

Reforming innovation systems in BY, KAZ and UA: Lost in Transition/Translation?”

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cbased - Community Based
Innovation Systems

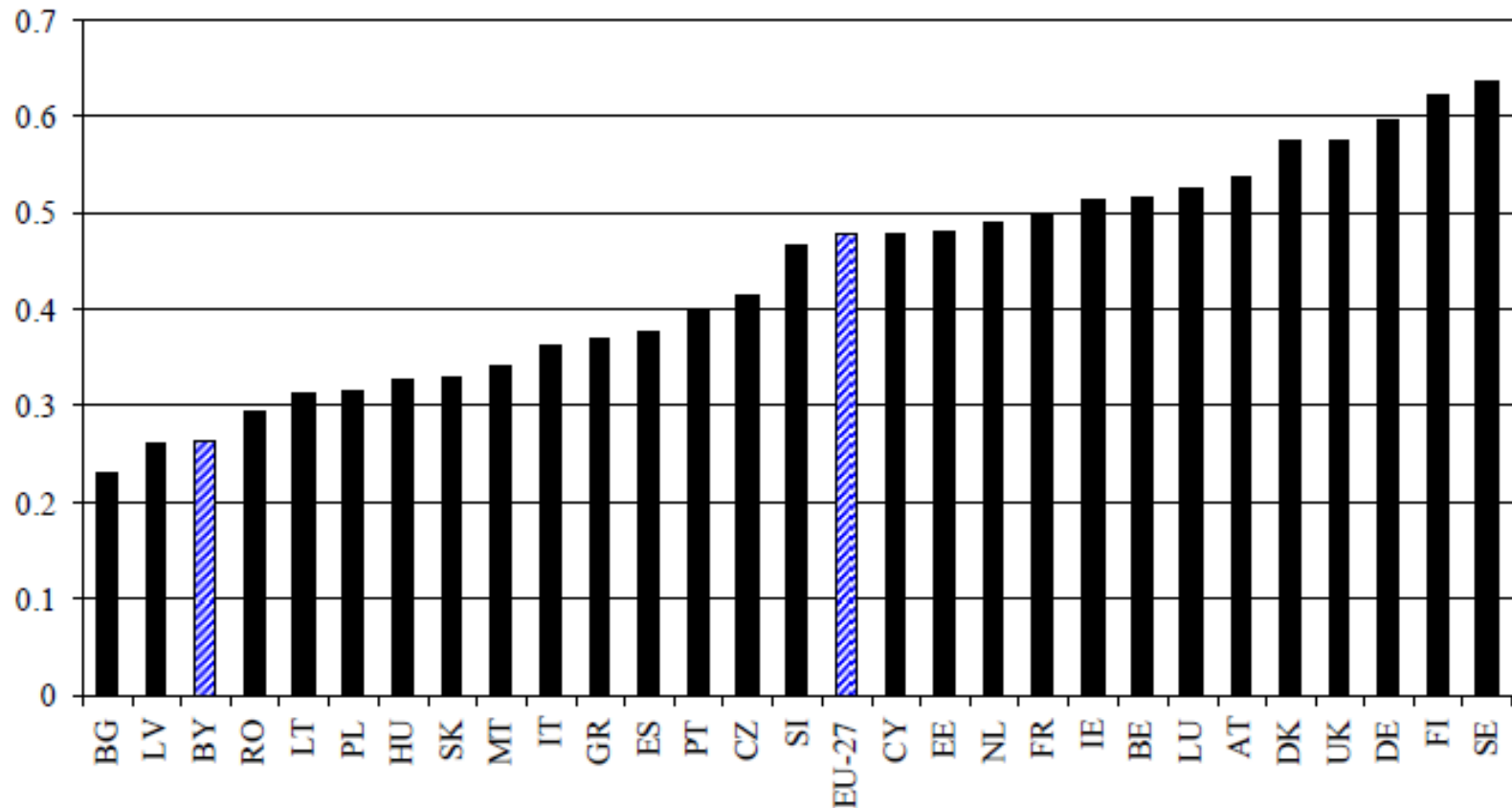
Before I start

- **Applied, policy oriented and inductive**
 - Experiences made during UNECE IPRs, first attempt to reflect across countries
- **Country characteristics**
- **Discussion of experiences**
 - Modernisation or innovation
 - Innovation and entrepreneurship
 - Financing innovations
 - Extractive and inclusive institutions and other observations

R&D spending 2009

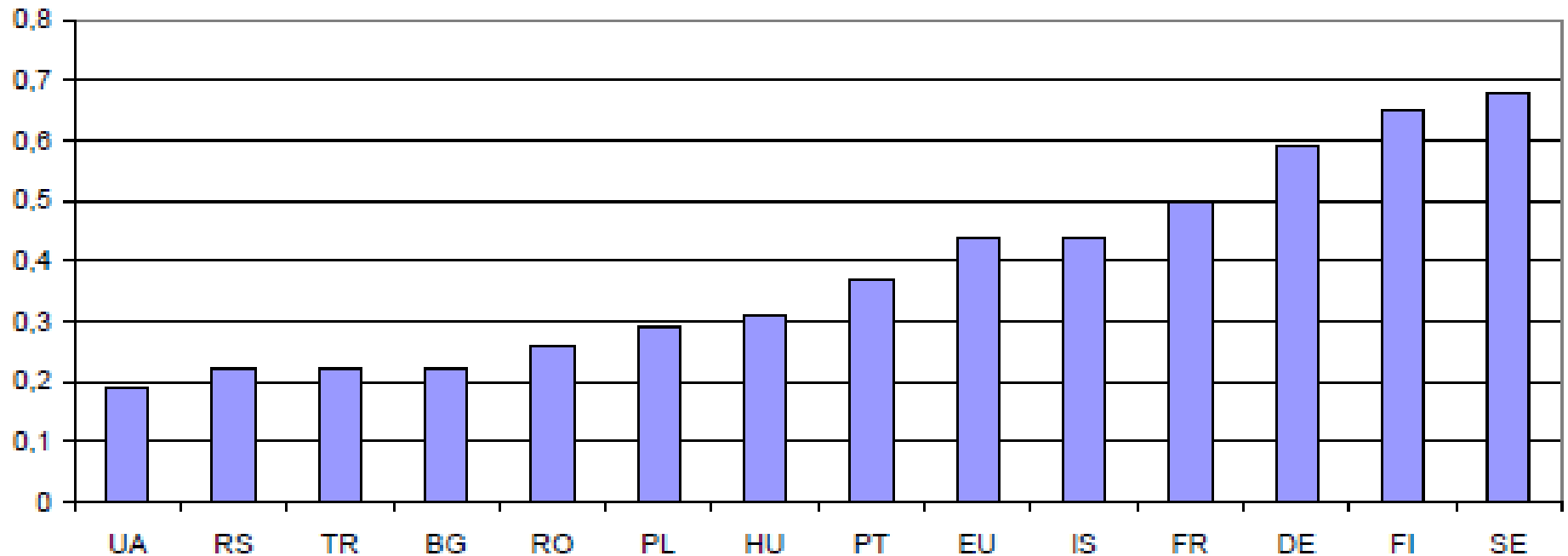
- **Kazakhstan:** 0,23%
- **Belarus:** 0,64%
- **Ukraine:** 0,86%

Innovation Scoreboard Belarus



Source: N. Bohdan, "Critical analysis of the level of innovative development of Belarus in 2010", research project commissioned by the SCST.

Innovation Scoreboard Ukraine



R&D and innovation

- **Starting to be a topic in many of non EU transition countries**
- **Innovation performance reviews on request**

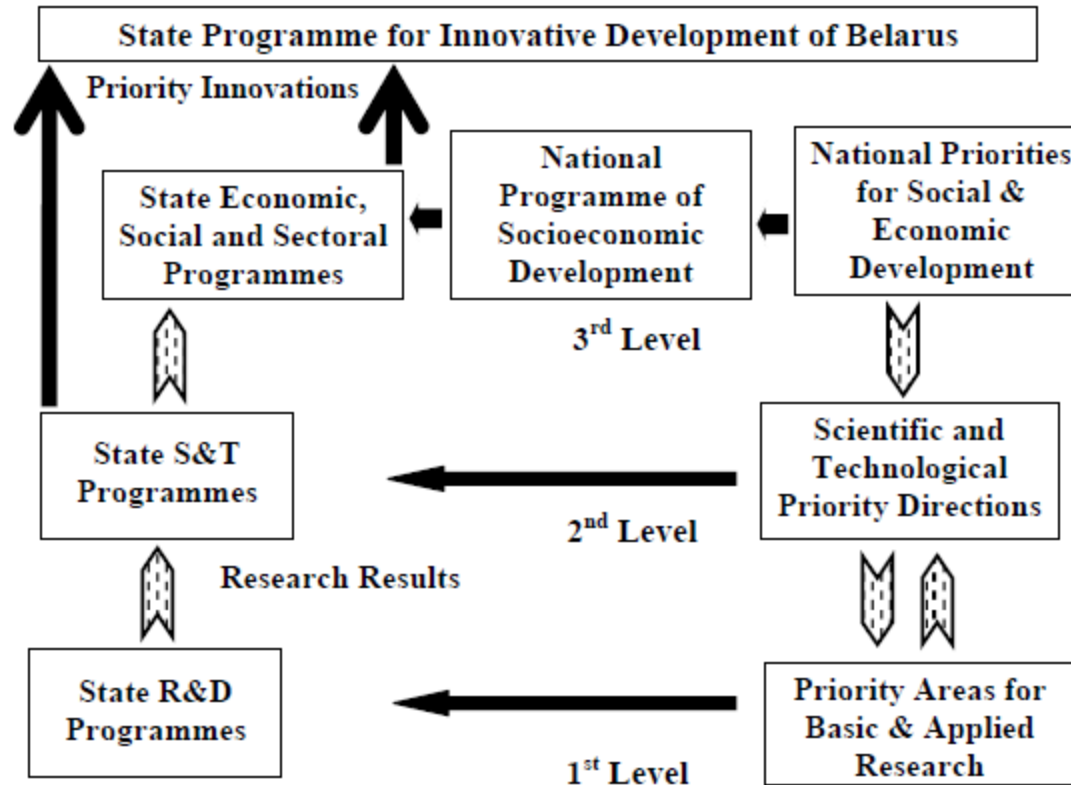
Country profiles

Belarus

Belarus: Main issues

- **„Unchanged“ Soviet system**
 - Large parts of economy are still state-owned
- **Preserved engineering and manufacturing capabilities**
- **Underdeveloped SME sector**
- **Strong capabilities in policy implementation**
- **SPID: Complex system of programmes**

Hierarchical structure of the state programmes



Source: Presentation by I. Solonovich at the fifth session of the UNECE Committee on Economic Cooperation and Integration, 1-3 December 2010, Geneva.

Main target indicators

| Indicator | Years | | | | | | Increase 2005- 2010 |
|---|----------|------|---------|-------|-------|-------|---------------------------|
| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | % |
| | Reported | | Targets | | | | |
| Share of new products in total industrial output | 10.4 | 11.5 | 13.0 | 15.0 | 17.0 | 19.0 | 82.7 |
| Share of innovative enterprises in total number of industrial enterprises | 14.1 | 14.5 | 17.5 | 20.0 | 22.5 | 25.0 | 77.3 |
| Share of certified products in total industrial production | 68.0 | 68.0 | 68.5 | 69.0 | 69.5 | 70.0 | 2.9 |
| Share of innovative products in total volume of industrial production | 15.2 | 15.5 | 16.0 | 16.5 | 17.5 | 18.5 | 21.7 |
| Establishment and certification of quality management systems according to ISO 9001 (with a cumulative total) | 658 | 750 | 1,000 | 1,300 | 1,600 | 2,000 | 204.0 |
| Share of expenditure on equipment, tools and equipment | 16.0 | 17.0 | 17.5 | 18.0 | 18.5 | 19.0 | 15 |

Innovation funds

- **Innovation funds are levied by 26 institutions from companies**
 - 0.25% - 15% of turnover, 30% for scientific purpose, 70% for modernisation
 - Cumbersome competitive awarding process

Research and innovation in BY

- **Linear system**
- **R&D is concentrated in scientific institutions**
- **Most development is done in Academy of Sciences**
 - Increasingly efforts are on the commercialisation of research
 - 50% of costs to be financed by company
 - Failure if technology is used for less than 5 years – resources have to be paid back
 - Enterprises are almost excluded from R&D performance
 - Innovation projects in the BY context are most of the time investment projects

Main issues

- **Risk aversion**
 - Everything is planned – no risk wanted
- **Preoccupation with public venture capital**
- **Business angels, VCs and the Minsk Start-up Weekend...**

Planned development of innovative infrastructure

| | <i>Number of institutions</i> | |
|---|-------------------------------|-----------------|
| | Mid- 2006 | End-2010 |
| Industrial companies | 2,271 | 2,325 |
| <i>of which, innovation-active companies</i> | 318 | 581 |
| Scientific-production centres | 56 | 71 |
| Research organizations | 295 | 295 |
| <i>of which, institutions of higher education</i> | 55 | 55 |
| High-technology parks | 1 | 1 |
| S&T parks | 10 | 20 |
| Innovation centres | 5 | 8 |
| Technology transfer centres | 24 | 30 |
| Business-incubators | 9 | 10 |
| Information and marketing centres | 10 | 30 |
| S&T libraries (including factory libraries) | 476 | 490 |
| Venture organizations | – | 3 |

Source: http://www.government.by/public/shared/rus/innovations_p/en/05.html

Expand and diversify financial support

- **Expand and diversify system of financial support**
 - **To be coordinated with other areas**
- **Promote innovation in companies**
- **Measures should include the following**
 - **Tax relief for innovation-oriented activities to alleviate financial constraints**
 - **New policy instruments like subsidised loans, innovation grants and vouchers, guarantees schemes**
 - **Providing targeted public support to facilitate private equity finance**

No risk no fun

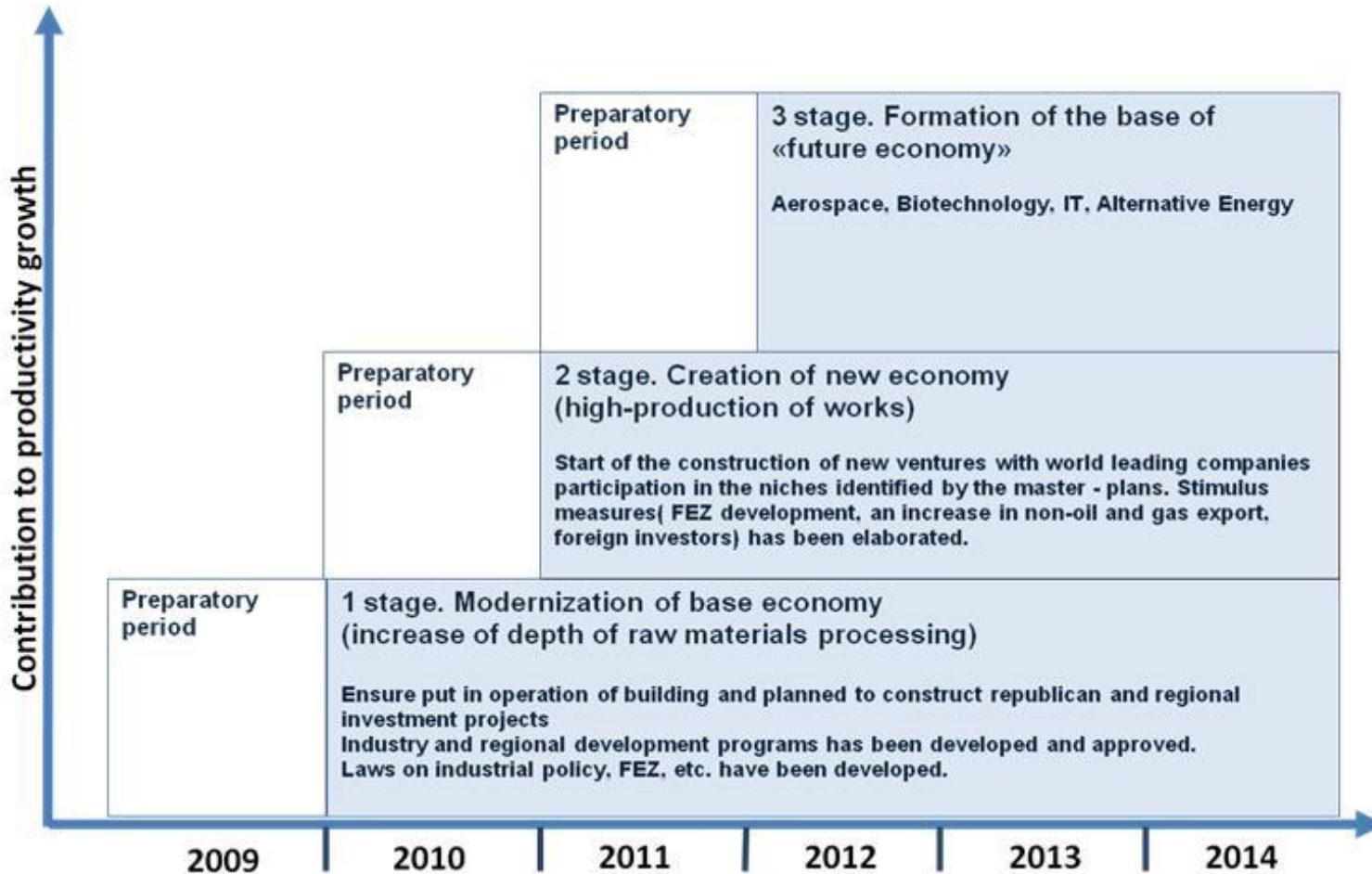
- **Accept more risk in innovation. Failure is an integral part of innovation activities**
- **Higher risk tolerance may involve**
 - Non repayable grant-scheme
 - Specify conditions under which the now existing penalties would not apply

Simply the existing system

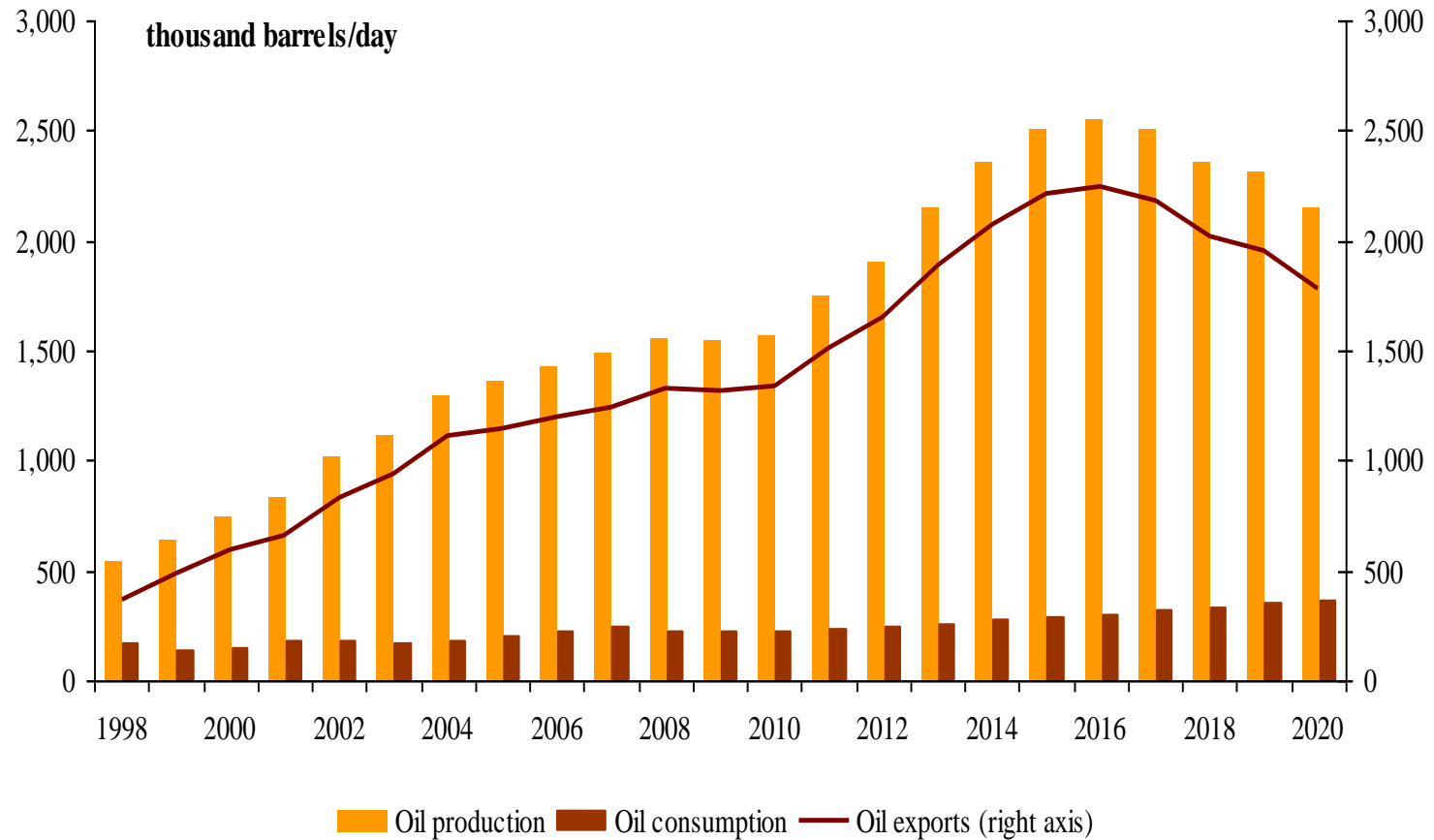
- **Simplify existing system of innovation support and remain open to new innovation possibilities**
 - Streamline state-run programmes and regroup them into technology oriented, mission oriented and general purpose programmes
 - Relieve state-run programmes from support to modernisation investment
 - Develop and reinforce general purpose innovation programmes

Kazakhstan

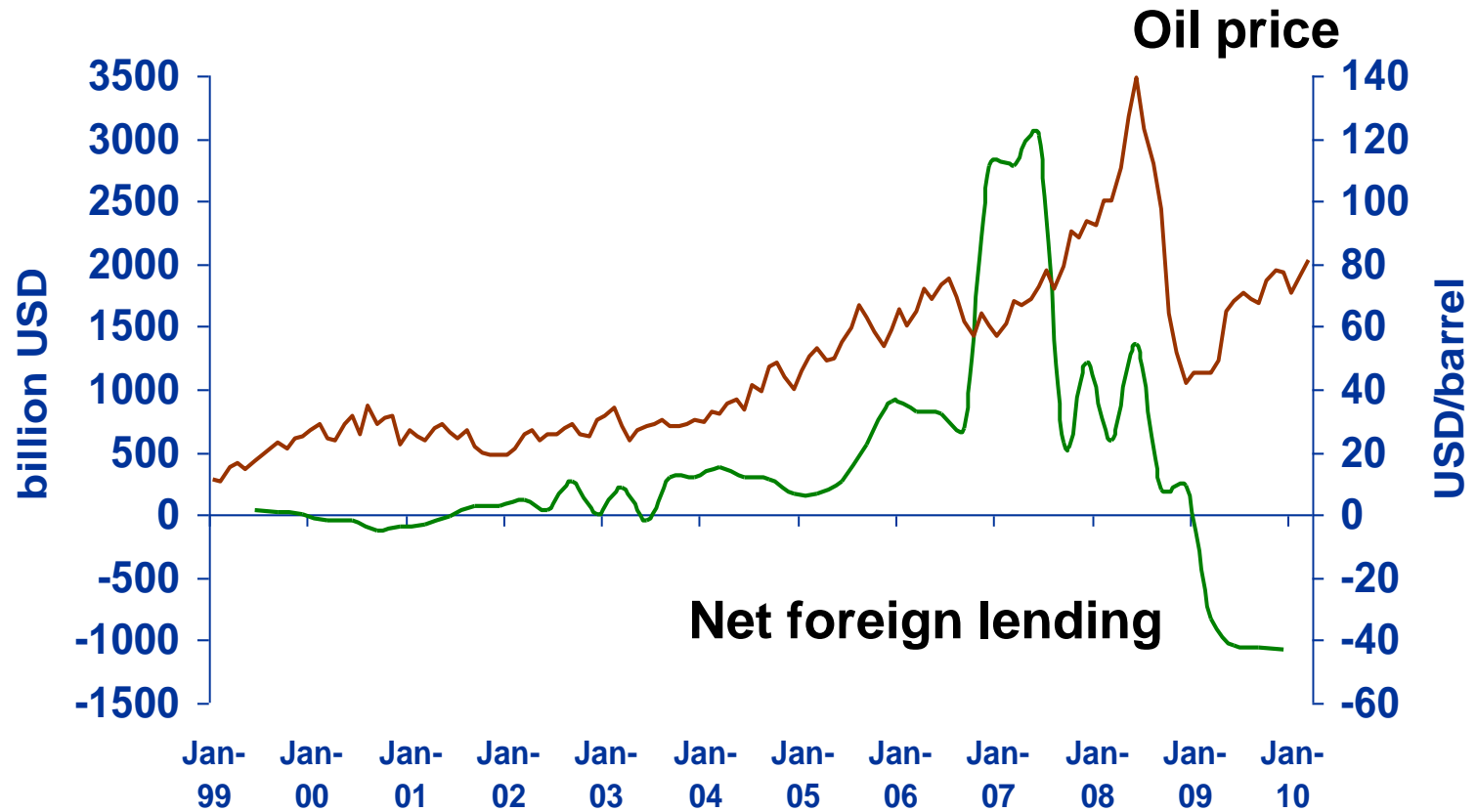
Innovation finance and development



Diversifying the economy?



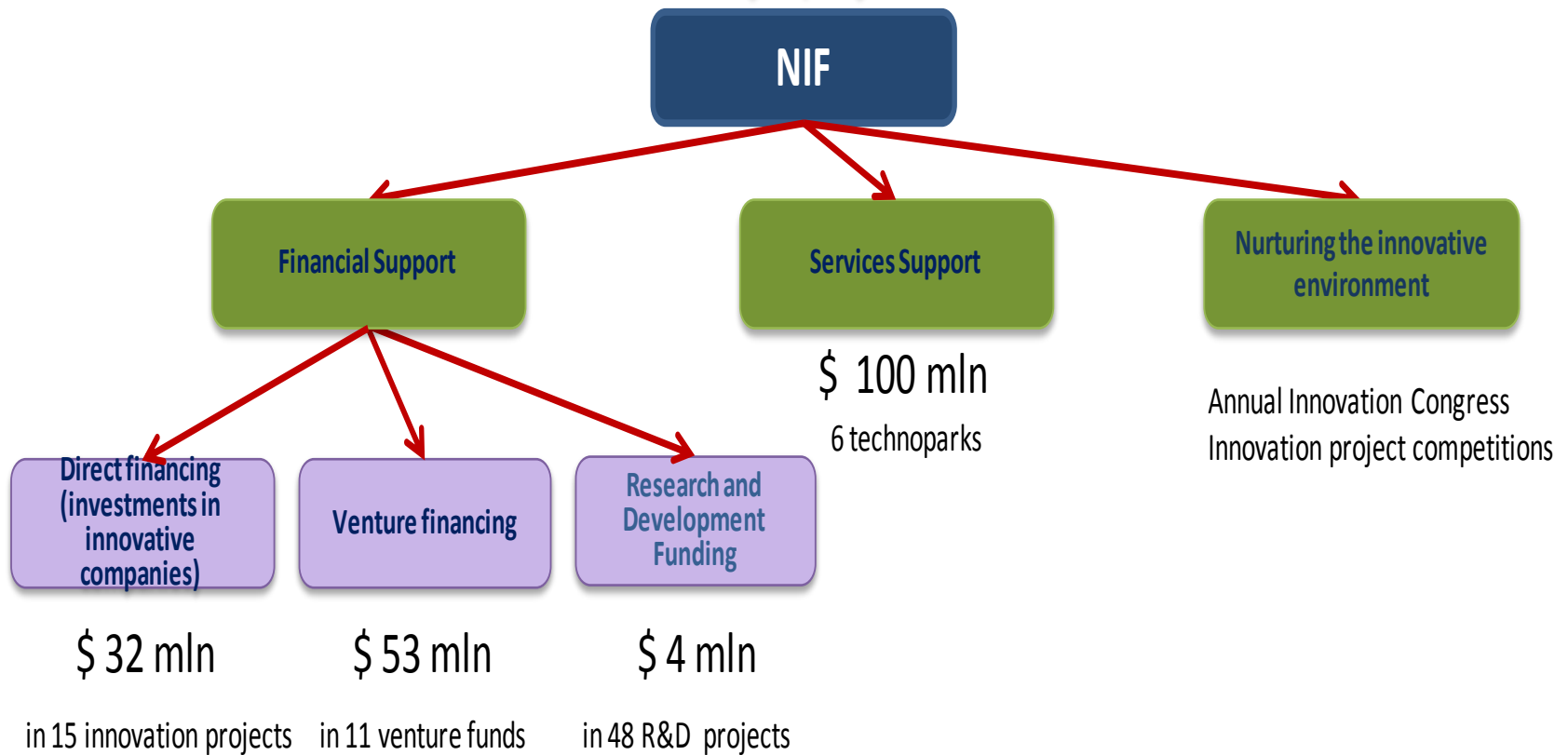
What's this?



Institutional set-up

| | Main field | Equity finance | Subsidised loans | Grants |
|---|---------------------------|---|--|---|
| Development Bank of Kazakhstan | Long term finance | | Infrastructure and pilot projects | |
| Entrepreneurship Development Fund - DAMU | SMEs | | Various programmes, Microfinance, Business Roadmap 2020, Productivity 2020 | |
| Kazakhstan Investment Fund | Private equity investment | Various development projects | | |
| National Innovation Fund | Innovation | Investment projects in innovative companies, national and foreign venture funds | | R&D grants for various purposes, e.g. patenting, acquiring technology, feasibility studies, R&D |
| Science Fund | Commercial. | | Commercialisation | |

Innovation finance



Integrated programmes

Productivity 2020

Programme Administrator

Programme Operator

Instrument operators

KIIDI

Kazakhstan Development Bank

National Innovation Fund

Ministry of Industry and New Technologies

Kazakhstan Industry Development Institute

Development of complex plan

Leasing Financing

Project and Engineering Organizations

Managerial and Production Technologies

Grants

Facing reality

- **Ambitious plans**
 - Naserbajew University
- **Realities in Kazakhstan are sometimes far away from short and long term development plans**
 - VC at best developed some technologies left over from Soviet times
 - Cathedrals in the desert

Recommendations

Modernisation as a top priority

- **Modernisation: Broaden public financial support by Damu**
 - Offering adequate finance over the life-cycle of a company wherever the private sector is not providing sufficient support
 - Strengthening the approach that **links access to financial resources to an upgrading of management practices** in SME
 - Increasing **microfinancing and small grants provision** to encourage experimentation of potential opportunities and entrepreneurial initiative.
- **Introducing a special new programme to support R&D and innovation activity in SMEs by DAMU**

Foster incremental innovation

- **Reduce the share of equity finance**
- **Foster incremental innovation projects**
- **Develop the financial system as a basis for long-run growth**
 - Stock market
 - Corporate venture capital
- **Continue integrated programmes**
- **Introduce evaluations**
 - Create a basis for evaluations, i.e. collect data on support activities etc.

Ukraine

Innovation Ukraine

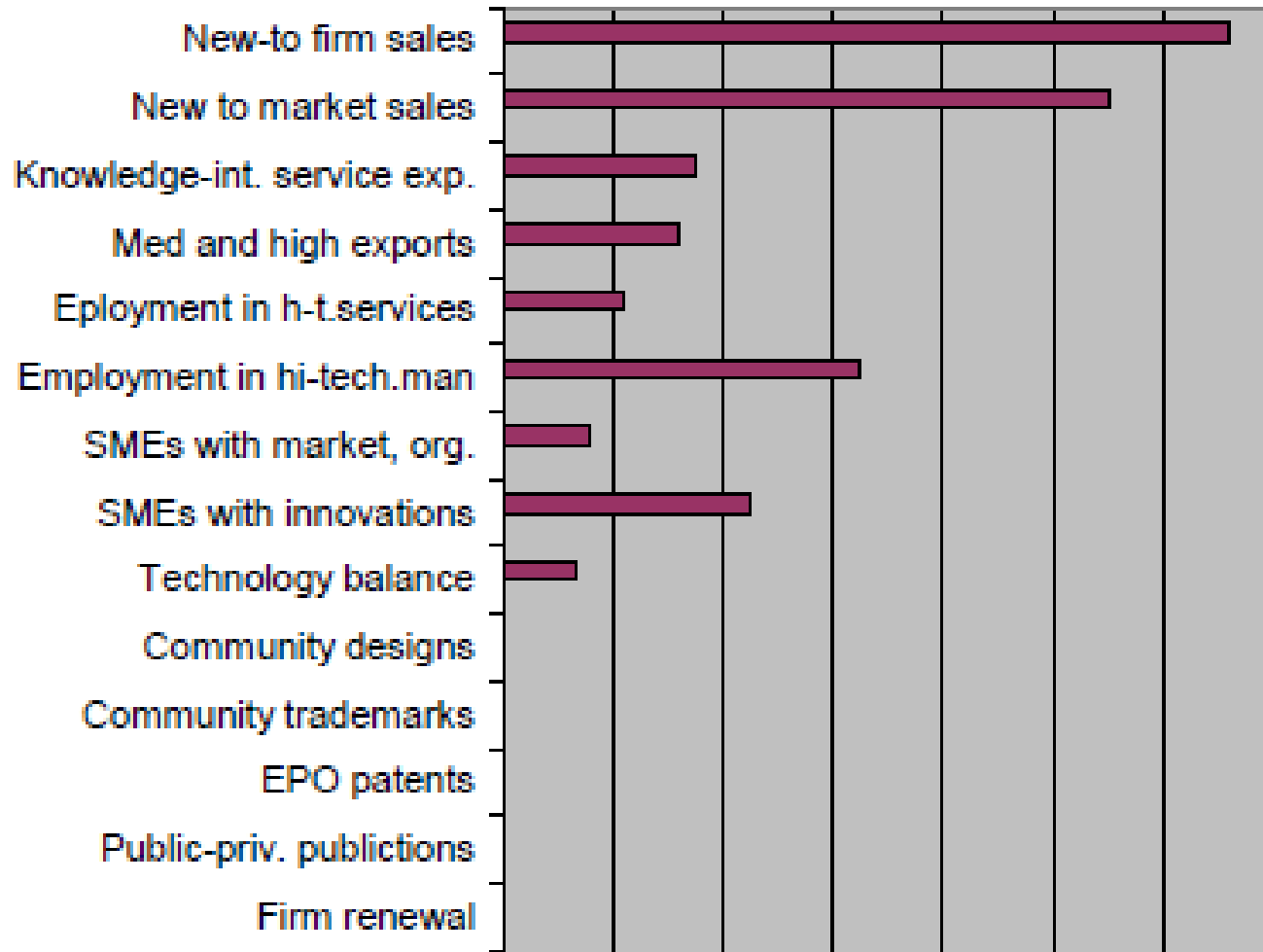
- **Had about half of Soviet researchers and infrastructures at the time of independence**
- **Extremely complex system of decision making**
- **Erratic developments**
- **Corruption is the main issue also in STI**
 - Constantly reworking laws, etc.
- **Software outsourcing as a success story**

Main STI indicators Ukraine

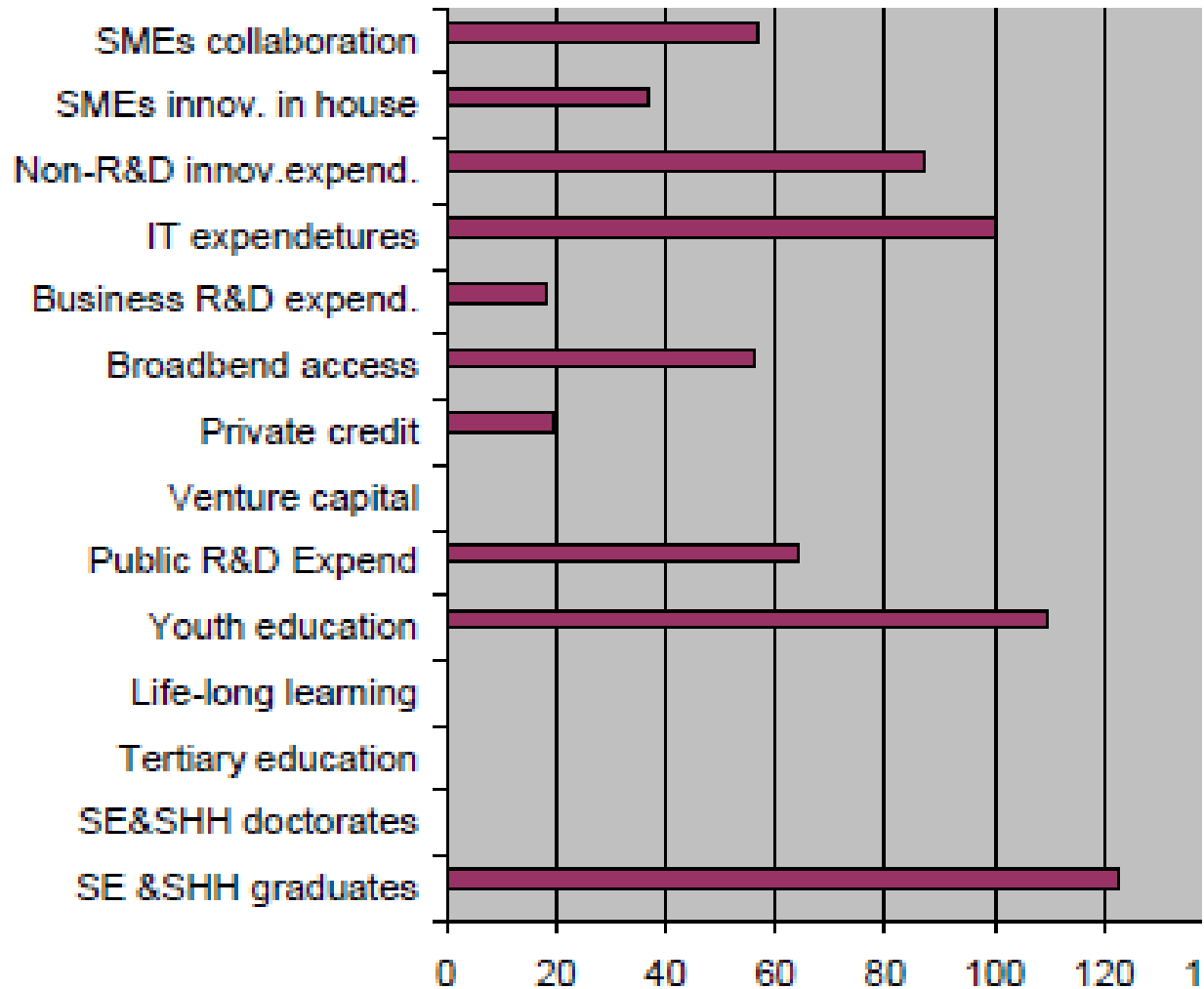
| | 2006 | 2007 | 2008 | 2009 | EU average (the latest available) |
|---|-------|-------|-------|-------|--------------------------------------|
| GERD (€ million) | 774.2 | 796.3 | 736.2 | 680.1 | 7000.1 |
| GERD per capita | 16.6 | 17.2 | 16.0 | 14.9 | 379.1 |
| R&D intensity (GERD as % of GDP) | 0.94 | 0.86 | 0.84 | 0.86 | 1.81 |
| BERD (€ million) | 303.5 | 309.1 | 244.5 | 217.4 | 4334 |
| GERD financed by business enterprise as % of total GERD | 39.4 | 45.3 | 50 | 37.2 | 54.7 |
| GERD financed by abroad as % of total GERD | 19.4 | 15.9 | 15.6 | 22.3 | 8.9 |
| GBAORD (€ million) | 311.1 | 392.8 | 365.8 | 301.7 | 2315 |
| GBAORD as % of general government expenditure | 1.14 | 1.26 | 1.22 | 1.15 | - |

Source: calculated on the base of data from the State Committee of Statistics of Ukraine (2010), and the OECD Main S&T Indicators (2010), N. 1

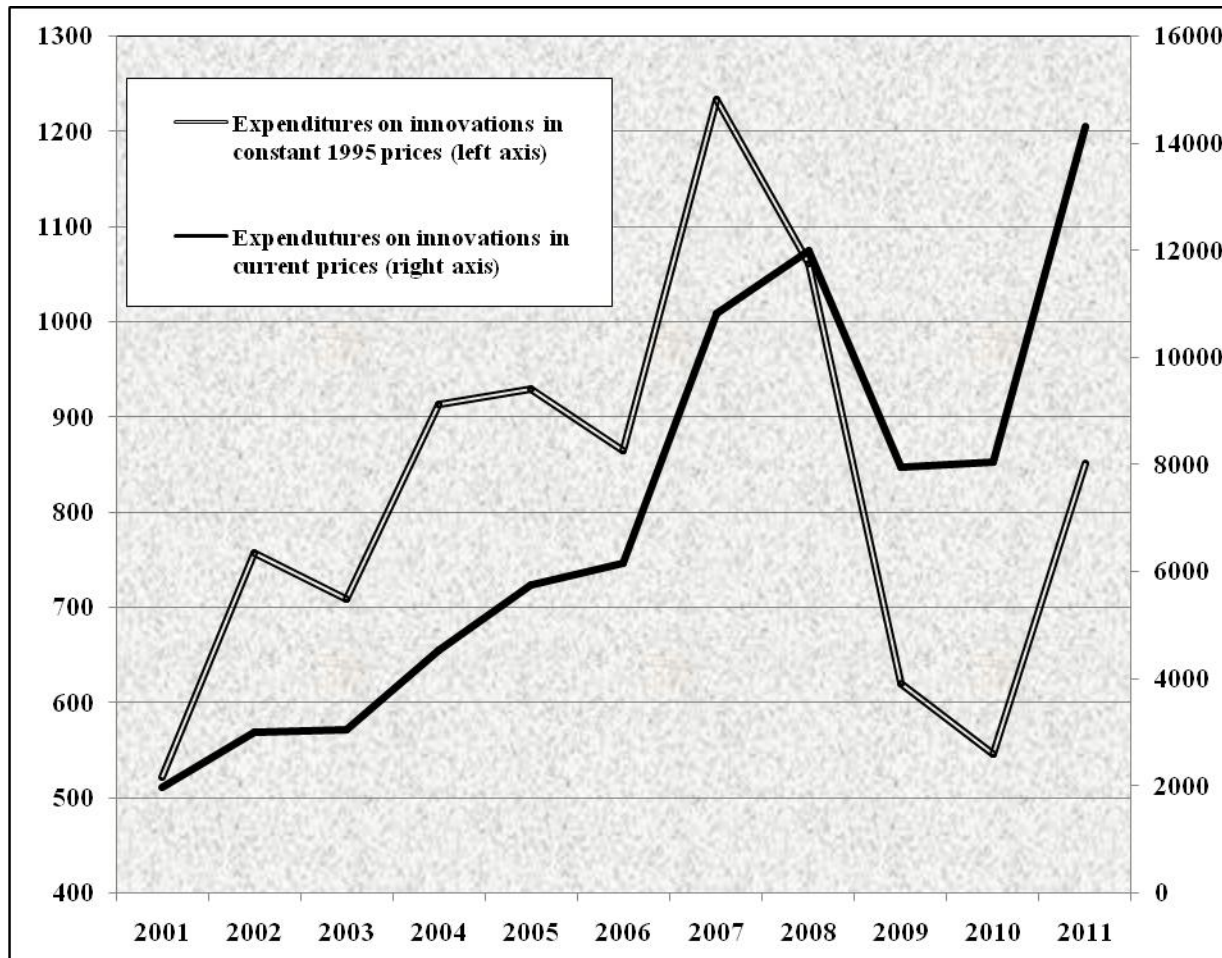
Innovation Scoreboard Ukraine



Innovation Scoreboards



Erratic developments



Financing Innovation

| Source of financing | Company resources | State and local budgets | Non-budget funds | Bank loans | National investors | Foreign investors | Other sources |
|---------------------|-------------------|-------------------------|------------------|------------|--------------------|-------------------|---------------|
| 1998 | 75.52 | 1.68 | 4.72 | 3.27 | 0.45 | 12.32 | 2.04 |
| 1999 | 69.63 | 10.09 | 3.2 | 6.13 | 0.57 | 7.57 | 3.1 |
| 2000 | 79.64 | 0.54 | 1.9 | 6.26 | 2.81 | 7.57 | 1.28 |
| 2001 | 83.9 | 2.96 | 1.19 | 6.03 | 1.77 | 2.97 | 1.17 |
| 2002 | 71.07 | 1.59 | 0.21 | 12.61 | 1.95 | 8.76 | 3.81 |
| 2003 | 70.21 | 3.14 | 0.02 | 18.01 | 3.66 | 4.25 | 0.71 |
| 2004 | 77.27 | 1.43 | 0.01 | 17.78 | 0.23 | 2.48 | 0.84 |
| 2005 | 87.72 | 0.75 | 0 | 7.12 | 1.38 | 2.75 | 0.27 |
| 2006 | 84.6 | 2.08 | 0 | 8.48 | 0.43 | 2.86 | 1.54 |
| 2007 | 73.65 | 1.41 | 0 | 18.49 | 0.24 | 2.97 | 2.24 |
| 2008 | 60.56 | 2.94 | 0 | 33.72 | 1.41 | 0.96 | 0.4 |
| 2009 | 65.02 | 1.69 | 0.02 | 11.84 | 0.39 | 19.03 | 2 |
| 2010 | 59.35 | 1.15 | 0.01 | 7.78 | 0.39 | 29.07 | 1.34 |
| 2011 | 52.92 | 1.13 | 0 | 38.3 | 0.32 | 0.4 | 6.94 |
| Average | 72.22 | 2.33 | 0.81 | 13.99 | 1.14 | 7.43 | 1.98 |

A lot of innovation support structures on paper

| Innovation infrastructure components | Quantity |
|--|------------|
| Techno parks | 16 |
| Innovation business incubators | 24 |
| Innovation centers | 15 |
| Centers of IP commercialization | 14 |
| Innovation and TT Centers | 4 |
| Centers of science, engineering and economic information | 14 |
| Science educational centers | 3 |
| Education-research-production centers | 4 |
| Investment (innovation) venture fund | 1 |
| Non-bank finance and credit organizations | 15 |
| Research implementation enterprises | 21 |
| Consultancy centers | 2 |
| Innovation research centers | 4 |
| Total | 147 |

Is innovation to be funded by the elite?

- DeKarta Capital (dekartacapital.com)
- Eastlabs (www.eastlabs.co)
- KMCORE (www.kmcore.com)
- TA Ventures (www.taventure.com)
- Torben Majgaard, founder of Ciklum (www.ciklum.com)
- Vostok Ventures (vostokventures.com)

Recommendations

- **Improve framework conditions: rule of law, corruption etc.**
- **Start a very small innovation support programme and demonstrate that this can work in Ukraine**
- **Create fair conditions for venture capital**
- **Improve or at least maintain level of university education in science and engineering disciplines**

Conclusions

What hampers development?

- **Modernisation or innovation?**
- **Private enterprises – entrepreneurship?**
- **Development level of the financial system?**
- **Extractive or inclusive economic and political institutions?**

Modernisation or innovation

- **Modernisation to be prioritised**
- **Maintain islands of excellence in STI and – of course – enlarge them**
- **Expect this to take a long time**

Ministries

Economy

FFF

XYZ

XYZ

XYZ

XYZ

FFG

XYZ

XYZ

XYZ

ERP

AWS

1945 1962 1970 1985 1995 2004 2011 2020

R&D

Inv/R&D

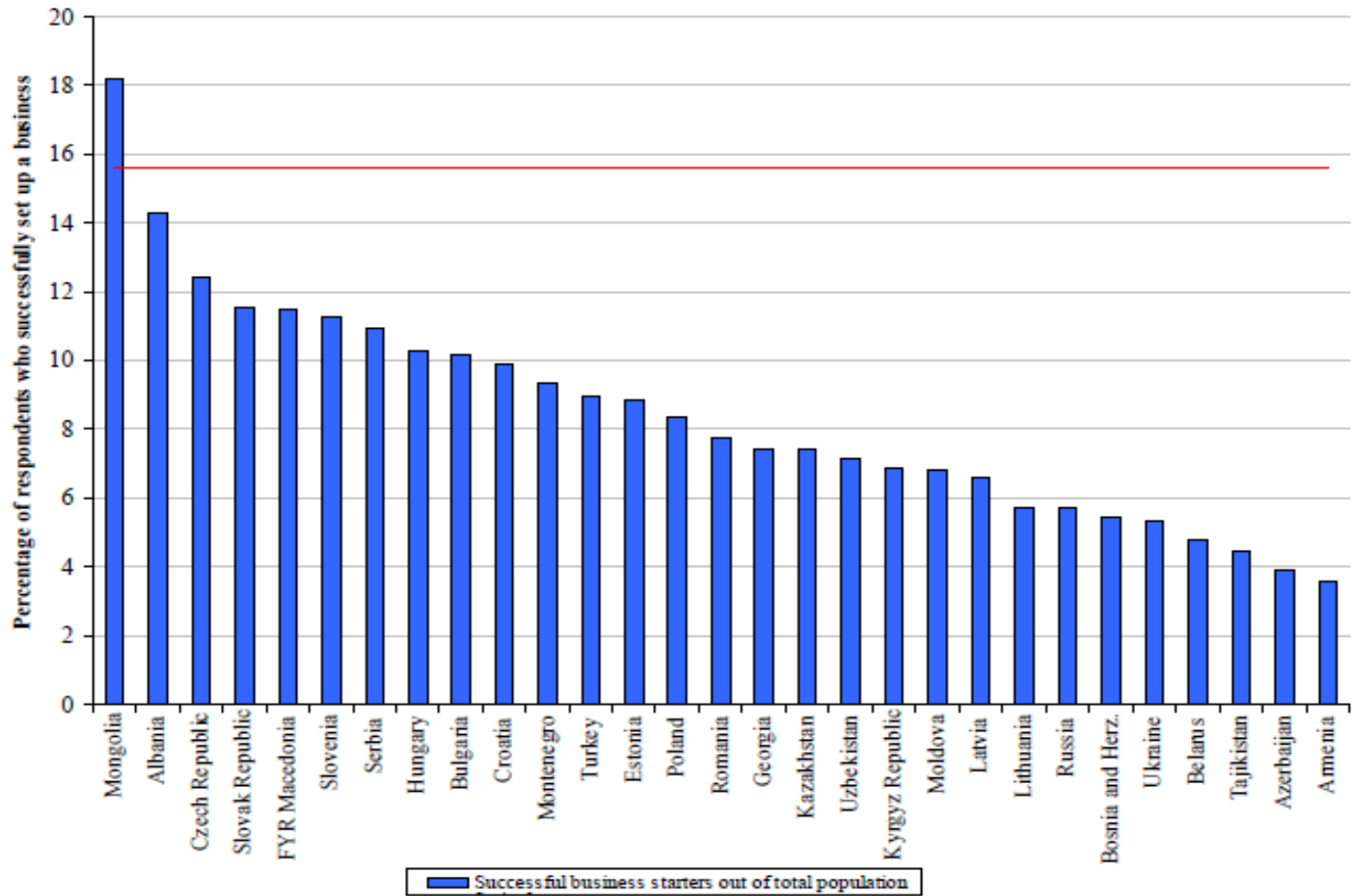
Strategy

FWF

Science

Ministry

Are people less entrepreneurial?



Source: LiTS.

Path dependence in financial systems

- **Sources for innovation finance:**

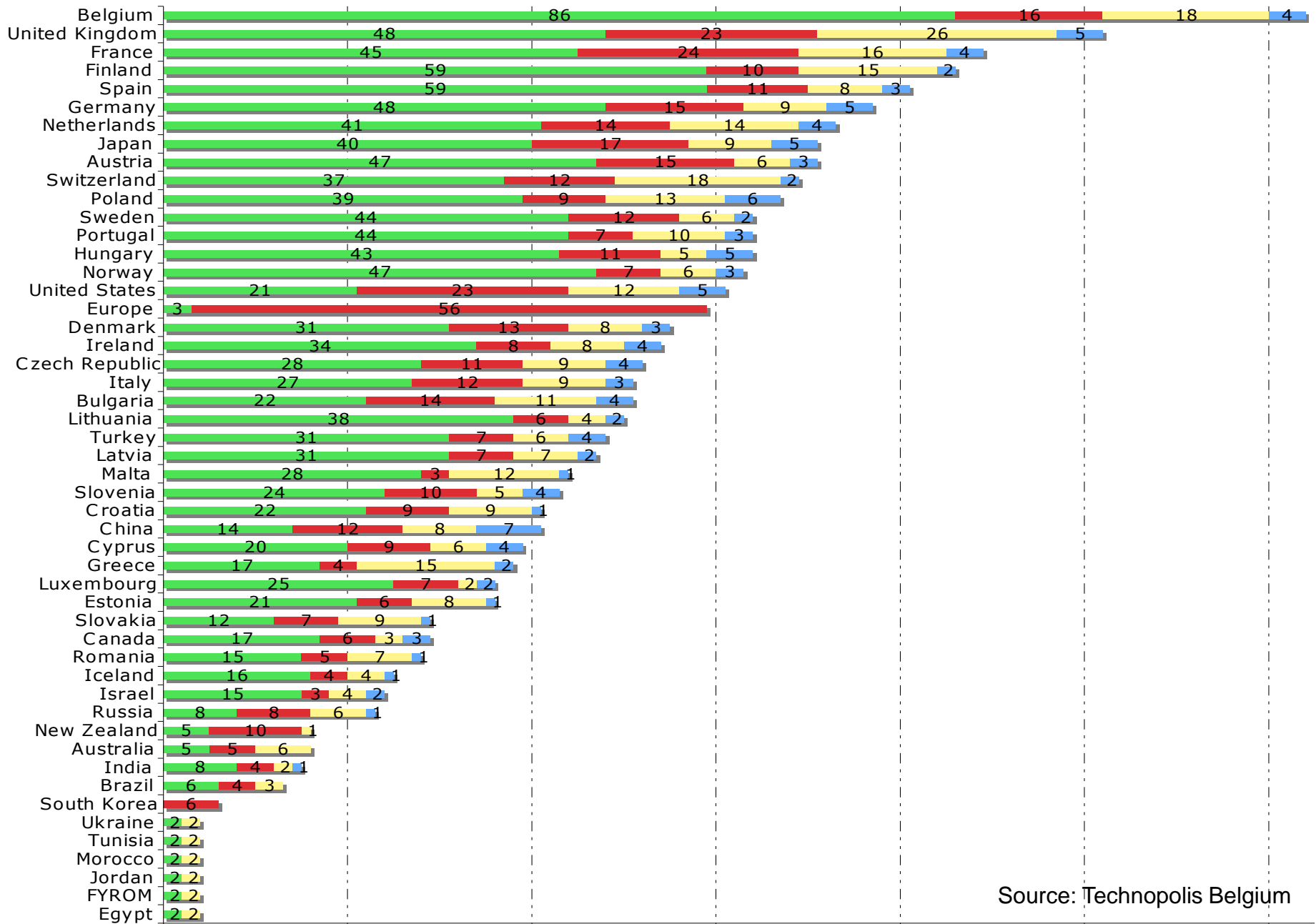
- Banks
- Public support programmes
- Company or – in case of start-ups – family & friends
- Venture capital

Which financial system favours what?

| Bank based system | Equity based system |
|--|---|
| <p>External finance mostly through bank</p> <p>Sectors based on incremental innovation develop well</p> <p>Efforts to increase availability of VC</p> <p>Risky projects supported by public institutions</p> | |
| | <p>Venture capital as a major source of finance for risky projects</p> <p>High market capitalisation</p> <p>Sectors based on R&D develop faster</p> <p>Incremental innovation might find it difficult to innovate</p> |

Resources for innovation and entrepreneurs

- **To be financed out of cash flow in companies**
- **Family and friends for entrepreneurs**
 - Most important source of finance for entrepreneurs
 - Less inequality generates more innovators
 - Bootstrapping
- **Consulting services and education necessary**



Source: Technopolis Belgium

■ Support Measure
 ■ Organisation
 ■ Policy Document
 ■ Information Source

More VC needed?

- **Financial system impacts on ability to take risks**
 - VC is one – important - component in this
- **Financial system co-shapes the sectoral structure**
- **Sectoral structure determines R&D expenditures**
- **VC has positive impact on growth at company level**
- **No impact on innovation**
- **Investment in innovation system are key**
 - VC leverages this investment
 - VC is part of an eco-system

Cross border VC flows

| Country k | Country i | AUS | BEL | CN | DEN | FIN | FRA | GER | IRE | IT | NET | NOR | POR | ES | SD | SW | UK | US |
|----------------|-----------|-----|--------|-----|------|-----|--------|--------|-----|--------|-------|-------|------|-------|-------|--------|--------|---------|
| Austria | | | -3 | 0 | -3 | 0 | 2 | -411 | -3 | -8 | -20 | 0 | 0 | 0 | 0 | -86 | -123 | -171 |
| Belgium | | 3 | | 0 | -9 | 122 | 3178 | -35 | 23 | 50 | 225 | 4 | 0 | 1,439 | 8 | 102 | -97 | -1,365 |
| Canada | | 0 | 0 | | -49 | -27 | 45 | -80 | 4 | 10 | -111 | -16 | 0 | -18 | 0 | -48 | 94 | -489 |
| Denmark | | 3 | 9 | 49 | | -55 | -30 | -4 | 0 | 0 | -48 | -39 | 0 | 0 | -9 | -95 | -241 | 359 |
| Finland | | 0 | -122 | 27 | 55 | | -20 | -358 | 0 | -4 | -15 | 24 | 0 | 0 | -10 | -26 | -225 | -477 |
| France | | -2 | -3,178 | -45 | 30 | 20 | | -2,640 | -19 | 552 | 418 | 39 | 11 | -205 | -24 | -150 | -5,278 | -10,513 |
| Germany | | 411 | 35 | 80 | 4 | 358 | 2,640 | | 84 | 510 | -441 | 23 | 614 | 2,849 | 1,748 | -481 | 2,957 | -1,057 |
| Ireland | | 3 | -23 | -4 | 0 | 0 | 19 | -84 | | 18 | -13 | 0 | 0 | 0 | -18 | -54 | -191 | -410 |
| Italy | | 8 | -50 | -10 | 0 | 4 | -552 | -510 | -18 | | 1,314 | -7 | 0 | 17 | 0 | -492 | -4,032 | -4,858 |
| Netherlands | | 20 | -225 | 111 | 48 | 15 | -418 | 441 | 13 | -1,314 | | 22 | 220 | 133 | 78 | -119 | -399 | -1,588 |
| Norway | | 0 | -4 | 16 | 39 | -24 | -39 | -23 | 0 | 7 | -22 | | 0 | 0 | 17 | 12 | -504 | -1,197 |
| Portugal | | 0 | 0 | 0 | 0 | 0 | -11 | -614 | 0 | 0 | -220 | 0 | | 846 | 0 | -339 | -375 | -208 |
| Spain | | 0 | -1,439 | 18 | 0 | 0 | 205 | -2,849 | 0 | -17 | -133 | 0 | -846 | | -24 | -124 | -1,765 | -2,979 |
| Sweden | | 0 | -8 | 0 | 9 | 10 | 24 | -1,748 | 18 | 0 | -78 | -17 | 0 | 24 | | -84 | -509 | 991 |
| Switzerland | | 86 | -102 | 48 | 95 | 26 | 150 | 481 | 54 | 492 | 119 | -12 | 339 | 124 | 84 | | 183 | 5,142 |
| United Kingdom | | 123 | 97 | -94 | 241 | 225 | 5,278 | -2,957 | 191 | 4,032 | 399 | 504 | 375 | 1,765 | 509 | -183 | | -1,888 |
| United States | | 171 | 1,365 | 489 | -359 | 477 | 10,513 | 1,057 | 410 | 4,858 | 1,588 | 1,197 | 208 | 2,979 | -991 | -5,142 | 1,888 | |

Extractive or inclusive economic and political institutions

- Why are some nations growing and developing successfully?
- Acemoglu/Robinson (2012) distinguish between inclusive and extractive economic and political institutions
 - Societies which form inclusive political and social institutions become rich
 - They enable the flourishing of human talent and the search for self-improvement
 - permit persons to use their talents, to let them exploit productivity improvements and allocate the fruits of such efforts to these persons, promote development.
 - Societies with extractive institutions led to stagnation

Why extractive political institutions hamper innovation?

- **Elites use institutions to extract surplus from the population**
 - This stifles innovation and technological change because this could reduce their power of exploitation.
 - Those not part of the elite are also not interested in productivity improvements because the results will be appropriated by their masters
- **Do geography, access to knowledge or institutions decide on economic development**

Factors for development

| | Geography | Knowledge | Institutions |
|------------|------------------|--|---|
| Belarus | | Working system Isolated - different concepts | Functioning institutions Egalitarian society Complex system Planned economy |
| Kazakhstan | Raw materials | Elite educated in leading institutions Policy advice available | Large share of state owned enterprises Inequalities Corruption No competition |
| Ukraine | | Well educated elite Deteriorating knowledge institutions Policy advice available, Politicians? | Corrupt system Oligarchs |

Some observations

- **What are we talking about? What are the right concepts?**
 - Cooperatives in St.Petersburg
 - Trust, modernisation and innovation
- **„Strange“ risk attitude**
 - Risk aversion in the public domain
 - Use of public money does not allow for failure
 - Incentives often missing or (e.g. competition)
- **Corruption, framework conditions, ease of doing business**
 - Reduce the success rate of entrepreneurs
 - Forces many activities into the informal economy (100/90/66)
 - Create a deal flow

Thank you for your attention!

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