“The 10 billion euro question”. How to most effectively support innovation in Poland

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Senior Economist
The World Bank, Warsaw

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Economic growth in Poland and the EU-10 is lower than before the crisis and among high-achieving emerging markets. Enhancing technology absorption and innovation will be essential to accelerate growth.

Key issues: low R&D and innovation spending, low innovation output, suboptimal industrial structure, inefficient public support for private sector innovation, no relationship between innovation/R&D and growth.

“The 10 billion euro question” – how to adjust existing support instruments to most efficiently spend public and EU money on supporting innovation until 2020?
Post-crisis growth likely to be lower

Figure: GDP Growth Rates in EU-10, EU-15 and the pace of convergence, 2005–2012, in percent

Source: World Bank based on Eurostat
Also relative to non-EU countries

Figure: GDP Growth Rates in EU-10, EU-15 and the World, 2008–2012, in percent

Source: World Bank based on the IMF and Eurostat
Issue #1: Stagnant R&D expenditures...

**Total R&D spending**

- **% of GDP**
  - Germany
  - Slovenia
  - Czech Rep.
  - Hungary
  - Poland
  - Bulgaria

**Private sector R&D spending**

- **% of GDP**
  - Germany
  - Slovenia
  - Czech Rep.
  - Hungary
  - Poland
  - Romania

**Public and scientific sector R&D spending**

- **% of GDP**
  - Germany
  - Slovenia
  - Czech Rep.
  - Hungary
  - Poland
  - Bulgaria

Source: Eurostat
Figure: Expenditure on innovation-related activities as percentage of GDP

Source: IBS based on the European CIS
Issue #2: Low public innovation outputs

Figure: Assessment of the Amount and Quality of Public R&D Spending in EU-27

Issue #3: Low share of high-tech in manufacturing

Employment share of high-tech and medium-high-tech manufacturing *1
% in economic active population

Employment share of knowledge intensive service sectors *2
% in economically active population

*1 OECD definition; chemicals, machinery, electrical equipment, motor vehicle, other transport equipment, electronics, medical instruments

*2 Eurostat definition; telecommunications, IT services, R&D services

Source: Eurostat
Issue #4: Inefficient public support for private R&D

Figure: Structure of R&D financing in Poland, by sectors, 2008

Source: IBS
Figure: The share of public support for private R&D and capital investment under OP IE in total expenditures, 2008-2010

Source: IBS
Manufacturing rather than services...

**Figure: Structure of govt support for private R&D (actions 1.4 and 4.1 of Innovative Economy Program), 2008-2010**

- **Total amount: 3,15 bln PLN**
  - Manufacturing: 64%
  - Other: 5%
  - Transport, storage, telecom: 3%
  - Mining and quarrying: 3%
  - R&D: 4%
  - IT services: 5%
  - Construction: 7%
  - Retail and wholesale: 9%

- **Total manufacturing: 2 bln PLN**
  - Rubber and plastic products: 27%
  - Fabricated metal products, except machinery and equipment: 14%
  - Machinery and equipment n.e.c.: 8%
  - Other non-metallic mineral products: 8%
  - Recycling: 5%
  - Furniture; manufacturing n.e.c.: 7%
  - Motor vehicles, trailers and semi-trailers: 5%
  - Other manufacturing: 26%

Source: IBS
Capital investments in large enterprises rather than in SMEs...

Figure 3.16 The structure of public support to innovation (OP IE only) with respect to intervention type and firm size

Source: IBS
And technology absorption rather than innovation

Figure: Structure of innovative activities of enterprises in Poland and comparator countries (in 2008, by expenditure)

Source: IBS based on the EU CIS
All this despite an elaborate public support system

**Figure: Public support instruments, 2007-2013**

<table>
<thead>
<tr>
<th>University / RDIs</th>
<th>Applied research and development</th>
<th>Company formation</th>
<th>Capital investment</th>
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<tbody>
<tr>
<td>Direct support</td>
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<tr>
<td>Grant</td>
<td>OP IE 1.1, OP IE 1.3</td>
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<td>OP IE 4.4, OP IE 4.5, Regional programmes</td>
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<td>Key R&amp;D projects, Product of the future, Technological Initiative, InTech, Regional programmes, Voucher for Innovation</td>
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<tr>
<td>Loan</td>
<td></td>
<td>OP EPD 1.2</td>
<td>Technology Credit (incl. OP IE 4.3), OP EPD 1.2, Loan for innovation, Regional programmes</td>
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<tr>
<td>VC/PE</td>
<td>OP IE 3.2, OP IE 3.3, National Capital Fund</td>
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<tr>
<td>Tax</td>
<td>Tax deduction for innovation (I)</td>
<td></td>
<td>Tax deduction for innovation (II)</td>
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<tr>
<td>Indirect support</td>
<td></td>
<td>Incubators / tech offices / specialized services</td>
<td>Cooperation and organization</td>
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<tr>
<td>Human capital</td>
<td>OP IE 1.2, OP HC 2.1, OP HC 4.2</td>
<td>OP IE 2.2, OP IE 2.3, OP EPD 1.1, OP EPD 1.3, Regional programmes</td>
<td>OP IE 5.1, 5.4, Patent PLUS, OP EPD 1.4, Regional programmes</td>
</tr>
<tr>
<td>Research infrastructure</td>
<td>OP HC 2.3, OP IE 3.1, OP IE 5.2 – 5.3, OP EPD 1.3, Regional programmes, National Services System, National Innovation Network</td>
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Source: IBS
And substantial increase in outlays

Figure: Public innovation-related spending, billion PLN

Source: IBS
For all support instruments....

Figure: Total budget for public support instruments, 2007-2013, in PLN

<table>
<thead>
<tr>
<th>Direct Support</th>
<th>University / RDIs</th>
<th>Firms</th>
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</thead>
<tbody>
<tr>
<td>Basic and scientific research</td>
<td>3 208 865 448 (7.79%)</td>
<td>12 663 851 901 (49.64%)</td>
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<tr>
<td>Applied research and development</td>
<td>5 069 928 615 (12.31%)</td>
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<tr>
<td>Company formation</td>
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<tr>
<td>Capital investment</td>
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<tr>
<td>Grant</td>
<td>12 663 851 901 (30.74%)</td>
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<tr>
<td>Loan</td>
<td>100 432 941 (0.24%)</td>
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<tr>
<td>VC/PE</td>
<td>967 528 000 (2.35%)</td>
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<tr>
<td>Tax</td>
<td>11 400 000 (0.02%)</td>
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<tr>
<td>Total</td>
<td>7.79%</td>
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<tr>
<th>Indirect Support</th>
<th>Human capital</th>
<th>Research and university infrastructure</th>
<th>Incubators / tech offices / specialized services</th>
<th>Cooperation and organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 646 519 612 (5.50%)</td>
<td>5 914 363 451 (12.36%)</td>
<td>1 516 024 949 (3.68%)</td>
<td></td>
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<tr>
<td>9 043 497 471 (21.95%)</td>
<td>121 95%</td>
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Issue #5: However, low innovation didn’t stop Poland from growing faster than peers

Figure: Real GDP per capita growth 1990-2010, (1990 = 100)

Source: IBS based on OECD
Which, however, may not be sustainable…

Figure: GDP per capita and total R&D spending, in % of GDP, 2008

Source: IBS based on OECD
So, what to do about it?
A few outstanding questions...

Diagnostic Question
(“Why”)

1. Stage of Poland’s tech development – innovation or absorption?

Policy Question
(“What”)

14(5). Horizontal or sectoral policy?

16. Innovation support based on tech stages?

17. Innovation support based on business stages?

Implementation Question
(“How”)

8. Entrepreneur-science collaboration?

9. Industry-RDI collaboration?

10. Collaboration among enterprises?

11. Creativity of employees?

12. Private funds for risky projects?

13. Measure demand for educated talent?

4. Financial: direct or indirect? Loans or grants?

6. Scope and spread – fewer instruments with bigger budgets, or vice versa?

7. Non-financial: research infra, tech park, incubator…?

18. Innovative attitudes?

15. Integrate results of technology foresight?

19. Potential of new markets?

20. Skills / jobs for future competition?

3. Analysis of effectiveness of different types of support?

2. Technology or non-technology investment?

Objectives and indicators

Choice of instruments

Resulting mix of measures

Integrate results of technology foresight?

Potential of new markets?

Skills / jobs for future competition?
And a few others too

<table>
<thead>
<tr>
<th>&quot;Broad&quot; questions</th>
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<tbody>
<tr>
<td>- Support technology absorption or innovation?</td>
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<td>- Horizontal or sector-specific support?</td>
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<tr>
<td>- What are the pre-conditions (e.g. human capital, legal framework) for enterprise innovation?</td>
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<tr>
<td>- How to boost creativity in companies and in citizens?</td>
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<tr>
<td>- How to change the structure of the economy from low to high-tech?</td>
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<tr>
<td>- How to reduce public sector’s risk aversion?</td>
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<th>&quot;Middle&quot; questions</th>
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<tr>
<td>- What’s better for the support system - grants or loans?</td>
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<td>- Should we support directly on indirectly?</td>
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<td>- Support more non-technical innovations or technological mainly?</td>
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<tr>
<td>- A limited number of instruments with large budgets or a lot of small projects with smaller budgets?</td>
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<tr>
<td>- Promote innovation in large companies or in SMEs and start-ups?</td>
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<tr>
<td>- Increase R&amp;D tax incentives?</td>
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<tr>
<td>- Is funding gap or the deal pipeline a real barrier?</td>
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<tr>
<td>- How to involve the financial sector in expanding access to financing?</td>
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<th>&quot;Specific&quot; questions</th>
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<tbody>
<tr>
<td>- Should “absorption” measures switch to loans?</td>
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<td>- What kind of financial institutions would be appropriate?</td>
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<tr>
<td>- How to support service sector innovation?</td>
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<tr>
<td>- How to measure the effectiveness of public spending?</td>
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Our recommendations

“I'll be happy to give you innovative thinking. What are the guidelines?”
Recommendations for enhancing efficiency of public spending on innovation

- **Re-focus matching grants:** target the early stages of the innovation process (R&D, proof of concept and prototyping) rather than absorption through capital investment.

- **Reduce public sector’s risk aversion:** change incentives to allow for commercial failure.

- **Shift the focus of incubation services:** the scaling-up stage rather than the pre-incubation stage. Incubators to take an equity stake in the start-up companies.
Recommendations for enhancing efficiency of public spending on innovation

- Scale down absorption grants in favor of market-based instruments: technology credit for creditworthy companies and first loss guarantees for less creditworthy firms.

- Change the selection process in public/EU funding: focus on project innovativeness, eliminate irrelevant criteria, introduce selection committees with international experts, use ex ante impact evaluation to test new approaches, accept failure

- Improve monitoring and impact evaluation: design selection processes with impact evaluation in mind, set clear objectives, assign clear responsibility to policymakers
Recommendations for improving the economic structure and increasing innovation spending

- Increase competition: privatize, promote single EU market, improve the business environment to lower entry barriers to startups.

- Promote R&D intensive FDI: increase the budget of PAIIZ, focus on R&D, enhance diplomatic support.

- Stimulate international knowledge-sharing: support participation in technology conferences, study tours and workshops abroad in centers of technology excellence.

- Keep the real exchange rate at a competitive level.
Recommendations for human capital development

- **Enhance incentive systems for researchers to collaborate with business**: promote success, increase private share in IP ownership rights, show leadership in “naming and shaming”; subsidize R&D trainee programs

- **Promote international flow of talent**: expand scholarships for researchers to study abroad and to return home, expand the role of foreign experts in scientific committees, promote highly qualified immigration, mostly from Eastern Europe

- **Support human capital development in the private sector**: cost-share training expanses with the private sector (PPP).
THANK YOU!