Germany & EU Cybersecurity Innovation Ecosystem Model

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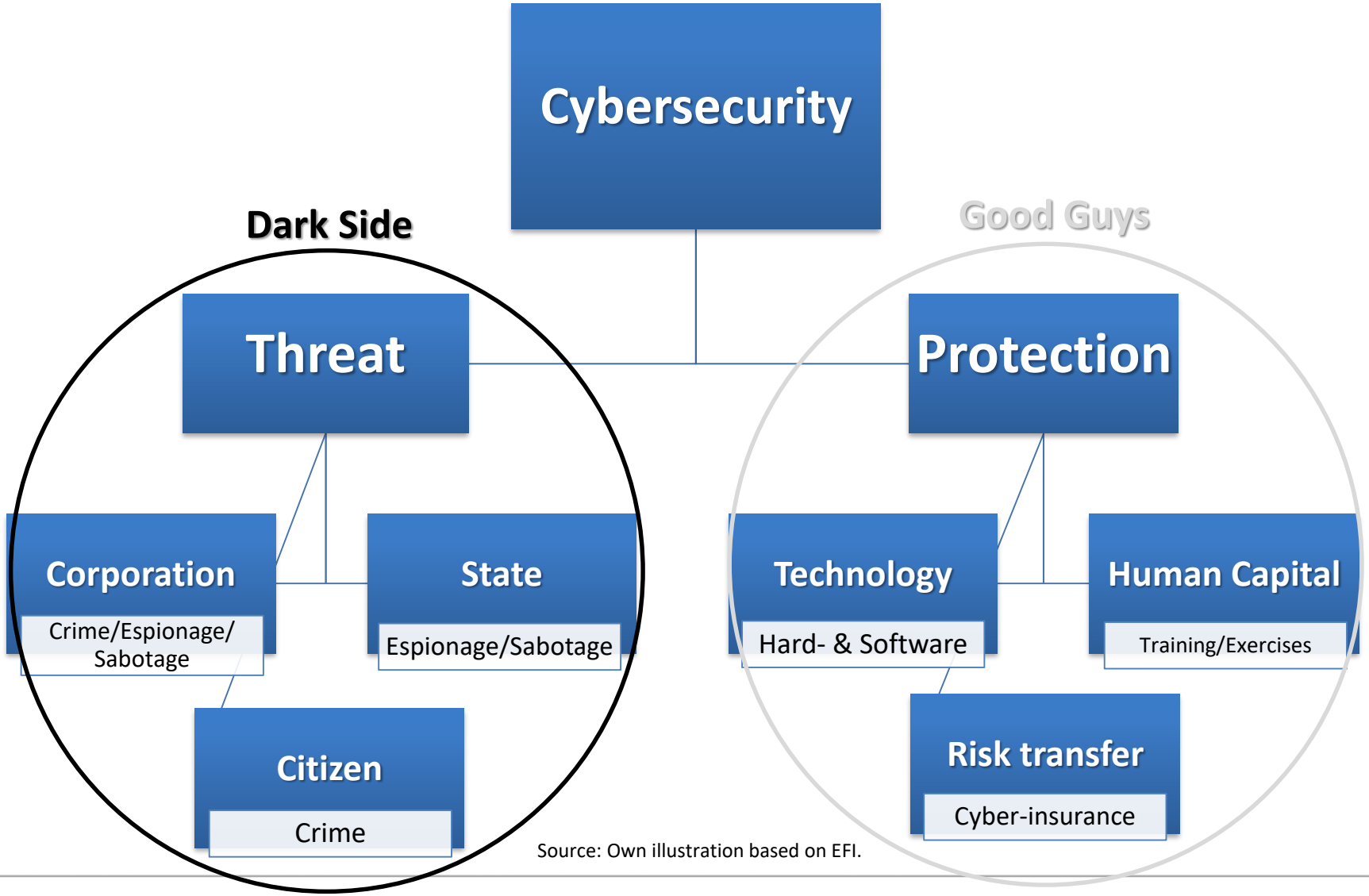
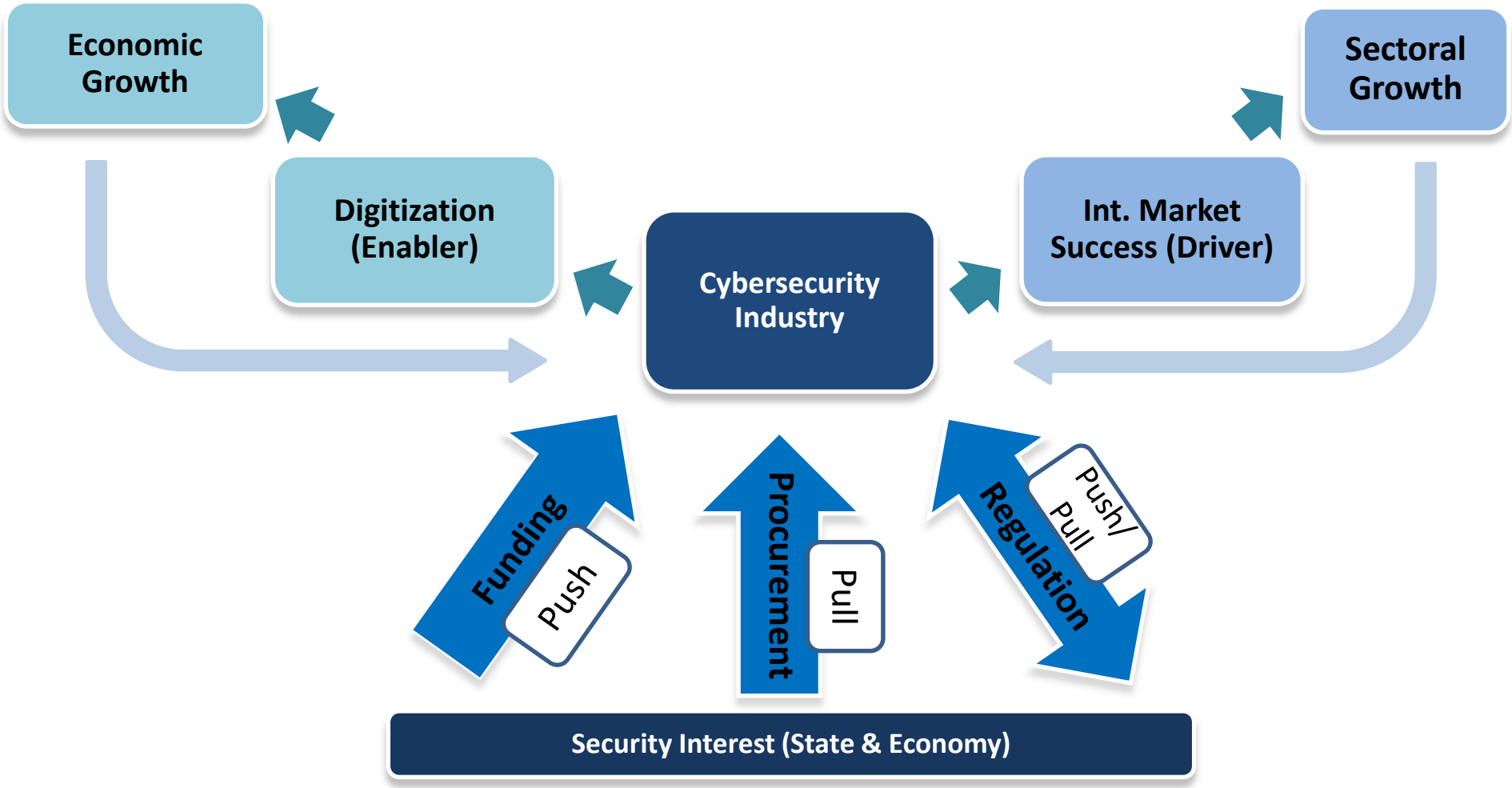
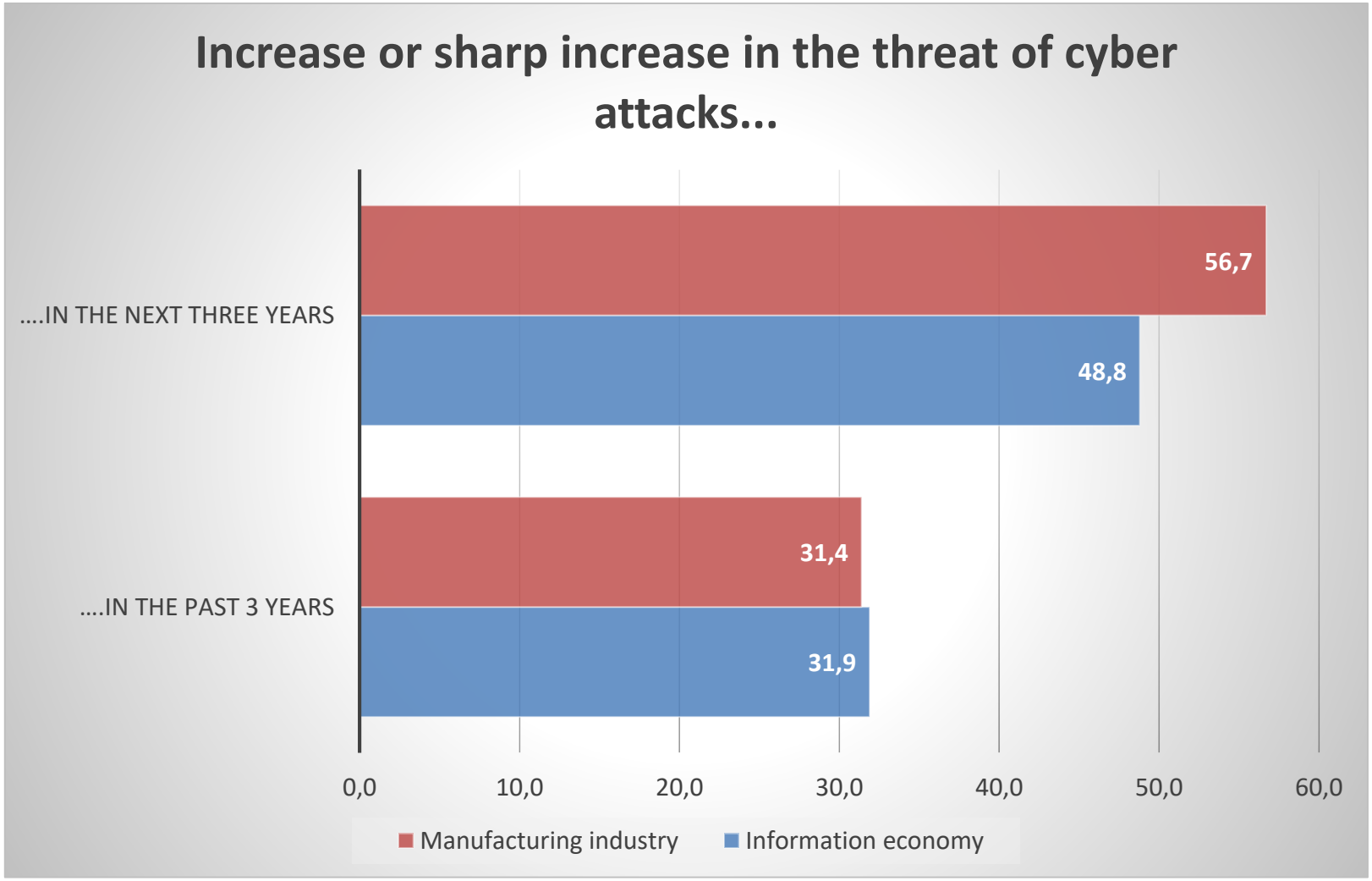


Source: Own illustration based on EFI.

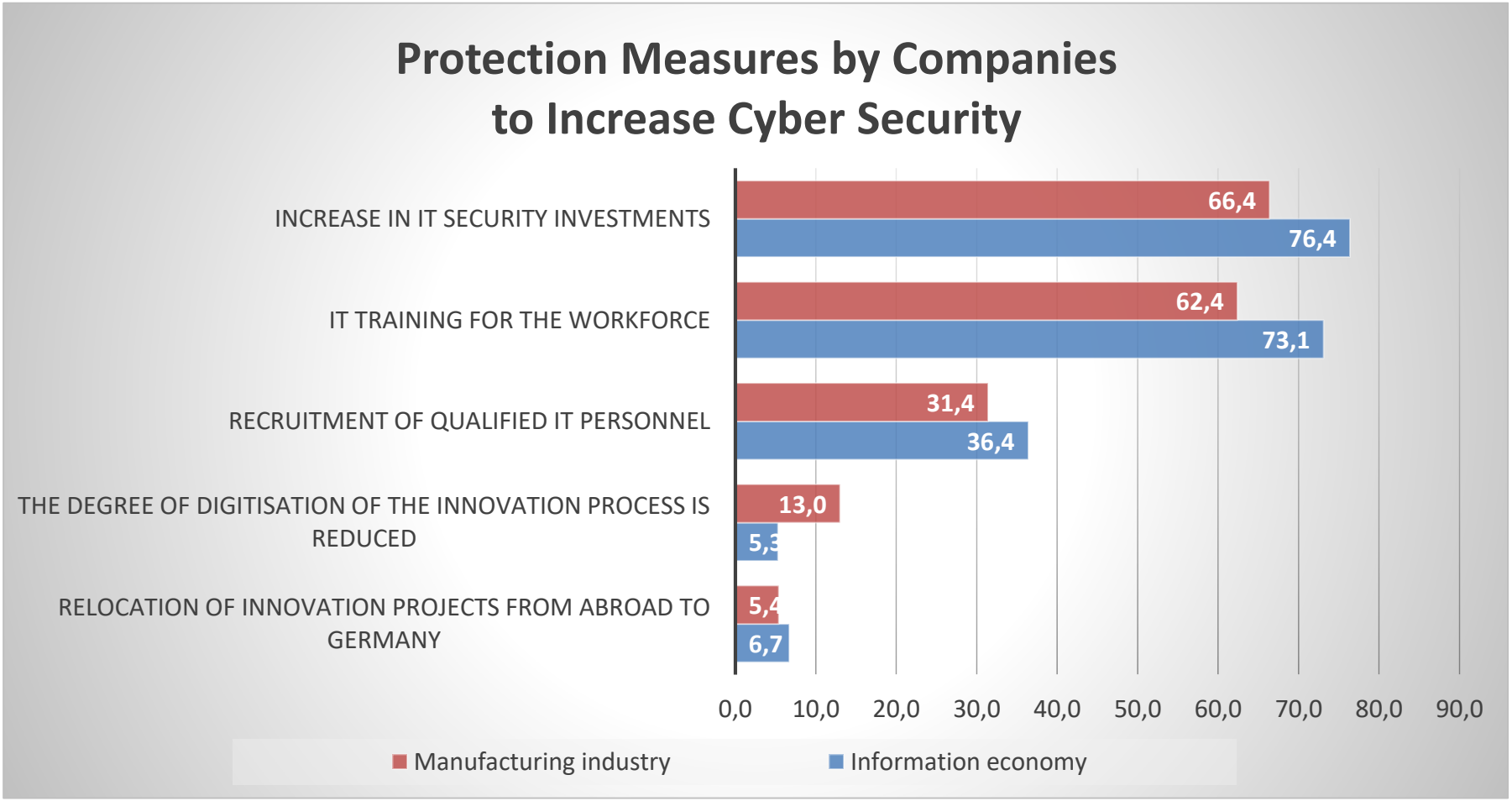


Source: Own illustration.

Expectations of Companies concerning Cyber Threats

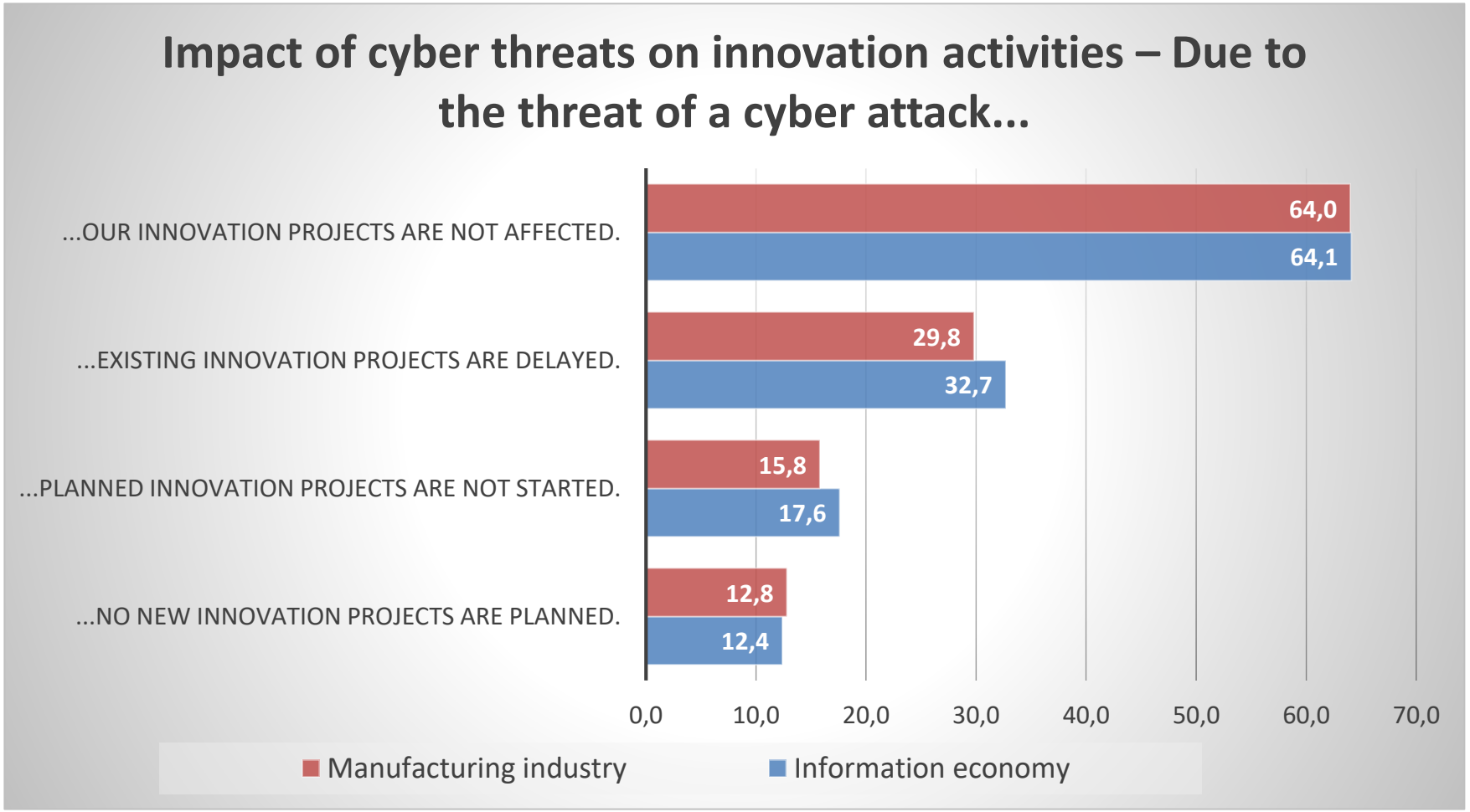


Source: Own illustration based on the *Research, Innovation and Technological Performance in Germany Report 2020* of the *Commission of Experts for Research and Innovation* (EFI).



Source: Own illustration based on ZEW Business Survey Information Economy 3rd Quarter 2019. Calculations in ZEW (2020).

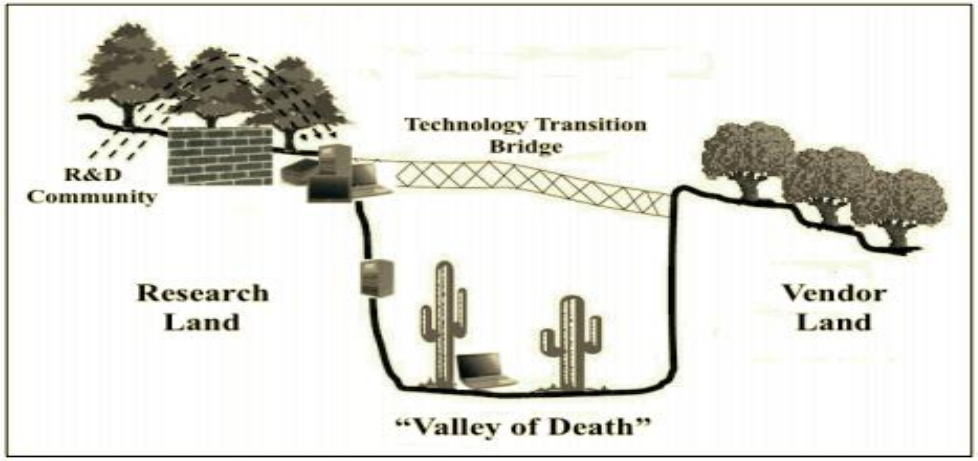
Digital Innovations for German Industry



Source: Own illustration based on ZEW Business Survey Information Economy 3rd Quarter 2019. Calculations in ZEW (2020).

From Invention to Innovation

- Applied research and market readiness: Valley of Death
- German Challenges:



  - Lack of Venture Capital
  - Overdeveloped Regionalism vs. Underdeveloped Clustering
  - Entrepreneurship-Culture: Cost of Bureaucracy and Taxes high for SME
  - E-Government still in their infancy
  - Public Procurement needs simplification
  - No BIG Digital Platform in Germany (GAFAM vs. Chinese Platforms)
  - New initiative GAIA-X

Lack of Human Capital

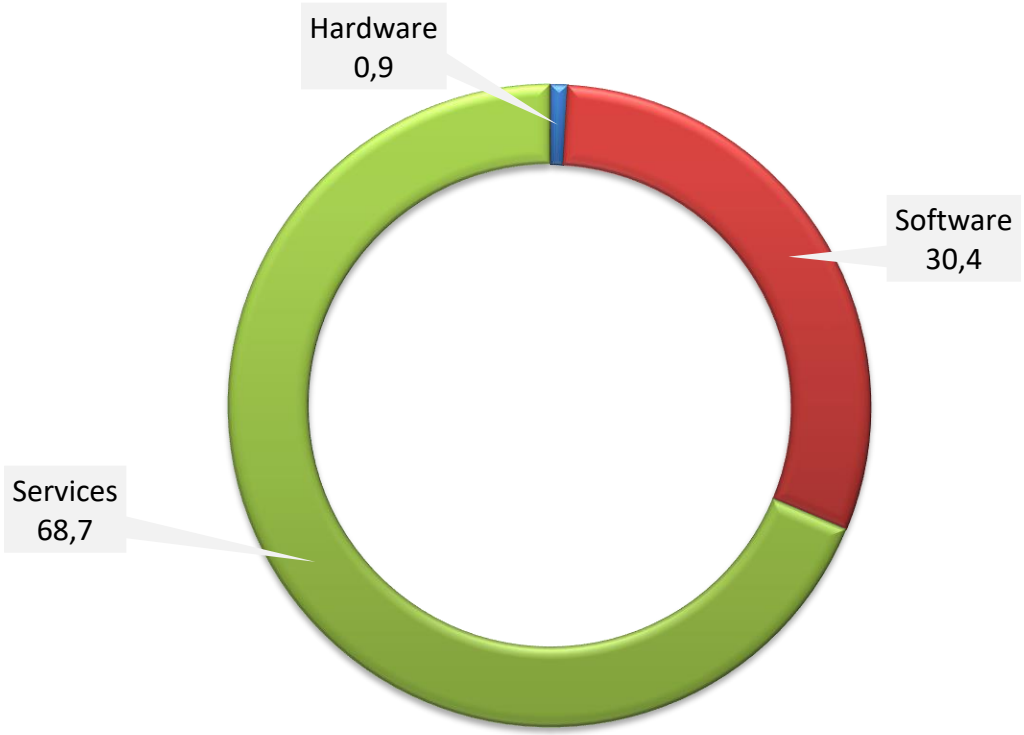
Demand:

- German IT-security sector grows significantly
  - In 2018 about 820,000 IT specialists (BA) employed
  - Job advertisements for cybersecurity experts have more than doubled in the last 4 years (LinkedIn 2018)
- Bitkom: 2018 approx. 82.000 positions in cybersecurity sector unfilled
- McAfee 2019: by 2020 approx. 160.000 security specialists will be missing in Germany

Supply:

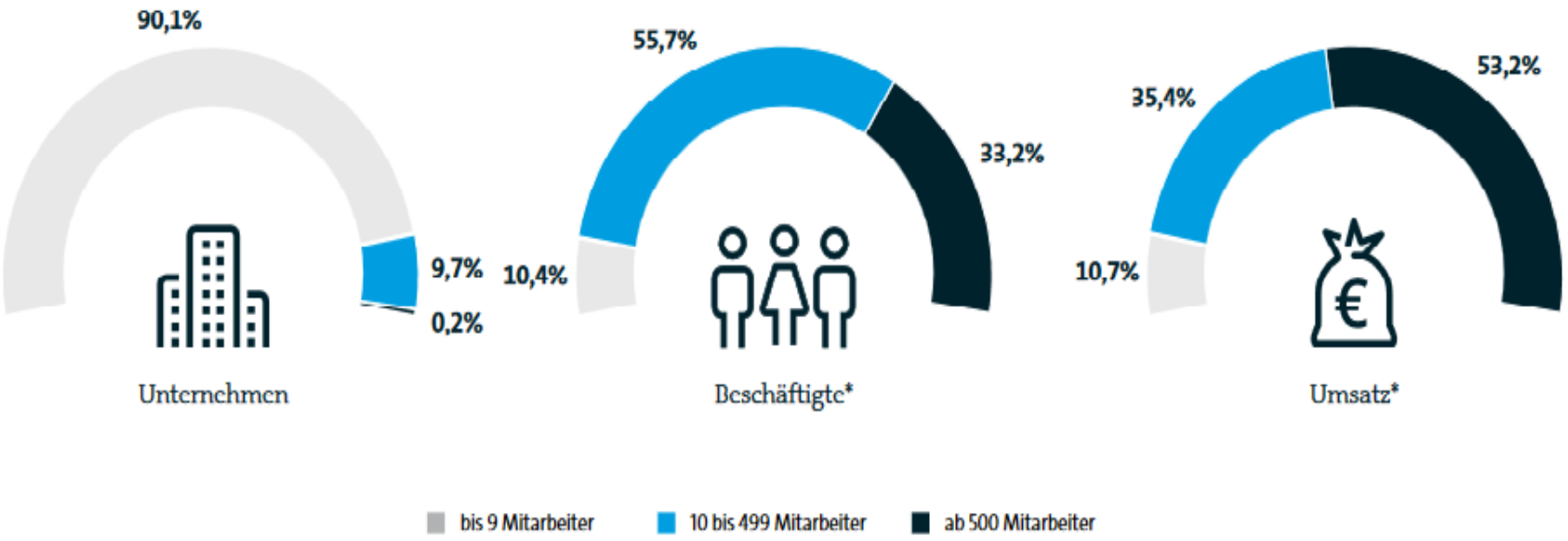
- Approx. 100.000 computer science students in DE,
- But only 28 „cybersecurity“ courses and hardly any graduates

IT-Security sectoral structure based on 2017 added value in %



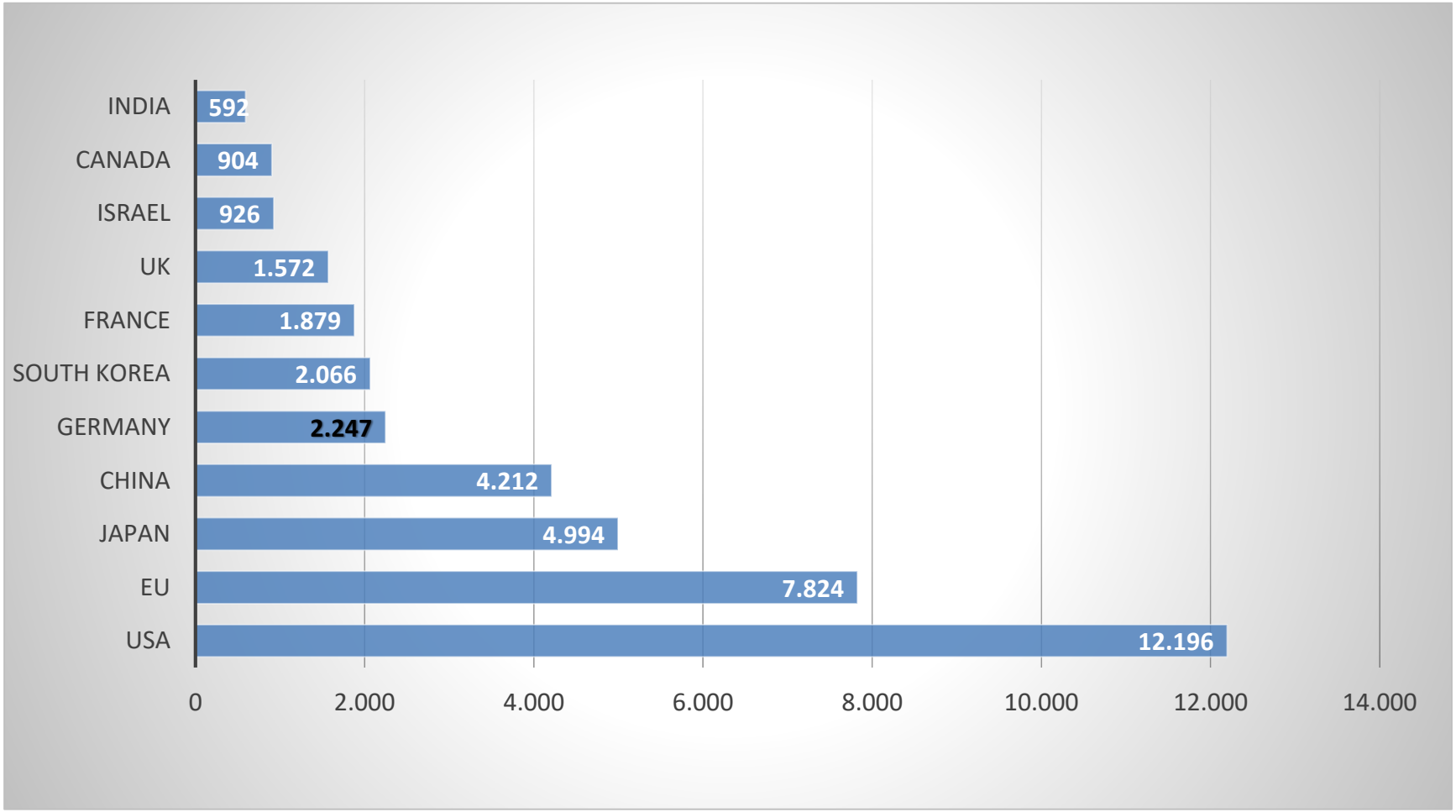
Source: Own illustration based on WifOR; Statistisches Bundesamt 2017

56% of employees work in 10% of medium-sized IT companies (10-499 employees) and generate 35% of the total turnover of the industry



Source: Bitkom 2018

Number of transnational patents in the field of cybersecurity (Top 10 countries and EU) 2000-2017



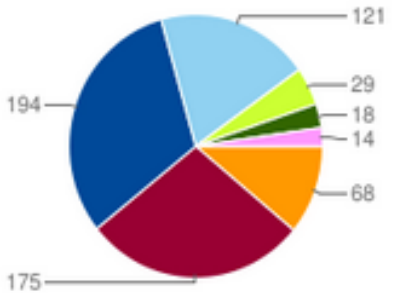
Source: Own illustration based on calculations by the Max Planck Institute for Innovation and Competition.

Source: Security Research Map; BMBF

IT-Security Clusters in Germany

- Berlin/Potsdam
- Munich
- Bonn/Euskirchen
- Darmstadt/Karlsruhe
- Saarbrücken

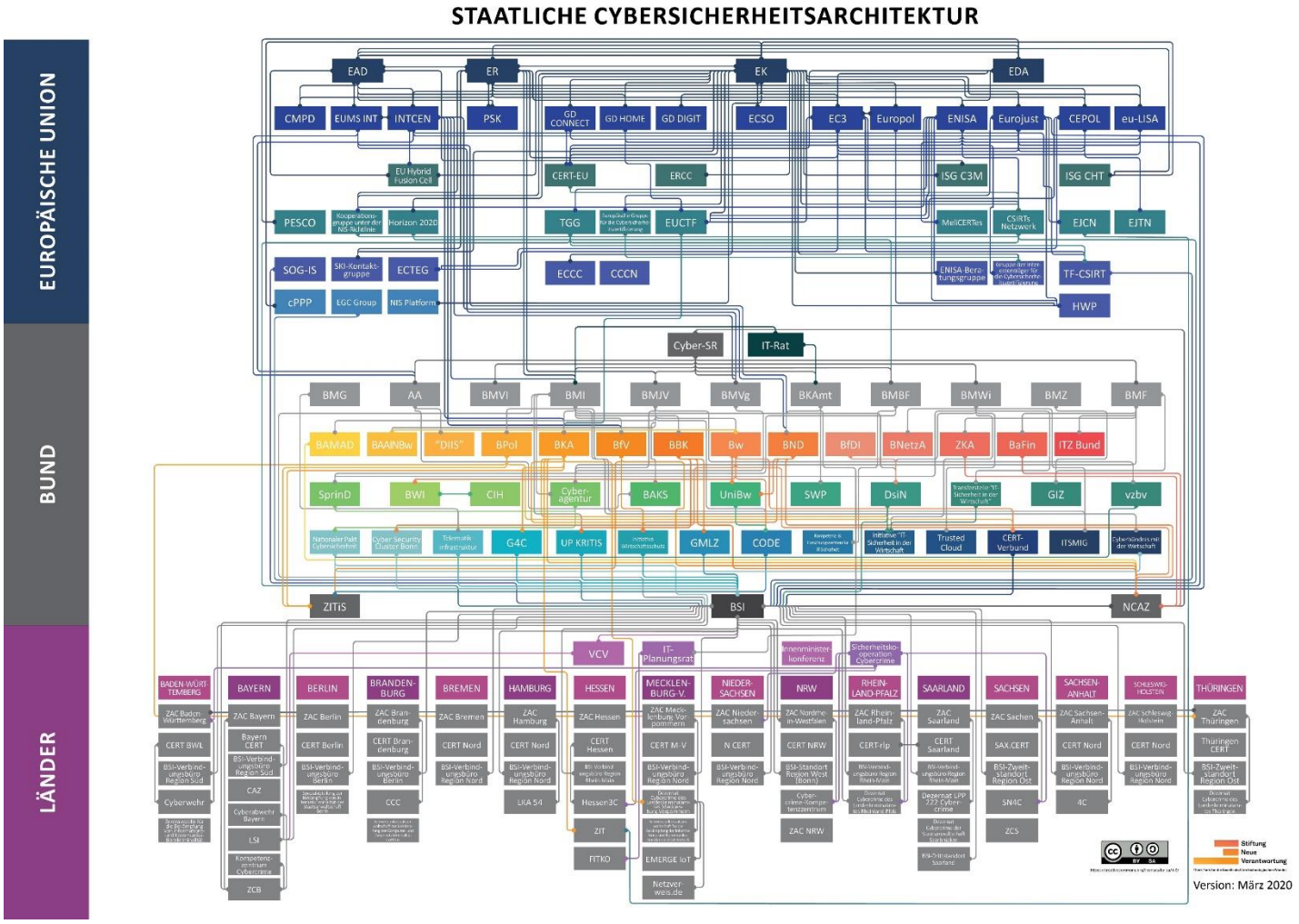
Statistics: 619 in total in ICT



Anzahl	Kategorie
68	Großunternehmen
175	KMU
194	Hochschulforschung
121	Forschungsinstitute
29	Netzwerke
18	BOS
14	Verbände

Information Security Technology & Cyber Security (205)

The Role of Government - Cybersecurity Architecture Germany



Source: Stiftung Neue Verantwortung (SNV).

R&D IT-Security Programs in the EU vs Germany

<table>
<tr><th colspan="2">GOAL-TRL</th><th>Level</th><th>Horizon 2020</th><th>Germany</th></tr>
<tr><td rowspan="9"></td><td rowspan="5">Innovation Action</td><td>TRL 9</td><td rowspan="9">In Horizon 2020, the TRL is mainly applied in market-oriented calls. Due to a different state aid law, the EU can also support the subsequent stages until shortly before market entry (TRL 9).</td><td></td></tr>
<tr><td>TRL 8</td><td></td></tr>
<tr><td>TRL 7</td><td></td></tr>
<tr><td>TRL 6</td><td></td></tr>
<tr><td rowspan="5">Research and Innovation Action</td><td>TRL 5</td><td rowspan="5">German programs generally only allow funding up to TRL 5.</td></tr>
<tr><td>TRL 4</td></tr>
<tr><td rowspan="3"></td><td>TRL 3</td></tr>
<tr><td>TRL 2</td></tr>
<tr><td>TRL 1</td></tr>
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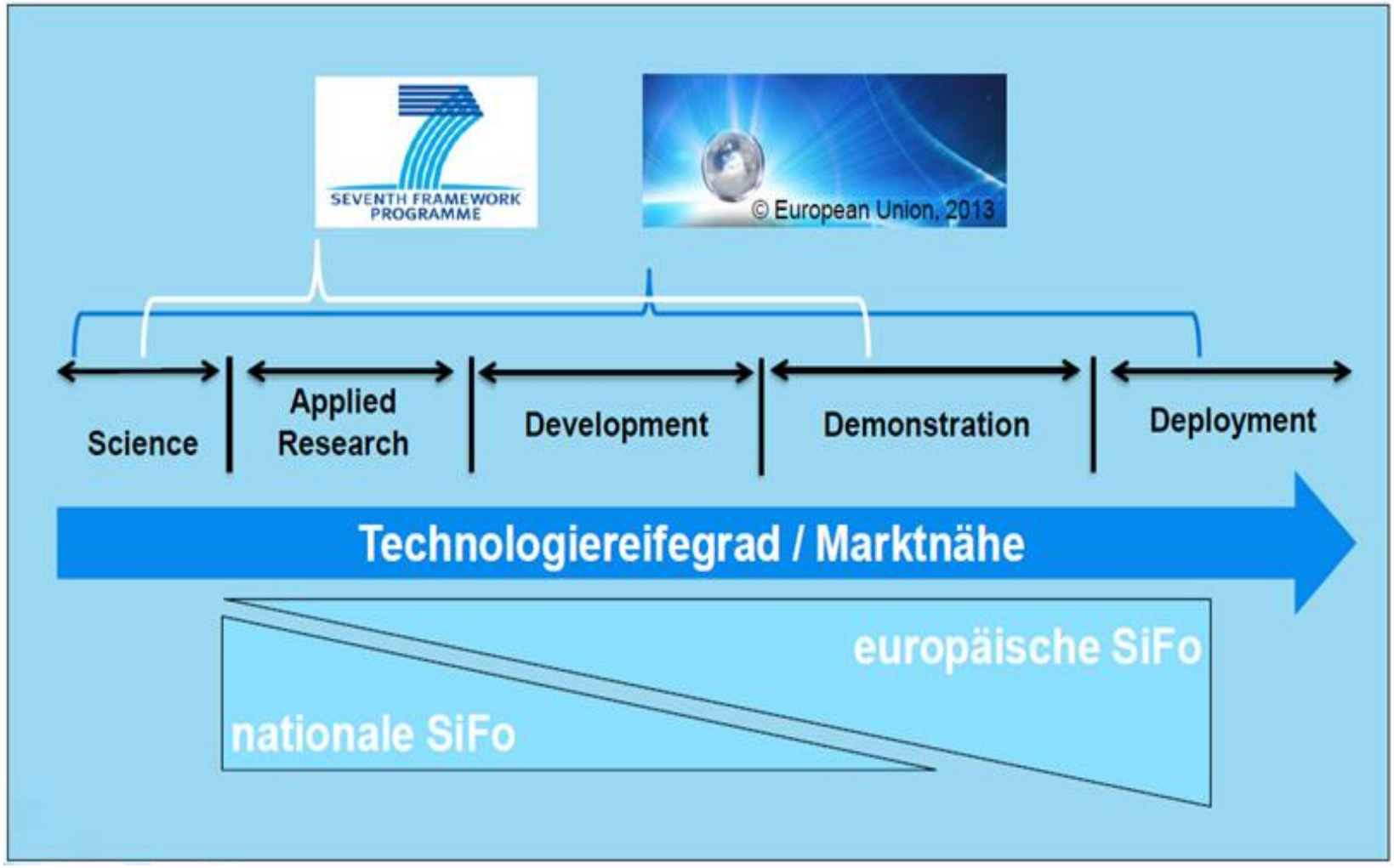
Innovation Promotion

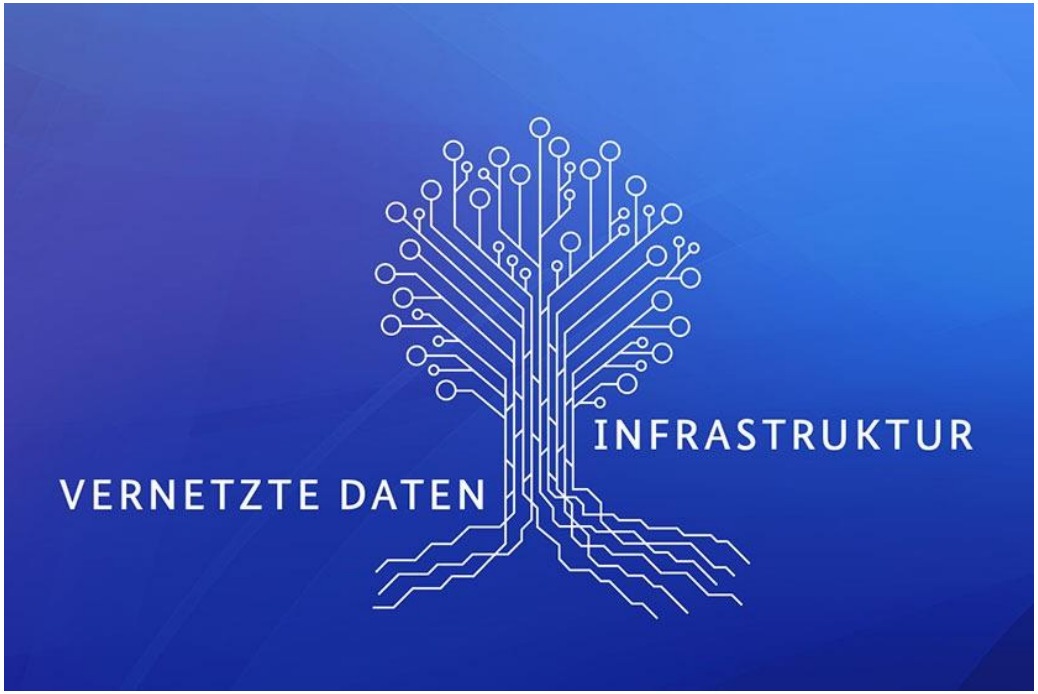


Source: National and European security research in comparison.

Innovative cybersecurity industry
- as trustworthy suppliers,
- but control exports
- back doors & trojans for control.

Innovative cybersecurity industry
- for more growth and employment,
- for digitization of the economy,
- but market size matters,
- data sovereignty as a sales argument.

Best Practice



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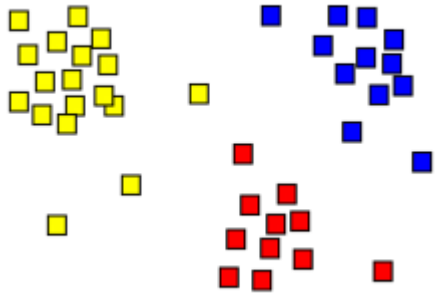
Success Factors



Thank You!

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