



Science for Education and Education for Science in Central and South Eastern Europe

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Integration of Physics Community in Central & South Eastern Europe into ERA

EPS - CEI Strategy

EPS - CEI (European Physical Society - **Committee of European Integration**) - **six** strategic actions for 2013-2016:

1. Integrating Access to Research Infrastructures in Europe.
2. Developing a student training Program - schools for Physics students from Central, SouthEastern and Western Balkan countries.
3. Fostering the quality of teacher training.
4. Promoting Sciences (Physics in particular) and Science Education.
5. Strengthening the regional cooperation.
6. **Examination and preparation of the joint EU projects**

Synergy with other forums and organizations:

- CERN
- ICTP **Trieste**
- CEI - Central European Initiative **Trieste**
- UNESCO (Paris & Venice Office)
- SEENET MTP - Southeastern European Network in Mathematical and Theoretical Physics
- BPU - Balkan Physical Union
- Etc....

Fundraising by initiating common programs with other stakeholders and donors:

Ex: Towards the integration of the physics community in CEI countries into the ERA

Main founder: CEI

Partners and co-founders: Physical Society Nis/ SEENET MTP **Network - Office**
EPS, UNESCO, ICTP

Main activities: Workshops on

- Training and research - **Bucharest, May 2014**
- Mobility and integration - **Sofia, November 2014**
- Education - **Trieste, December 2014**

Project submitted: Vocational training in Optics

Project in preparation: Training Network in High Energy Physics

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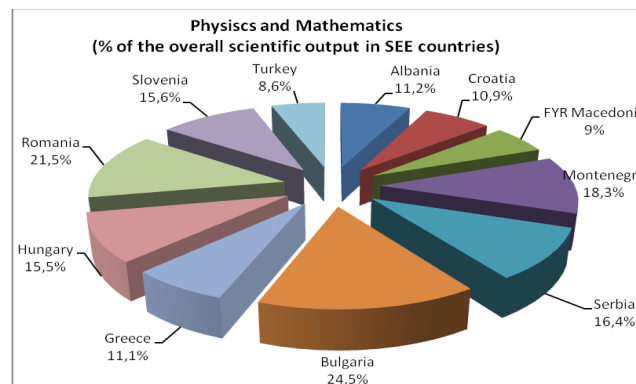
E-survey on Capabilities of Central & South Eastern Europe

- EPS – CEI members had at their disposal the results of the electronic survey named **South Eastern European Mathematics & Physics E-survey**, initiated by UNESCO-Venice Office within the Project **Strengthening Basic and Engineering Sciences Capacities in South Eastern Europe SEE. Map of Excellence in Physics and Mathematics in SEE**, and conducted by Southeastern European Network in Mathematical and Theoretical Physics (SEENET-MTP) and **University of Craiova**.
- The report was finalized during the 4-th SEENET meeting “Science and Society” (S&S) ... in Craiova, Romania.
- I add a link <http://www.seenet-mtp.info/see-database>, you could keep or delete ...
- The data were collected among 40 universities and research institutes in the field of Mathematics and Physics originated from:
 - Albania,
 - Bosnia and Herzegovina,
 - Macedonia/FYROM,
 - Moldova,
 - Montenegro,
 - Romania,
 - Serbia
- The main objectives of the survey were related to:
 - Financial profile,
 - Research staff profile,
 - Research infrastructures,
 - Performance,
 - Major research and educational programs,
 - Regional and international cooperation.
- The research institutes were classified into three groups: National (Independent) research institutes, Academy affiliated research institutes, University affiliated units.

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Main findings of the E-survey: scientific production

- The scientific output from Mathematics and Physics from the Central /SEE region is comparable with those of others research groups from the world.
 - Worldwide scientific production (based on Web of Science publications):
 - 10.9% for physics and mathematics combined (mathematics represent 2.1% of the total while physics accounts for 8.8%).
 - In Central/South East Europe (Albania, Croatia, FYR of Macedonia, Montenegro, Serbia, Bulgaria, Greece, Hungary, Romania, Slovenia and Turkey): 13.1% of the total scientific production for physics and mathematics (mathematics is 3.5%, physics 9.6%)¹.
 - There are very good data about publications and cooperation in sciences made by Viktor Urumov. I guess you can find an internet or ask him to provide you ...
- The scientific output from Mathematics and Physics from the SEE region represents majority of the overall scientific output in every particular country in this region



¹ Duro Kutlača, *Scientific Productivity in SEE in the area of Mathematics and Physics, Joint meeting on mathematical physics and science policy, 19-22 September 2012, Craiova, Romania*

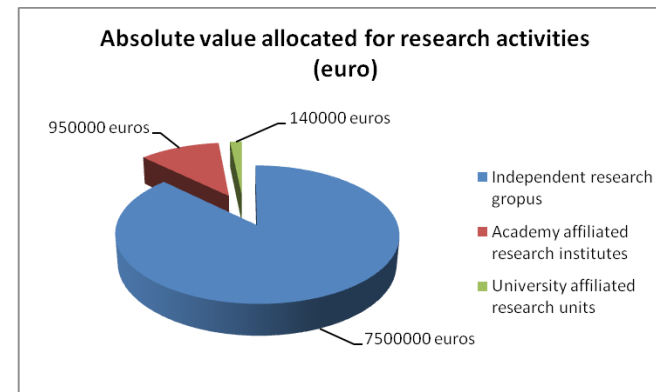
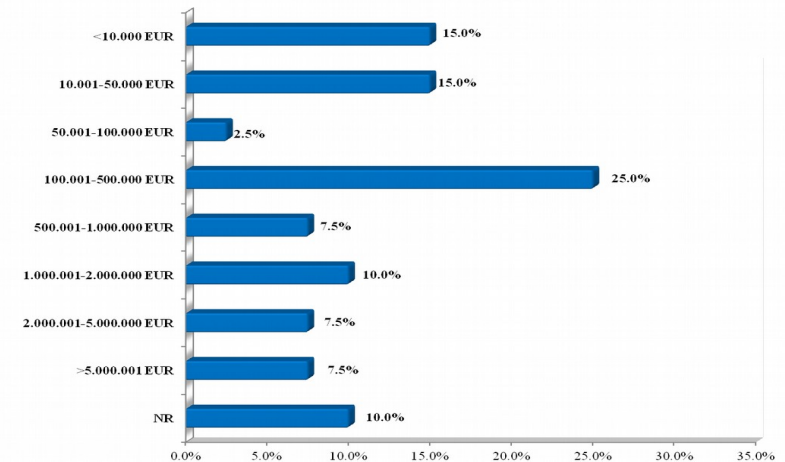
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Fig.1 Scientific Productivity in SEE in the area of Mathematics and Physics (2005-2012)

Main findings of the E-survey: finance

- The annual budget of the research units lasts:
 - 15%: smaller than 10.000 Euro,
 - 62% (majority): between 100.001 and 500.000 Euro,
 - 7.5%: more than 5 million Euro.
- Annual budget on the three investigate categories of research units:
 - Independent research institutes: around 8 million euro,
 - Academy affiliated research institutes: almost 1 million euro,
 - University affiliated research units: a bit over 700.000 euro.
- Average percent of the annual budget used for research activities:
 - Independent research institutes: 99.5 % (7.5 million euro annually).
 - Academy affiliated institutes: about 99% (950.000 euro/year).
 - University affiliated research units: 20% (140.000 euro per year).

Note: 10% of the university institutes did not allocate any funds to research.



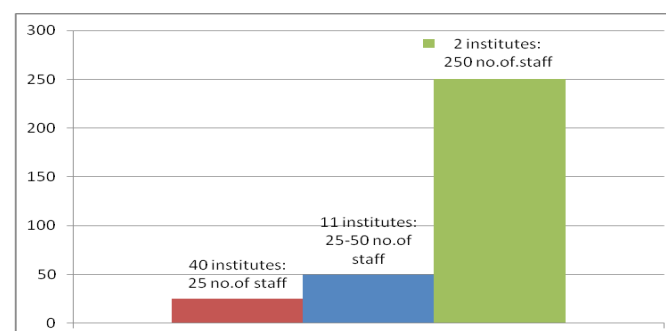
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Main findings of the E-survey: human resources

- Regarding the dimension of the institutes in terms of staff involved in research activities:

Total number of Staff involved in research activities

Number of researchers/Unit	Unit no.	% (Unit no./40)
0-25	16	40.0
26-50	11	27.5
51-100	6	15.0
101-250	5	12.5
>250	2	5.0
Total	40	100.0



- International staff: 60% of the institutes (24) have no international researchers and only one institute has more than 5

Number of international staff	Unit No.	%
0	24	60.0
1-5	6	15.0
>5	1	2.5
Not mentioned	9	22.5

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Main findings of the E-survey: research infrastructure

- Equal number of respondents evaluated as “major facilities” accessible ones (with value less than 100.000 Euro) and with value bigger than 1.100.000 Euro.

Average value of acquisition	Response no.	%
<100.000	8	20.0
101.000-300.000	7	17.5
701.000-900.000	2	5.0
>1.100.000	8	20.0
N.R.	15	37.5

- Repartition of major infrastructures:
55.0% of respondents have one major facility in their centre.
15.0% have between 2-5 major facilities.
22.5% do not have any major facility in their centre.
- What exactly means a “major facility”?

Facilities/equipment/instrumentation	Response nos.	%
Laboratory	9	22.5
Microscope	6	15.0
Spectrometer	3	7.5
Strong Computer Facility	9	22.5
Library	2	5.0
Other	4	10.0
N.R.	7	17.5

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- On the other hand, regarding capabilities, over half of the respondents (55.0%) indicated that they have one major facility in their research centre and 15.0% that they have between 2-5 major facilities. It is important to see that an important percent (22.5%) indicated that they do not have any major facility in their centre. (Fig.4) Most of the equipments were bought during 2006-2008, as 37.5% of the respondents indicated. 12.5% of centres indicated that they have new equipments that were bought starting with 2009. It is also important to see that another important part of the centres have facilities, that are bought before 1996 (20.0% of respondents indicated this).

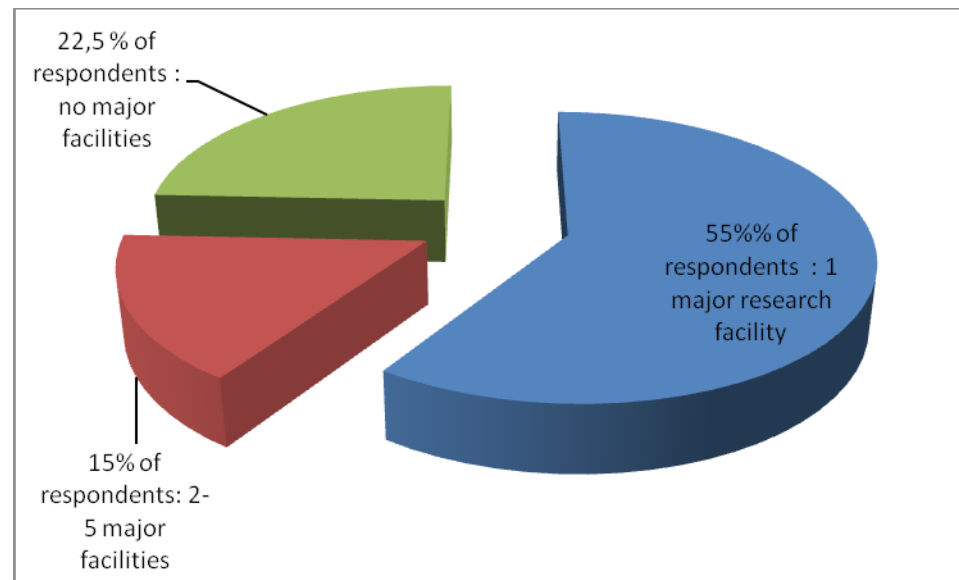


Fig.4 - Major facilities in research centers

- It is reasonable to conclude that many research units live in scientific isolation. Most of the centres (16) have access to only 1 to 10 international journal, while only nine centres have access to more than 100 international peer-reviewed journals. 17 centres mentioned that they have access to a limited number of electronic databases (between 1 and 3 databases), and less than half (9) indicated that they have access to a quite large number of data bases (between four and six).

Strategic actions in promoting Sciences (Mathematics/Physics) and Education

- **Creation of the regional cooperation networks capable to enable the communication and interrelationships between research centres**, as a solution for benefiting in common from the use of their infrastructure and human resources. Such networks will contribute to the growth of research capacities, increasing the chance of accessing international research programs (example: SEENET-MTP <http://www.seenet-mtp.info>).
- **At a ministry level it is recommended to launch and finance special programs for interregional cooperation**, which can create new interregional networks.
- **Encouraging the change in policy of science in order to be able to hire researchers from other centres.**
- **Establishing as a priority the finance of the reintegration programs designated to young researchers** and the motivation of certain scientific personalities to contribute at the rising of powerful research schools.
- **The growth of capacity and know-how in the field of competing for research projects** and the participation to major research programs.
- **Cataloguing the whole available infrastructure and sharing both that information and the infrastructure**. This way, the efficiency for infrastructure acquisitions is highly increased.
- **EPS-CEI, SEENET-MTP and BPU are ready to:**
 - contribute in creation a panel for communication and cooperation between Large Infrastructure Centres and community of physicists, teachers, pupils ... – a global audience in the SEE/Balkan – Central Europe region.
 - The next meetings to develop this idea and create a mechanism for cooperation could be
 - Meeting in Sinaia, Romania (May) 2016
 - Meeting at LI – Bucharest during 2016 ..