Conditions for a successful scientific cooperation of Ukraine with countries of EU

Vladimir MAYER
Centre National de la Recherche Scientifique (France), Moscow Office for EE&CA

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Organization and management of S&T in Ukraine compared to EU countries – some prime issues to be addressed

What is different?

- double role of the Academies of sciences - learned society and research performing organization
- percentage of university personnel engaged in research relatively low
- salaries generally low, partly covered by projects, disparities
- difficulty to attract young people, high average age of researchers
- considerable portion of research personnel without a scientific degree
- pyramidal structure of organization, long terms of “staying in power”
- publishing policy (national publications versus international publications)
- system of evaluating laboratories and researchers (external experts, use of bibliometric indicators)
Use of statistical and bibliometric indicators in evaluating the state of S&T system in Ukraine

- absolute values do not say much
- observe evolution of the same indicator in time (period after 1990)
- compare the same indicator for Ukraine with other countries
  - selecting related countries (Russia, Poland)
  - normalizing might be necessary
## Funding of elite organizations performing basic research in EU and EECA (2008)

<table>
<thead>
<tr>
<th>Organization</th>
<th>NASU (Ukr)</th>
<th>RAS (Rus)</th>
<th>PAS (Poland)</th>
<th>CAS (Czech R)</th>
<th>CNRS (France)</th>
<th>Max Planck. G (Germany)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of researchers</strong></td>
<td>19 820</td>
<td>49 683</td>
<td>4000</td>
<td>2600</td>
<td>11 500</td>
<td>4 417</td>
</tr>
<tr>
<td><strong>Budgetary financing (M€)</strong></td>
<td>181</td>
<td>948</td>
<td>170 (?)</td>
<td>200</td>
<td>2 300</td>
<td>1 176</td>
</tr>
<tr>
<td><strong>Off-budgetary financing (M€)</strong></td>
<td>132</td>
<td>597</td>
<td>32 (?)</td>
<td>140</td>
<td>510</td>
<td>258</td>
</tr>
<tr>
<td><strong>Total financing (B€)</strong></td>
<td>313</td>
<td>1 545</td>
<td>202 (?)</td>
<td>340</td>
<td>2 810</td>
<td>1 434</td>
</tr>
<tr>
<td><strong>Financing per researcher (T€)</strong></td>
<td>15.8</td>
<td>31.1</td>
<td>50.5 (?)</td>
<td>131</td>
<td>244</td>
<td>325</td>
</tr>
</tbody>
</table>

1 € = 8 hr.  
2005 data
National Academy of Sciences of Ukraine – development of personnel composition (1)

Source: NASU Brief annual reports
National Academy of Sciences of Ukraine – development of personnel composition

Source: NASU Brief annual reports

RAS 67%
Evolution of scientific publications reported in Ukraine

Number of scientific journals: 71 (1991), over 1000 in 2002
Number of scientific publications: 80 000 (1991), 180 000 (2001)
Number of publications abroad: 6 000 (1991) 18 000 (1999)

Number of publications in international databases: constant 4000-4500 (1991-1999)

Source: Naukovyi profil Ukrainy, British Council 2002

Scientific articles published by Ukrainian Universities (thous. units):
1 – in foreign publishing houses
2 – in Ukrainian publishing houses

### Bibliometry of European publications according to Scopus data base for a period 1996 - 2007
(source Nataliya Shulga, Ukr. Scient. Club))

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>UKR</th>
<th>RUS</th>
<th>POL</th>
<th>FRA</th>
<th>GER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (mil)</td>
<td>46.2</td>
<td>141.7</td>
<td>38.6</td>
<td>65.1</td>
<td>82.1</td>
</tr>
<tr>
<td>Annual number of publ. (th)</td>
<td>5.46</td>
<td>30.8</td>
<td>15.3</td>
<td>61.0</td>
<td>84.4</td>
</tr>
<tr>
<td>Annual number of citations (th)</td>
<td>14.9</td>
<td>113</td>
<td>75.4</td>
<td>624</td>
<td>907</td>
</tr>
<tr>
<td>Number of publications</td>
<td>1</td>
<td>5.6</td>
<td>2.8</td>
<td>11.2</td>
<td>15.5</td>
</tr>
<tr>
<td>(normalized)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of citations</td>
<td>1</td>
<td>7.6</td>
<td>5.1</td>
<td>42</td>
<td>61</td>
</tr>
<tr>
<td>(normalized)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number publ. 2008 (th)</td>
<td>6.14</td>
<td>31.8</td>
<td>21.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
only small portion of publications reported in Ukraine is listed
about six times less publications listed compared to Russia
share of the EU co-publications increases steadily from 18% (1997) to 33% (2006)
this trend is independent from the evolution in the number of Ukrainian publications
- approximately six times less copubl of Ge and Fr with Ukr than with Ru
- Poland an important co-publication partner

Bibliometrics of Ukrainian publications in ISI data bases; co-publications Ge, Pol, Fr, GB
(source Scope East project)
### Thematics of co-publications between Ukraine and EU (2001-06)
(source Scope East project)

<table>
<thead>
<tr>
<th>THEMATICS</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYSICS, CONDENSED MATTER</td>
<td>16.2%</td>
</tr>
<tr>
<td>MATERIALS SCIENCE, MULTIDISCIPLINARY</td>
<td>13.4%</td>
</tr>
<tr>
<td>CHEMISTRY, PHYSICAL</td>
<td>12.1%</td>
</tr>
<tr>
<td>PHYSICS, APPLIED</td>
<td>11.3%</td>
</tr>
</tbody>
</table>

- Four thematics - over one half (53%) of all co-publications (six in Russia)
- Chemistry – strongly present (about twice higher share than with Russia)
- Life sciences - a small part of cooperation (molecular biology 2.4%)
Main Ukrainian laboratories involved in co-publications with EU (2001-2006)
(source Scope East project)

1. NASU Phys&Technol. Inst. Kharkov
2. NASU Mol. Biol. And Genetics Kiev
3. NASU Org. Chem. Kiev
4. NASU Phys. Chem. Kiev
5. NASU Metal Physics Kiev
6. NASU Problems Mat. Science Kiev
7. NASU Applied System Analysis Kiev
8. NASU Condensed Matter Phys. Lviv
9. NASU Mathematics Kiev
11. NASU Macromol. Chem. Kiev
12. NASU Magnetism Kiev

- NASU dominating co-publications EU (physics, chem., mol; biol., math)
- Kiev a leading town in cooperations
- Absence of leading University labs (it is not the case in Russia!)
### Universities in Ukraine: comparing ratings

<table>
<thead>
<tr>
<th>Rating</th>
<th>University</th>
<th>City</th>
<th>UNESCO</th>
<th>Kompas</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>Shevchenko University</td>
<td>Kiev</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>1-2</td>
<td>Polytechnics</td>
<td>Kiev</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>3-4</td>
<td>Kiev-Mogiliansky Academy</td>
<td>Kiev</td>
<td>9</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>3-4</td>
<td>Polytechnics</td>
<td>Kharkov</td>
<td>5</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>Getman Economic University</td>
<td>Kiev</td>
<td>11</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>6</td>
<td>State University</td>
<td>Donetsk</td>
<td>8</td>
<td>9</td>
<td>17</td>
</tr>
<tr>
<td>7</td>
<td>Polytechnics</td>
<td>Lviv</td>
<td>12</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>8-9</td>
<td>Technical University</td>
<td>Donetsk</td>
<td>15</td>
<td>4</td>
<td>19</td>
</tr>
<tr>
<td>8-9</td>
<td>State University</td>
<td>Dnepropetrovsk</td>
<td>7</td>
<td>12</td>
<td>19</td>
</tr>
<tr>
<td>10</td>
<td>Mining university</td>
<td>Dnepropetrovsk</td>
<td>6</td>
<td>15</td>
<td>21</td>
</tr>
<tr>
<td>11</td>
<td>Aviation University</td>
<td>Kiev</td>
<td>13</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Karazin State University</td>
<td>Kharkov</td>
<td>3</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bogomolets University of Medicine</td>
<td>Kiev</td>
<td>4</td>
<td>?</td>
<td></td>
</tr>
</tbody>
</table>

Shevchenko and Polytechnic Universities in Kiev are undoubtful leaders in ratings.
Total budget for 7 years of FP7: 50,5 Billion €
(Total budget for 5 years of FP6: 19.1 Billion € !)

Main programme blocks:

- COOPERATION 31,4 B€
- MOBILITY (Marie Curie) 4,7 B€
- IDEAS (ERC) 7,5 B€
- CAPACITIES 4,2 B€
Cooperation: overall success rates of proposals after 29 months:

**By teams:**
All countries: 18.4 %, ERA countries: 18.9 %, Third countries: 16.7 %

Russia 16 %, Ukraine 14 %

**By projects:**
- **Russia** (1st country outside ERA) 1174 applic., 175 mainlisted (12.7 %)
- **Ukraine** (8th country outside ERA) 410 applic., 54 mainlisted (13.1 %)
- **Poland** 437 ? mainlisted
Block CAPACITIES (logistic support of S&T in EU):

Main sub-blocks:
- Research Infrastructures
- Research serving SMEs
- Regions of knowledge
- Research potential
- Science in society
- Activities of international cooperation

Actions: INCO-NET, BILAT, ERA-NET, ACCESS, ERAWIDE

Russia  
184 applic., 54 mainlisted (29.3 %)

Ukraine  
79 applic., 22 mainlisted (27.8 %)
Activities of international cooperation FP7 concerning building up collaborations with EECA countries:

Following Scope-East programme of FP6:

- **INCO NET EECA** (2008, 48 months, 4 M€) POL particip.
- **INCO NET CA/SC** (2009, 48 months, 1,7 M€)
- **ERA-NET Rus** (2009, 48 months, 3,1 M€)
- **ERA-NET Black sea** (2009, 48 months, 3 M€)
- **BILAT Ukraine** (2008, 36 months, 0,6 M€) POL particip.
- **BILAT Russia** (2008, 36 months, 0,6 M€)
- **ACCESSRU** (2009, 30 months, 0,5 M€)
- **ERAWIDE** (2010, 36 months, 0,5 M€)