Universities‘ 2nd and 3rd Tasks
Science & Regional Development

basic prerequisites of academic environment for

internationalization and sustainable growth

Event: International Online Forum ”Global in the Regional: Kazakhstan in the Bologna Process and EU Projects”
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Presented by: Dr. Anatoli Beifert

Universities‘ main tasks

1. Education and training
2. Science, research and development
3. Innovation and regional development

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Global University Ranking

Rank	University	Country
1	University of Oxford	UK
2	California Institute of Technology	US
3	University of Cambridge	UK
4	Stanford University	US
5	Massachusetts Institute of Technology	US
6	Princeton University	US
7	Harvard University	US
8	Yale University	US
9	The University of Chicago	US
10	Imperial College London	UK
…	…	…
32	LMU Munich	DE
41	Technical University of Munich	DE
42	Heidelberg University Heidelburg	DE
75	Charité - Universitätsmedizin Berlin	DE
78	University of Tübingen	DE
80	Humboldt University of Berlin	DE
83	University of Freiburg	DE

Source: The World University Rankings, https://www.timeshighereducation.com (access: October 2020)

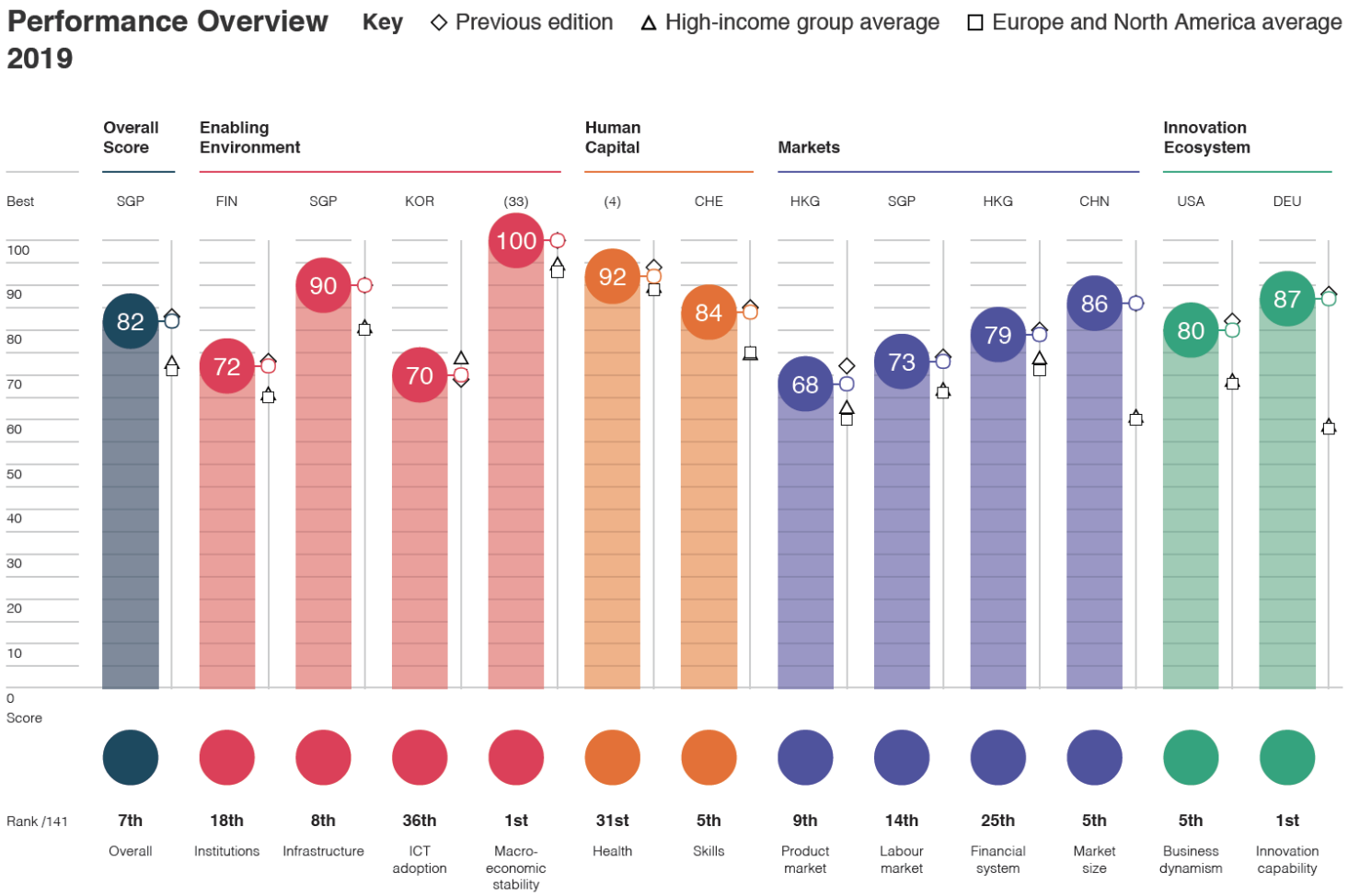
Global Competitiveness Index 2019

Rank	Economy	Score[1]	Diff. from 2018[2] Rank	Diff. from 2018[2] Score
1	Singapore	84.8	+1	+1.3
2	United States	83.7	–1	-2.0
3	Hong Kong SAR	83.1	+4	+0.9
4	Netherlands	82.4	+2	—
5	Switzerland	82.3	–1	–0.3
6	Japan	82.3	–1	–0.2
7	Germany	81.8	–4	–1.0
8	Sweden	81.2	+1	–0.4
9	United Kingdom	81.2	–1	–0.8
10	Denmark	81.2	—	+0.6
11	Finland	80.2	—	—
12	Taiwan, China	80.2	+1	+1.0
13	Korea, Rep.	79.6	+2	+0.8
14	Canada	79.6	–2	–0.3
15	France	78.8	+2	+0.8
16	Australia	78.7	–2	–0.1
17	Norway	78.1	–1	–0.1
18	Luxembourg	77.0	+1	+0.4
19	New Zealand	76.7	–1	–0.8
20	Israel	76.7	—	+0.1

Source: WEF - The Global Competitiveness Report 2019

Germany (ranking summary)

- High ranking
  - Macro economic stability — 1. rank
  - Innovation capability — 1. rank
  - Skills — 5. rank
  - Business dynamics — 5. rank
  - Market size — 5. rank
  - Infrastructure — 8. rank
- Low ranking
  - ICT adoption — 36. rank
  - Health care — 31. rank
  - Financial system — 25. rank
  - Institutions — 18. rank



Source: WEF - The Global Competitiveness Report 2019

Global Competitiveness Index 2019 (Germany) Innovation capability, R&D

Index Component	Value	Score *	Rank/141	Best Performer
12th pillar: Innovation capability 0–100	-	**86.8** ↓	**1**	**Germany**
Interaction and diversity 0–100	-	**77.6** ↓	**4**	**Singapore**
12.01 Diversity of workforce 1–7 (best)	5.3	71.5 ↓	16	Singapore
12.02 State of cluster development 1–7 (best)	5.4	73.5 ↓	4	Italy
12.03 International co-inventions per million pop.	21.40	95.4 ↑	11	Multiple (5)
12.04 Multi-stakeholder collaboration 1–7 (best)	5.2	70.0 ↓	7	Israel
Research and development 0–100	-	**99.5** ↑	**2**	**Japan**
12.05 Scientific publications score	1,131.0	100.0 =	3	Multiple (9)
12.06 Patent applications per million pop.	292.10	100.0 =	5	Multiple (8)
12.07 R&D expenditures % GDP	2.9	98.0 ↑	8	Multiple (7)
12.08 Research institutions prominence 0–100 (best)	0.80	100.0 =	4	Multiple (7)

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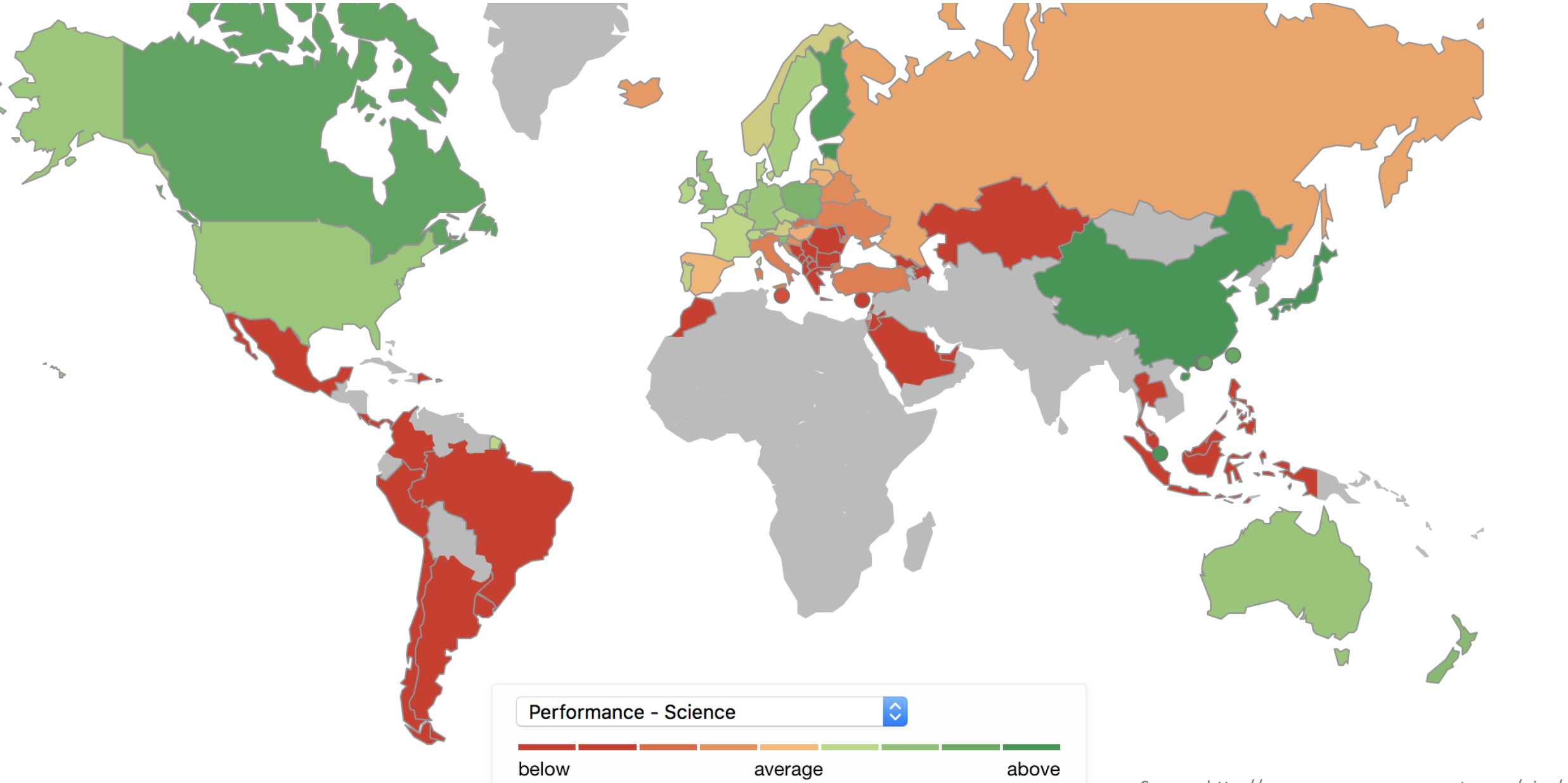
Pisa Study 2018 - Science



Source: http://www.compareyourcountry.org/pisa/

General HE environment in Germany

- PISA-Study “only” average
- German investments into education are below PISA average
    - DE: 4,4 % BIP
    - FR: 6,1 % BIP (PISA average)
    - USA: 7,2 % BIP
- No elite system of HE in Germany
    - *But(!!!) e.g. US, UK,* FR, etc. support higher education elite system

Academic Institutional System in Germany

- Universities (ca. 240)
    - Full spectrum of faculties, focus on fundamental sciences
    - Universal academic task, focus on education and science
    - PhD, Master, Bachelor
- Universities of Applied Sciences (ca. 160)
    - Engineering, Business, Social Sciences
    - Focus on innovation and business (professional) orientation
    - Technology transfer & regional development
    - Special research programmes together with business
    - Master, Bachelor, PhD programme possible, but normally in cooperation with Universities
- Research and Development Institutes
    - Large scale or special purpose research and research service providing organisations

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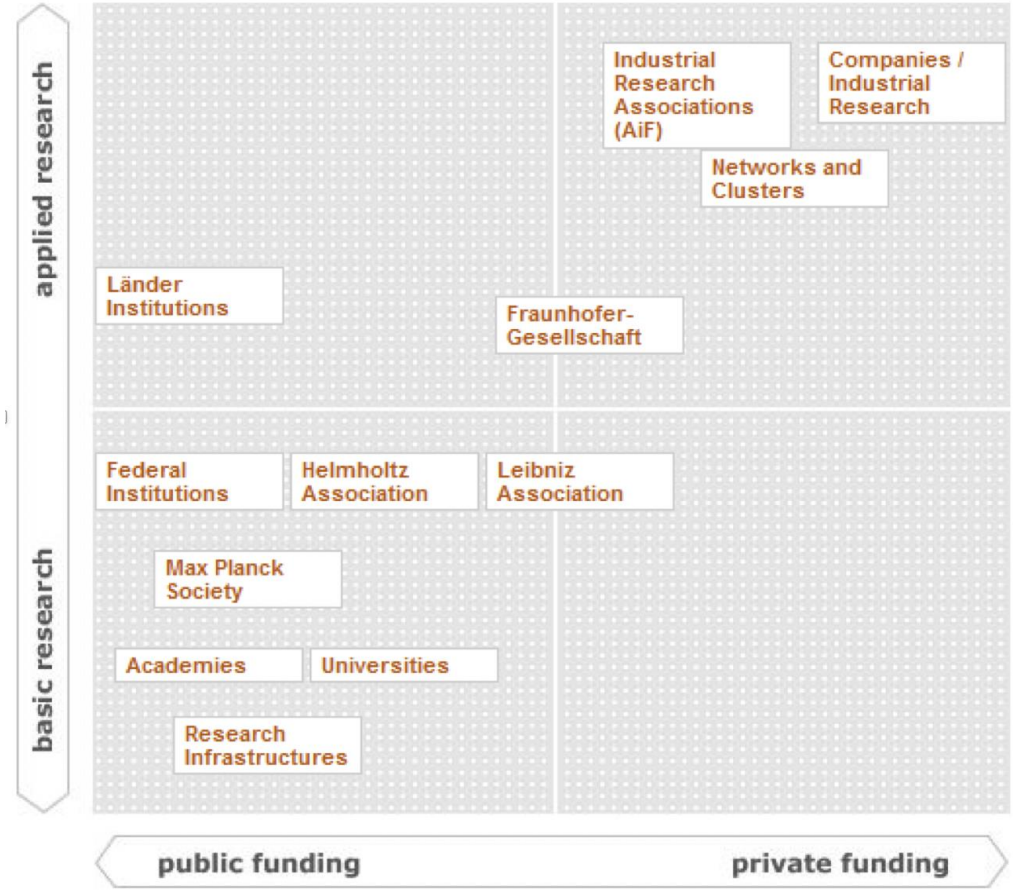
Science vs. Technology

- Science (fundamental research)
  - aims at totally new knowledge
  - result is unknown and highly unpredictable
  - high risks for investments
  - mainly public investments
- Technology
  - aims at correct/efficient implementation of already known knowledge
  - result is very known and predictable
  - attractive for business and private sector

Research performing institutions in Germany

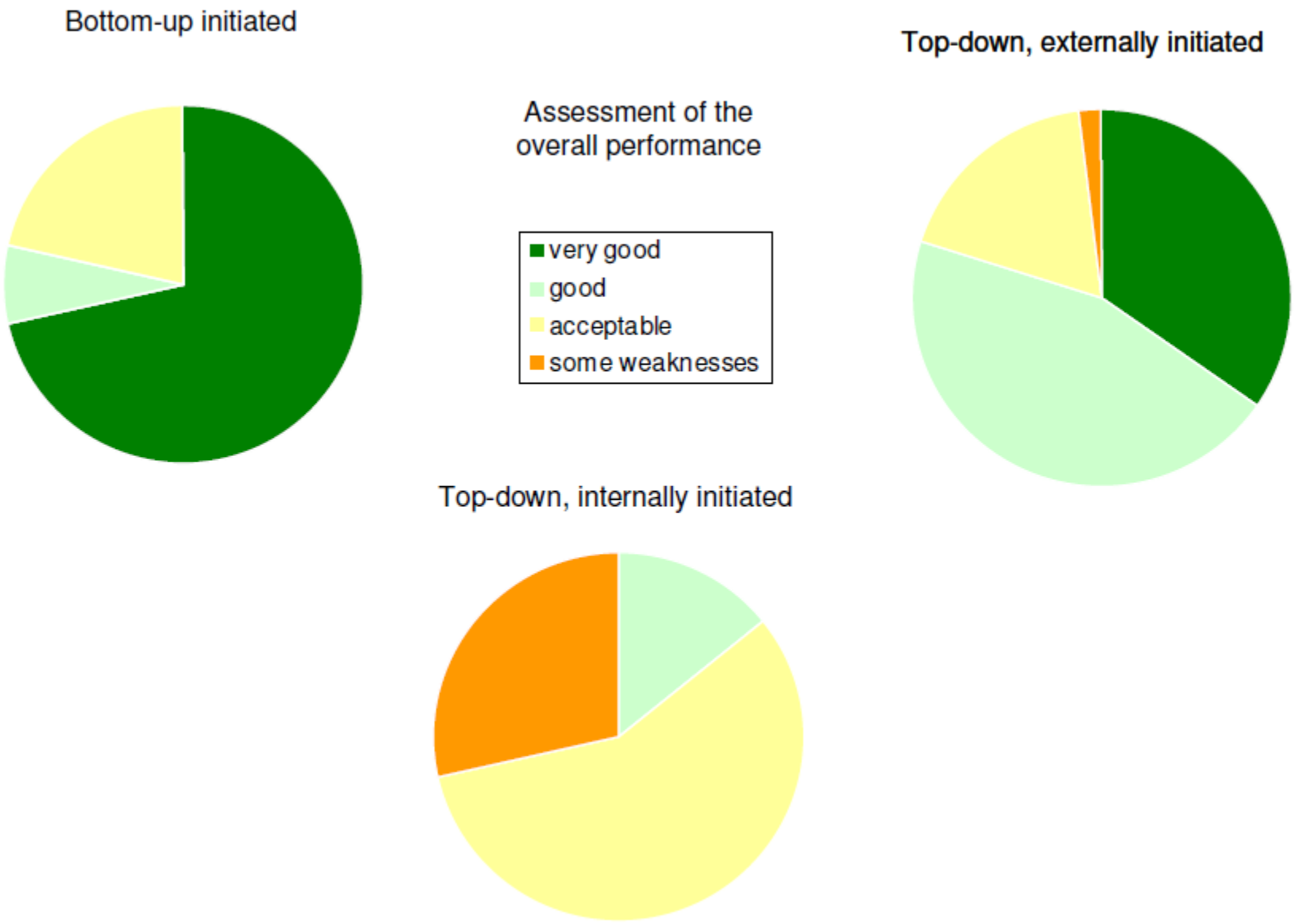


Innovation and Applied Science

- Innovation (applied science) projects have components of:
  - Totally unknown, new and already known knowledge
  - Different support systems, but generally:
    - the higher the share of the unknown, the greater the public involvement
    - the closer a project is to technology, the greater of private or business participation

- Venture capital
    - intermediate stage between science and technology
    - takes on the risks of the unknown and expecting high future profits/ROI

Applied Research & Cluster Performance



Examples from Germany – Universities as a regional powerhouse

- **(§) Freedom of science, research and teaching**
  - Article 5 of the Basic Law for the Federal Republic of Germany

- Contribution to regional development and innovation transfer
  - special focus on competence networks
  - Curriculum Development with special focus on regional needs and demographics
  - smart specialisation
- European Project Center
  - EU Project Application & Management for the region
- Special programs at universities
  - entrepreneurship development and training
  - start-up consultations
  - patent consultations
  - business idea development & screening

Case: Wismar and Nord-West Mecklenburg

- founded in 1229
- traditional hanseatic town
- **ca. 55.000 inhabitants**
- SE-colony till 1803
- since 2002 on the UNESCO-list of world heritage
- 1990 – 2000 transition economy

Main Industries

- Shipbuilding
- Wood / timber processing
- University Public Cooperation
- Seaport / Logistics
- Renewable energy
- Biosensors
- Food industry
- Innovation

Case Wismar: Regional Development

Europe’ one of the biggest shipbuilding yards (left-blue circle)

Europe’s biggest wood processing cluster (right-red circle)

Case Wismar – Regional Development & Innovation

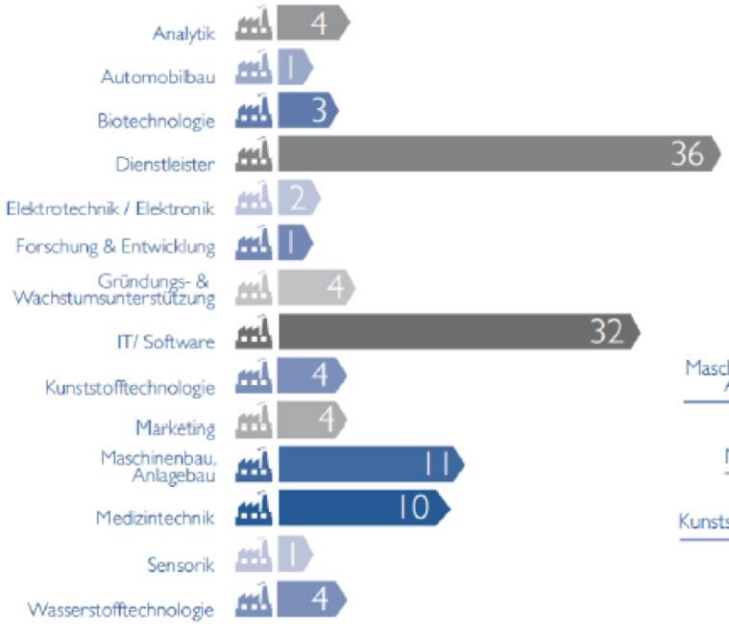
Wismar Science & Technology Centre

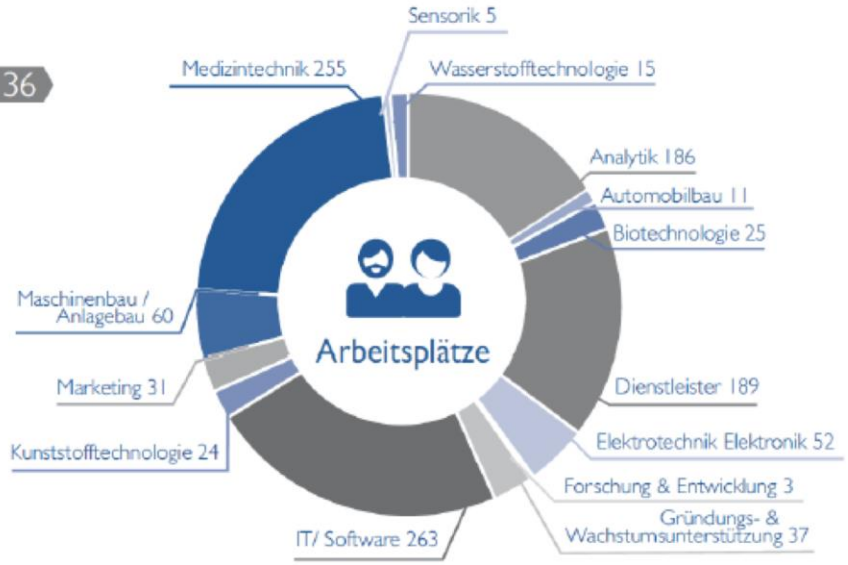
34% - Wismar Region
33% - Wismar University of Applied Scieces
33% - Private Investors

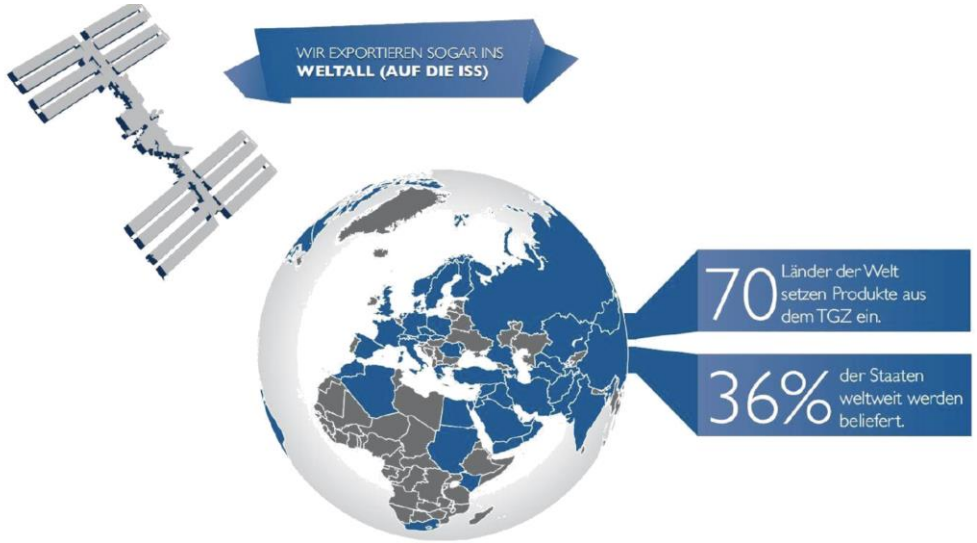
Alter Holzhafen

Hochschule – Philipp-Müller-Str.

TGZ Wismar (Science and Technology Centre Wismar)







Recommendations (1)

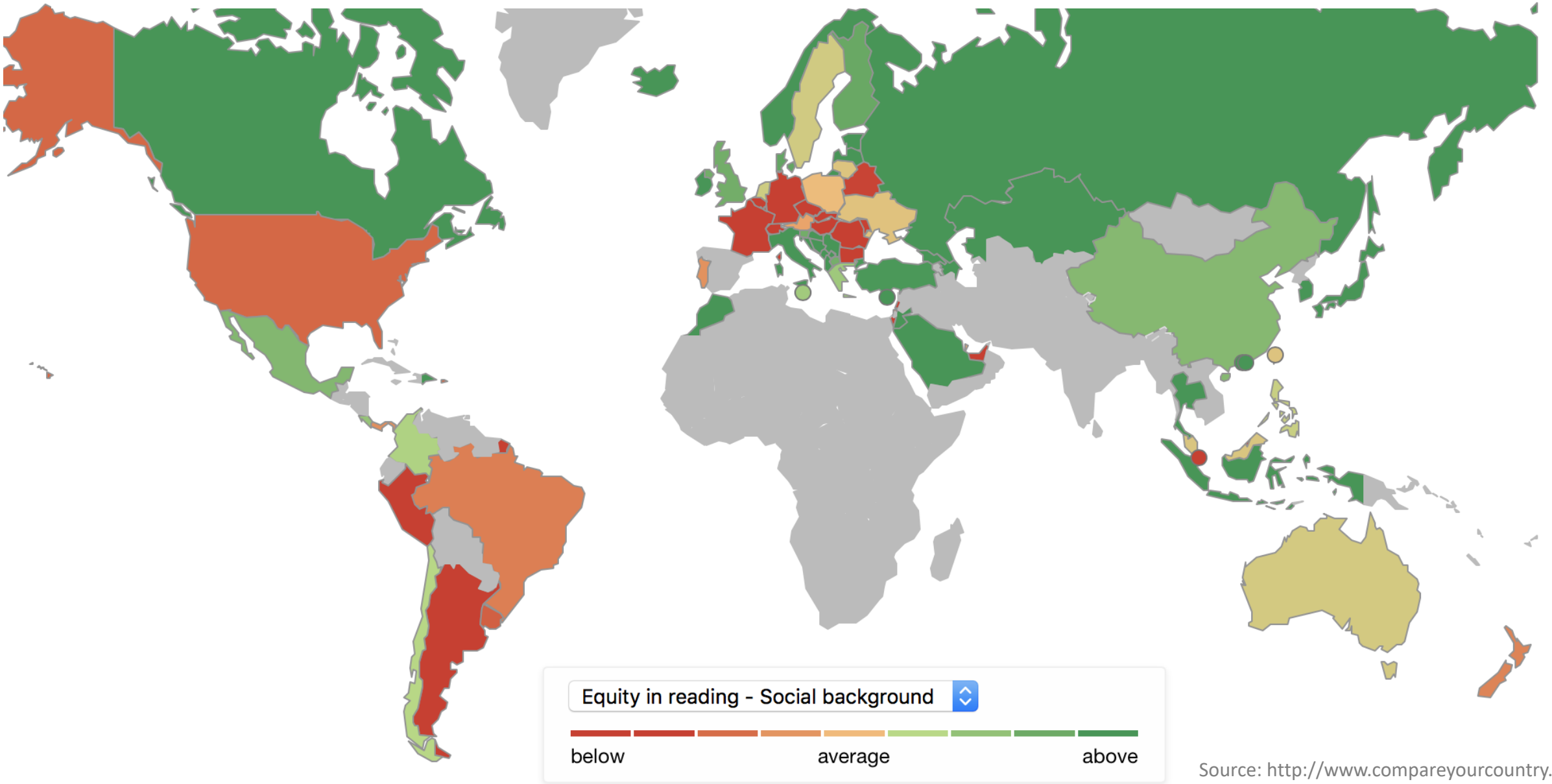
- Stop waiting for practical or planned results from fundamental science
- Fundamental science should be funded and supported by the state
  - no enforcement or punishments of scientists
  - stable and optimal conditions and motivations for scientific activities
  - the only expected results of public funding will be scientific publications and a smooth, slow growth in the quality of scientists and their works
  - administrative staff (internally and externally) shall support and not challenge scientists
- Mechanisms for allocating and distributing funds are known:
  - grants and the most transparent/honest expertise

Recommendations (2)

- Applied research and innovation may be formed as a business project
  - with clear goals, clear funding and clear ownership of the results,
  - considering side factors, e.g. provision of needed infrastructure, needed capacity building, securing potential consumers of the project results
- Applied research projects with sufficient scientific component need different regulations as e.g. in government procurement
- Practical results achieved in fundamental science should be further supported by / in different quality of business projects, e.g. universities' business incubators or science parks, etc.
- Scientists involved in applied science should receive a special treatment or compensation due to inevitable losses (e.g. lack of scientific publications, tight deadlines, etc.)

Epilogue

Pisa Study 2018: Equity in reading – Social Background



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