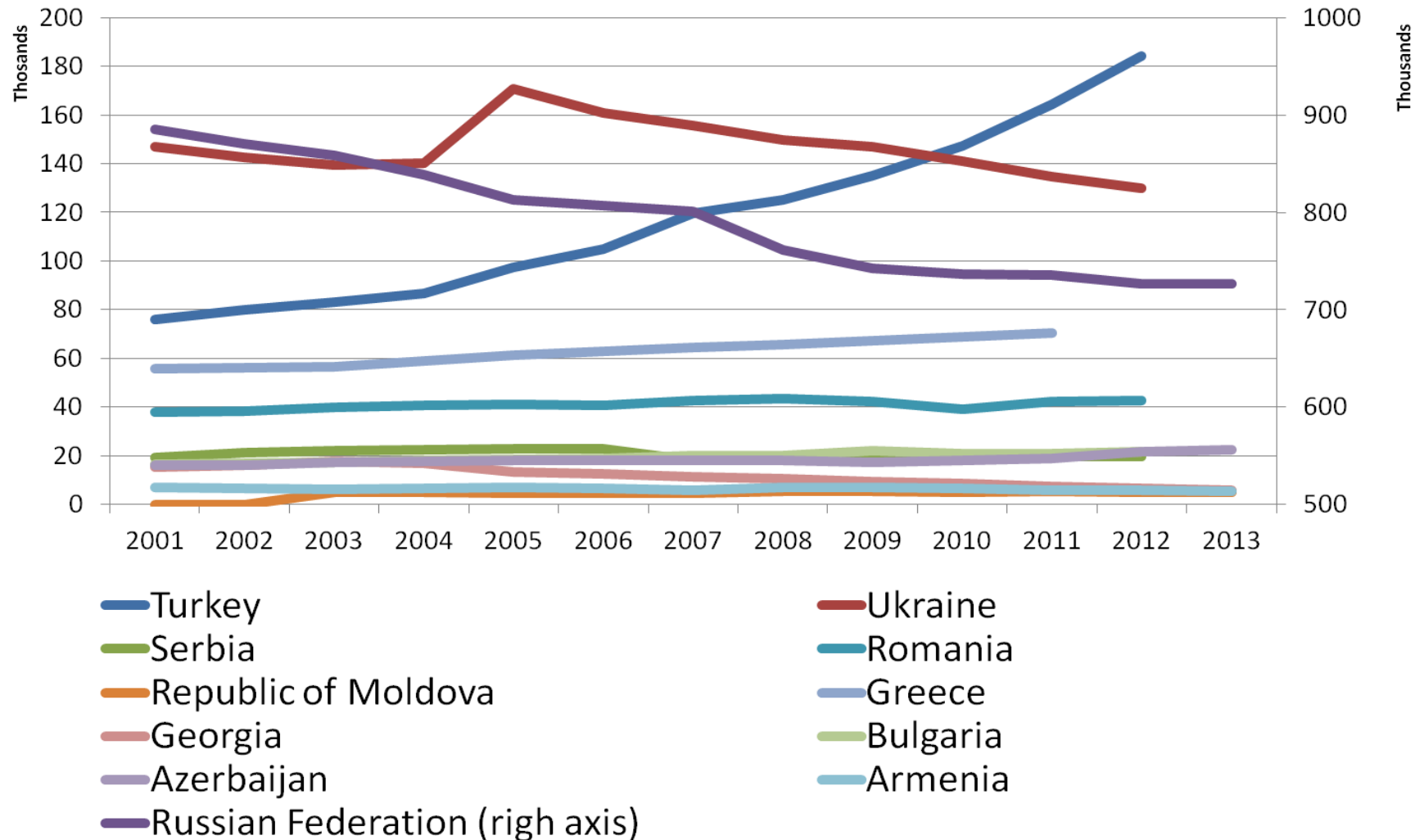
2

- 12 countries: 2 high income, 6 upper-middle income, 4 lower-middle income
- GDP: 5,9% of world GDP or 3 614,4 bln USD
- Intra trade – 300 bln USD
- Population - about 335 mln,
- Area – 20 mln km²



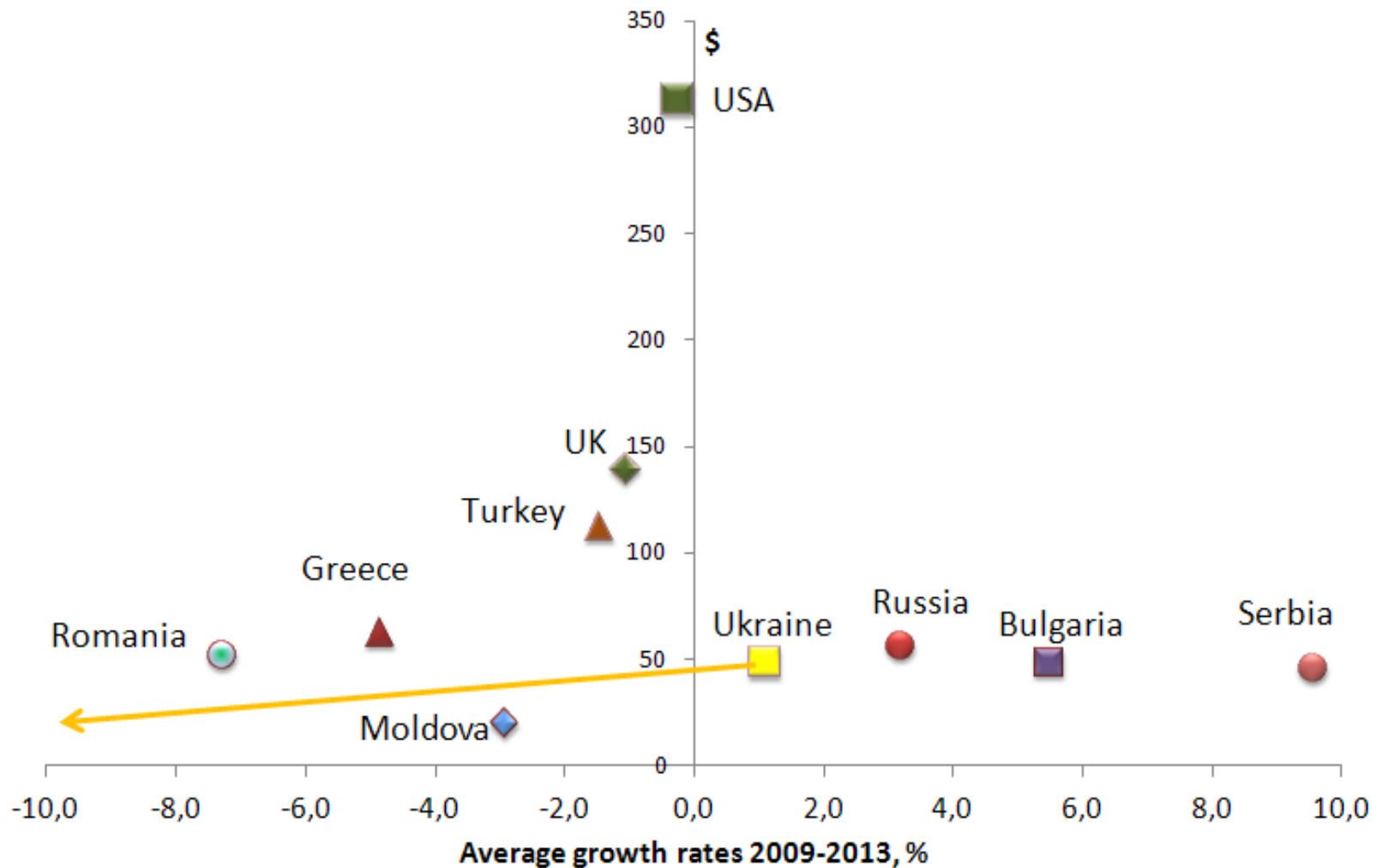
Human resources in R&D in BSEC

3



GERD per researcher FTE, PPP constant 2005 USD, thous.

4



Source: own calculations based on UIS

S&T publications

5

| | Annual growth, 2009-2014 , % | Documents, average per year 2009-2014 | International Cooperation, +/- 5% |
|----------------------|---|--|--|
| Russian Federation** | 5,7 | 43404 | -30 |
| <i>Turkey****</i> | 4,2 | 35040 | 20 |
| Greece*** | -0,8 | 17721 | 45-50 |
| Romania** | 2,6 | 13093 | 30-35 |
| Ukraine | 5,5 | 8703 | =37 |
| Serbia | 7,1 | 6354 | 35-40 |
| Bulgaria | -1,4 | 3736 | 45-50 |
| Armenia | 7,7 | 1000 | 55-60 |
| Georgia | 4,7 | 869 | 55-65 |
| Azerbaijan | -5,2 | 793 | 50-55 |
| Moldova | 2,5 | 389 | 65 |
| Albania | 29,1 | 309 | =37 |

Source: Scimago

Expenditures on R&D, 2009-2013

6

| Low level | Moderate (from 0,6% to 1%) | High (>1%) | EU average, 2013 |
|------------------|----------------------------------|-----------------|---------------------|
| Romania ? | Bulgaria ↑ | Russia ↓ | 2.01 (target 3) |
| Moldova ↓ | Greece ↑ | | |
| Armenia = | Serbia ? | | |
| Azerbaijan = | Turkey ↑ | | |
| Albania ? | Ukraine ↓ | | |

Structure of expenditures, sources

7

❑ The share of **business sector** is usually low and in some cases is **EXTREMELY low (Serbia, Albania <10%)** in all BS countries, apart from **Turkey** with about 50% GERD financed by business sector (it is on the level of UK, but less than USA by 12 p.p).

❑ Trends are not clear for all countries. It is rather clear for **Bulgaria and Romania** and **Ukraine** (both negative)

❑ As for **foreign financing** **Bulgaria** gets the highest portion of R&D expenditure from abroad (almost 50%) and its share has grown up drastically for the last 5 years.

❑ The high growth of foreign financing were experienced in **Romania and Moldova** (up to 15 and 12%), while **Ukraine and Greece** keep relatively high share on more or less stable level (respectively 20% and 14%)

GERD, by field of science, %

9

| | >40 | 30>40 | 20>30 | <20 |
|-------------------------------------|------------|------------|--|------------|
| Natural sciences | Armenia | Moldova | Azerbaijan | Bulgaria |
| | | | Ukraine | Russia |
| | | | | Turkey |
| Engineering & Technology | >70 | 40>70 | 20>40 | |
| | Russia | Turkey | Armenia | |
| | | Ukraine | Moldova | |
| | | Romania | | |
| | | Azerbaijan | | |
| Medical & Health | >40 | 20>40 | >10 | 5>10 |
| | Bulgaria ! | Greece | Turkey | Moldova |
| | | | | Azerbaijan |
| Agricultural sciences | >15 | 5>10 | | |
| | Moldova | Azerbaijan | | |
| | | Ukraine | | |
| | | Turkey ? | | |
| Social&Humanities | >15 | <10 | | |
| | Armenia | Romania ? | | |
| | Azerbaijan | | | |
| | Turkey | | | |
| | Moldova ? | | | |
| | | | ? - marginal value ! - sharp increase | |

Heterogeneity of BS STI systems

10

| GCR 2015-2016 | Higher education and training | Technological readiness | Technology adoption | Innovation and R&D |
|----------------------------------|-------------------------------|-------------------------|---------------------|--------------------|
| Albania | 0,7 | -1,5 | -0,5 | -0,4 |
| Armenia | -0,6 | -1,0 | | |
| Azerbaijan | -1,5 | 0,2 | 1,4 | 1,3 |
| Bulgaria | 0,0 | 1,3 | 0,4 | 0,4 |
| Georgia | -1,3 | -0,7 | -0,8 | -1,1 |
| Greece | 1,0 | 1,4 | 0,5 | -0,7 |
| Moldova | -1,0 | 0,4 | -0,6 | -0,9 |
| Romania | 0,2 | 0,9 | 0,8 | 0,9 |
| Russian | 1,3 | 0,1 | -0,8 | 0,2 |
| Serbia | -0,6 | 0,6 | -1,4 | -1,8 |
| Turkey | 0,3 | -0,2 | 1,9 | 0,3 |
| Ukraine | 1,5 | -1,4 | -0,8 | 1,5 |
| <i>Values (larger is better)</i> | | | | |
| Av_world | 4,24 | 4,06 | 4,17 | 4,07 |
| Av_BSEC | 4,48 | 4,18 | 4,35 | 3,69 |
| M_BSEC | 4,51 | 4,24 | 4,22 | 3,76 |

STI indices dynamic

11

| Linear trend, OLS | Higher education and training | Technological readiness | Technology adoption | Innovation and R&D |
|-------------------|-------------------------------|-------------------------|---------------------|--------------------|
| alpha=5% | Pillar 5 | Pillar 9 | Pillar9.A | Pillar 12 |
| Albania | 0,19 | 0,09 | -0,13 | 0,09 |
| Armenia | 0,12 | 0,16 | 0,01 (NS) | 0,01 (NS) |
| Azerbaijan | 0,05 | 0,18 | 0,01 (NS) | -0,001 (NS) |
| Bulgaria | 0,05 | 0,21 | 0,07 | 0,009 (NS) |
| Georgia | 0,04 | 0,18 | -0,02 (NS) | 0,002 (NS) |
| Greece | 0,05 | 0,20 | -0,01 (NS) | -0,014 (NS) |
| Moldova | 0,03 (NS) | 0,23 | 0,035 (10%) | 0,019 (NS) |
| Romania | 0,05 | 0,14 | 0,06 (NS) | 0,01 (NS) |
| Russian | 0,08 | 0,15 | 0,03 (NS) | -0,019 (NS) |
| Serbia | 0,07 | 0,15 | 0,009 (NS) | -0,03 |
| Turkey | 0,07 | 0,11 | -0,014 (NS) | 0,019 (NS) |
| Ukraine | 0,09 | 0,08 | -0,06 (NS) | -0,002 (Highly NS) |

NS = not significant at 5%

Policy gaps for BS: needs for reforms

12

| | Higher education and training (Pillar 5) | Technological readiness (Pillar 9) | Innovation (Pillar 12) |
|------------|--|--|---------------------------|
| Albania | -0,5 | -0,3 | -1,3 |
| Armenia | -0,6 | -0,2 | -1,1 |
| Azerbaijan | -1,0 | -0,2 | -1,1 |
| Bulgaria | -0,8 | 0,0 | -1,3 |
| Georgia | -0,8 | -0,2 | -1,4 |
| Greece | -0,6 | -0,2 | -2,3 |
| Moldova | -0,6 | 0,2 | -1,4 |
| Romania | -0,8 | -0,1 | -1,2 |
| Russia | -0,6 | -0,1 | -1,1 |
| Serbia | -0,8 | 0,0 | -1,3 |
| Turkey | -0,9 | -0,5 | -1,9 |
| Ukraine | -0,5 | -0,3 | -1,1 |

Innovation Efficiency Ratio: **be cautious**

13

| Rank in GII | Country | Score | Percentage Rank | S/W |
|-------------|--------------------|-------|-----------------|-----|
| 5 | Moldova | 1.0 | 0.97 | S |
| 15 | Ukraine | 0.9 | 0.90 | S |
| 21 | Bulgaria | 0.8 | 0.86 | S |
| 23 | Turkey | 0.8 | 0.84 | S |
| 34 | Armenia | 0.8 | 0.76 | |
| 55 | Serbia | 0.8 | 0.61 | |
| 58 | Romania | 0.7 | 0.59 | |
| 60 | Russian Federation | 0.7 | 0.58 | |
| 98 | Greece | 0.7 | 0.31 | |
| 107 | Georgia | 0.6 | 0.24 | |
| 115 | Azerbaijan | 0.6 | 0.19 | |

Summary (1)

- Despite the empirically proved positive impact of STI on economy, there are no consensus among policy makers of BS countries on the issue of facilitating and supporting STI development.
- Human potential is rather deteriorating or remains on the same level. The number of R&D personnel has been discernibly increased only in Turkey (>2.5 times), Bulgaria and Azerbaijan (1.3-1.4), Greece (1.3) in 2001-2013.
- Drop in R&D staff did not relate with increasing of financial provision of researcher in many BS countries. Only Serbia, Bulgaria and Russia increased financing per researcher, but the level is still very low. The best performer (Turkey) spent 3 time less than in USA and 1.3 less than UK.

Summary (2)

15

- As most important problems for all BS countries are rather in **innovation and R&D domain, particularly quality of scientific institution and education, linkages between actors**, to increase STI performance governments of BS countries should revise STI policy towards utilization of available knowledge. It includes university-industry alliances, innovation cooperation, technology transfer and IPR etc. At the same time research system should be reinforced, that needs comprehensive evaluation and assessment, competitive financing and adequate support.



STI cooperation: obstacles and further steps

BSH project identified obstacles and challenges in the STI cooperation between the EU and the Black Sea Countries and among themselves :

- ❑ The BSEC countries have a wealth of human capital and know-how that remains untapped. **This is largely due to the lack of a coordination mechanism.**
- ❑ The progress of reorganizing the research systems and structures should be assessed with the aim to consolidate the achievements and to address any weaknesses.
- ❑ Most of BS countries have faced a dramatic decrease of their R&D intensity since the early 90s. That led to the shutting down or reorientation of many research branches as well as a significant decrease in the number of researchers. **Financing through public/private partnerships and/or external sources of funding is still low and should be further promoted.**
- ❑ **The optimum exploitation of the research results and in particular their transformation into innovative products and processes should be further developed.**
- ❑ The gap between high-level political commitments and their actual implementation at the lower administrative and community levels, requires increased **stakeholder participation should be bridged.**
- ❑ Innovation capacity is influenced by legal barriers such as IPR and industry.

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17

Overview

Funding:

- ❑ Horizon 2020, under the Grant Agreement 645785 (H2020-INT-INCO-2014).

Duration:

- ❑ February 2015 – January 2018

Project Partners:

- ❑ 19 organisations, 16 countries: AT, DE, GR, TR, HU, BG, FR, MD, PL, PT, RO, AM, RU, UA, GE, AZ

Coordinator:

- ❑ Centre for Social Innovation (ZSI GmbH), Austria

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18

Key objectives

- to support the **EU's external relations** with the **target region**
 - ▣ by significantly contributing to ongoing bi-regional and regional STI policy dialogues,
 - ▣ and by increasing the knowledge base about the EU's external environment;
- to stimulate **bi-regional STI cooperation** and to strengthen the EU's economic competitiveness;
- to contribute to the establishment of **supportive framework** conditions
 - ▣ by facilitating the pooling of resources
 - ▣ and by identifying challenging thematic areas for mutual STI cooperation.

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19

Specific objectives

- Support the EU's external relations with the target region
 - ▣ EU Black Sea Cooperation Programme in STI (WP1)
 - ▣ Bi regional STI conference (WP1)
- Increase the knowledge base about EU's external environment;
 - ▣ Policy briefs (obstacles, drivers and opportunities; patterns of cooperation based on co publishing and co-patenting (WP1)
- Stimulate bi-regional STI cooperation;
 - ▣ Webinars on H2020 (WP3)
 - ▣ Grant scheme for brokerage events (WP3)
 - ▣ H2020 Summer school (WP3)

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20

Specific objectives

- Strengthen the EU's economic competitiveness;
 - ▣ Cluster identification, cluster manager training (WP4)
 - ▣ Business contacts and training of entrepreneurs (WP4)
- Contribute to the pooling of resources
 - ▣ Group of funding parties (WP2)
 - ▣ ToR for a joint call (WP2)
 - ▣ Call secretariat set up (WP2)
- Contribute to the establishment of supportive framework conditions;
 - ▣ Reviewer database (WP2)
- Identify challenging thematic areas for mutual STI cooperation
 - ▣ Thematic research directions (WP4)

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21

Contacts

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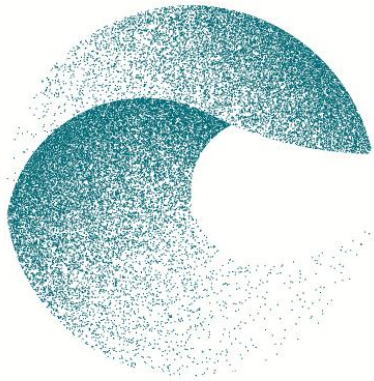
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Thank you for your attention!

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