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IEEPI INSTITUT EUROPÉEN ENTREPRISE ET PROPRIÉTÉ INTELLECTUELLE

Université de Strasbourg

BETA Bureau d'économie théorique et appliquée

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KNOWLEDGE AND TECHNOLOGY TRANSFER IN GERMANY: A FRAUNHOFER PERSPECTIVE

Dr. Rainer Frietsch, 07. April 2021, Strasbourg

Conférence: Le rôle de la PI dans les interactions entre Science et Industrie : quelle perspective européenne ?

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THE MISSION ORIENTATION IN THE GERMAN RESEARCH LANDSCAPE

Core messages:

- the mission orientation and the different institutional structures lead to different contributions in the transfer of knowledge and technlogy
- a number of instruments beyond IPR licensing are in use

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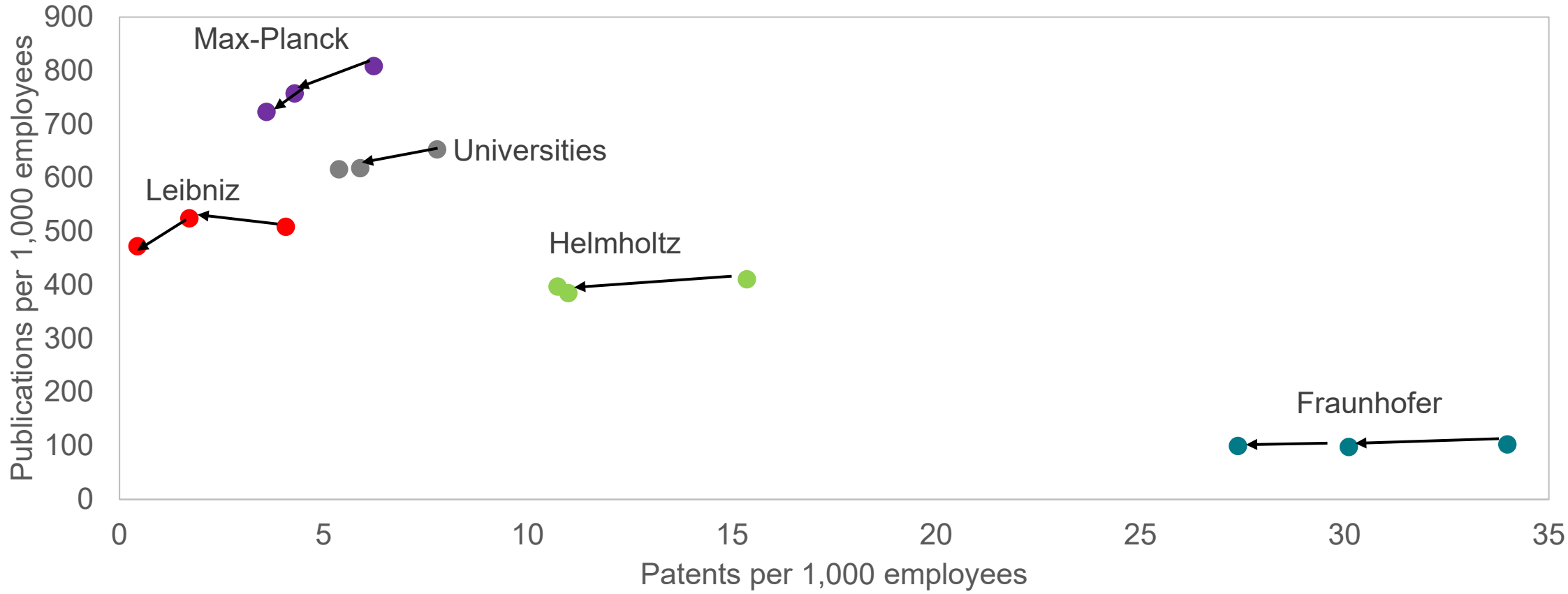
Missions: division of labour in the German science system, 2018

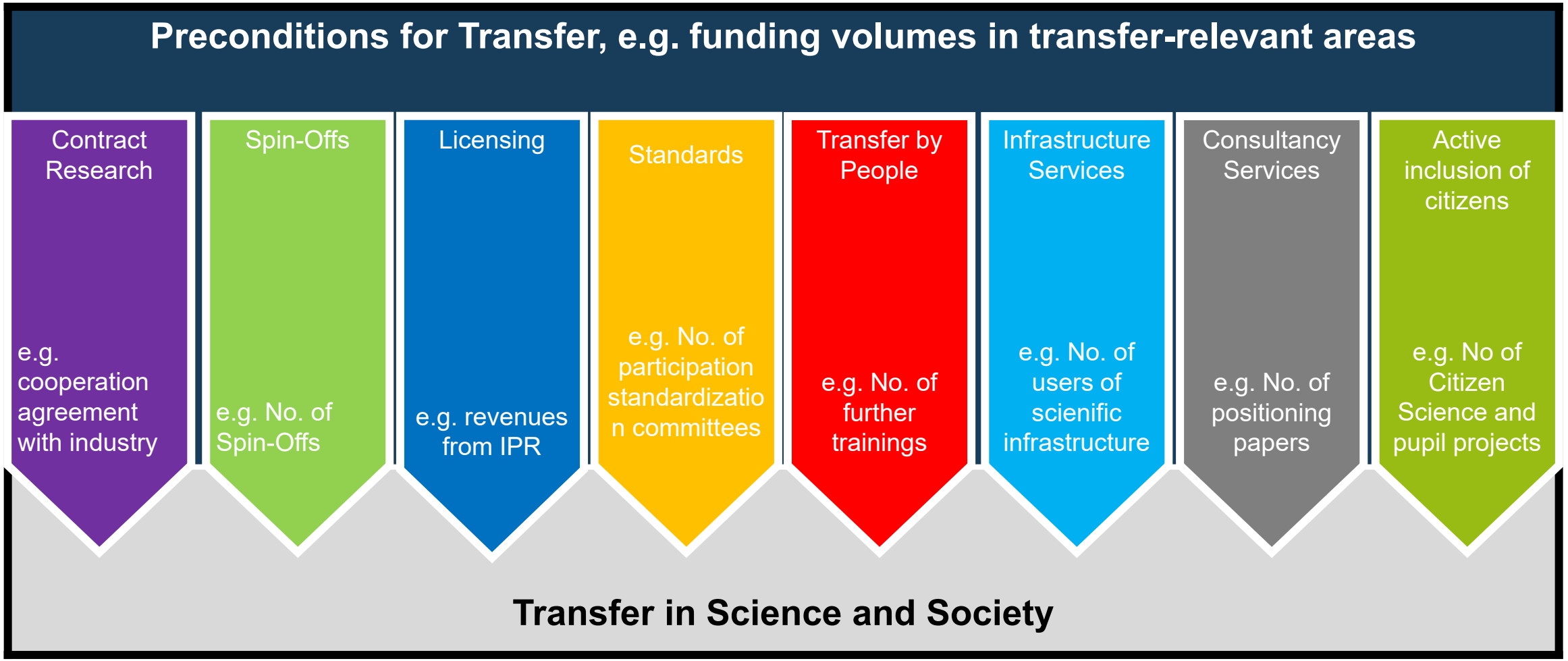
Source: BMBF - Bundesbericht Forschung 2020; own representation.

Missions: their implications
N of patents and publications, 2010-12, 2014-16, 2018-20



Source: Elsevier-Scopus, EPO-PATSTAT, destatis; Fraunhofer ISI calculations.

The transfer channels of the Pact for Research and Innovation



Source: GWK (2020); own translation.

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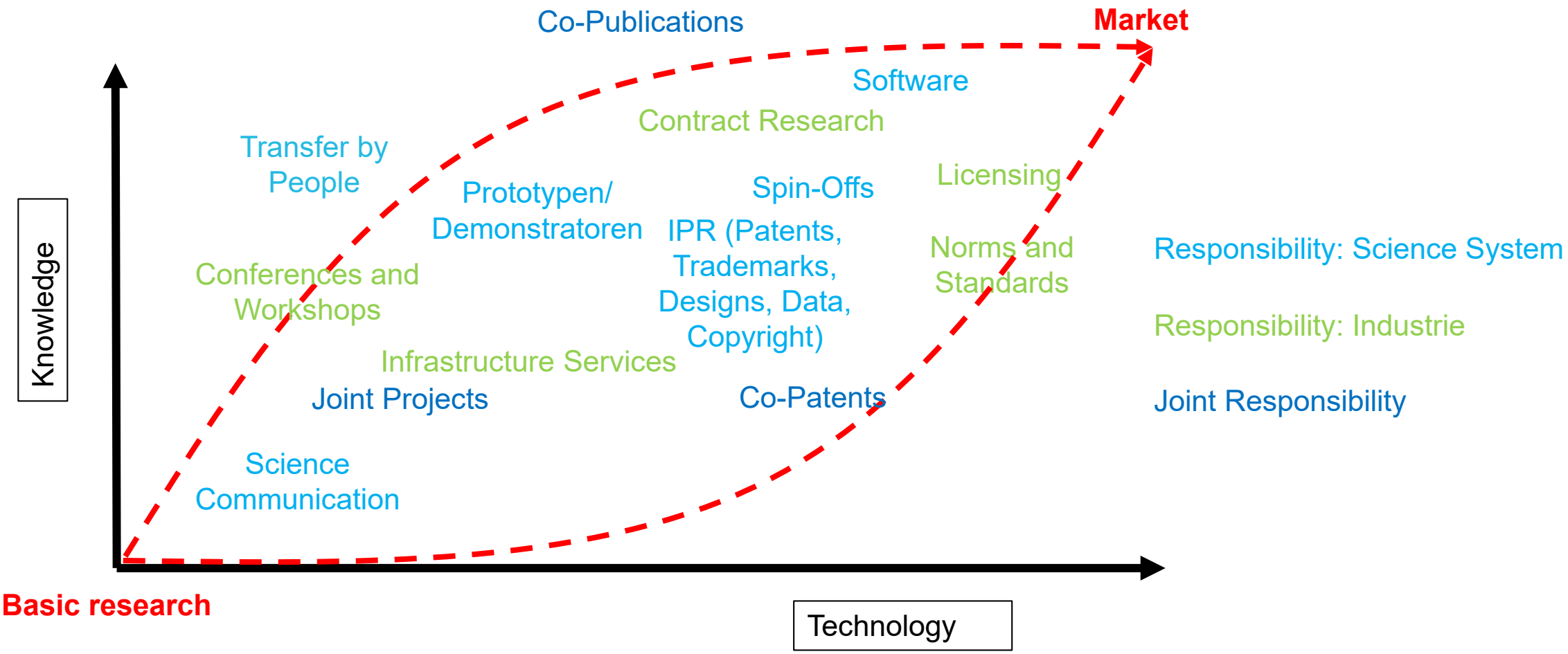
Knowledge and technology transfer channels



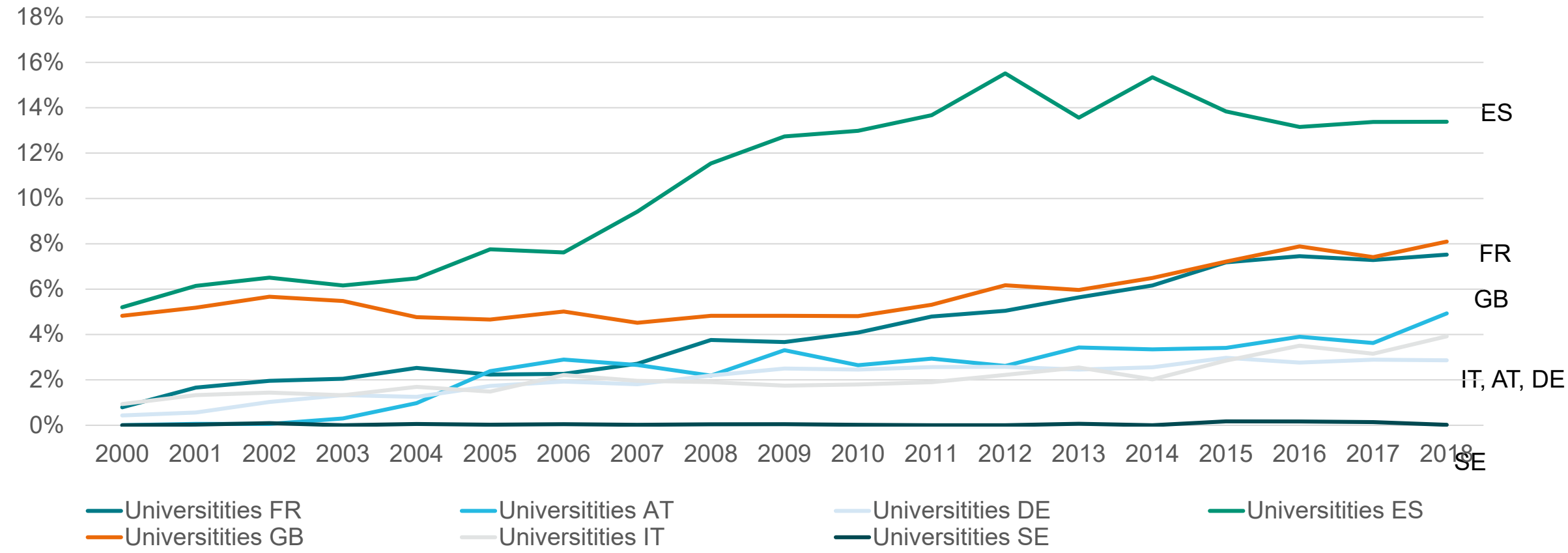
Source: own representation.

PATENTS FILED BY PUBLIC RESEARCH ORGANISATIONS VS. ACADEMIC PATENTS

Core messages:

- There is a lot more knoweldge and technology that results in IPR than what is filed by public research organisations

Shares of patents filed by universities in total country filings at the EPO



Source: Scopus, EPO-PATSTAT; Fraunhofer ISI calculations.

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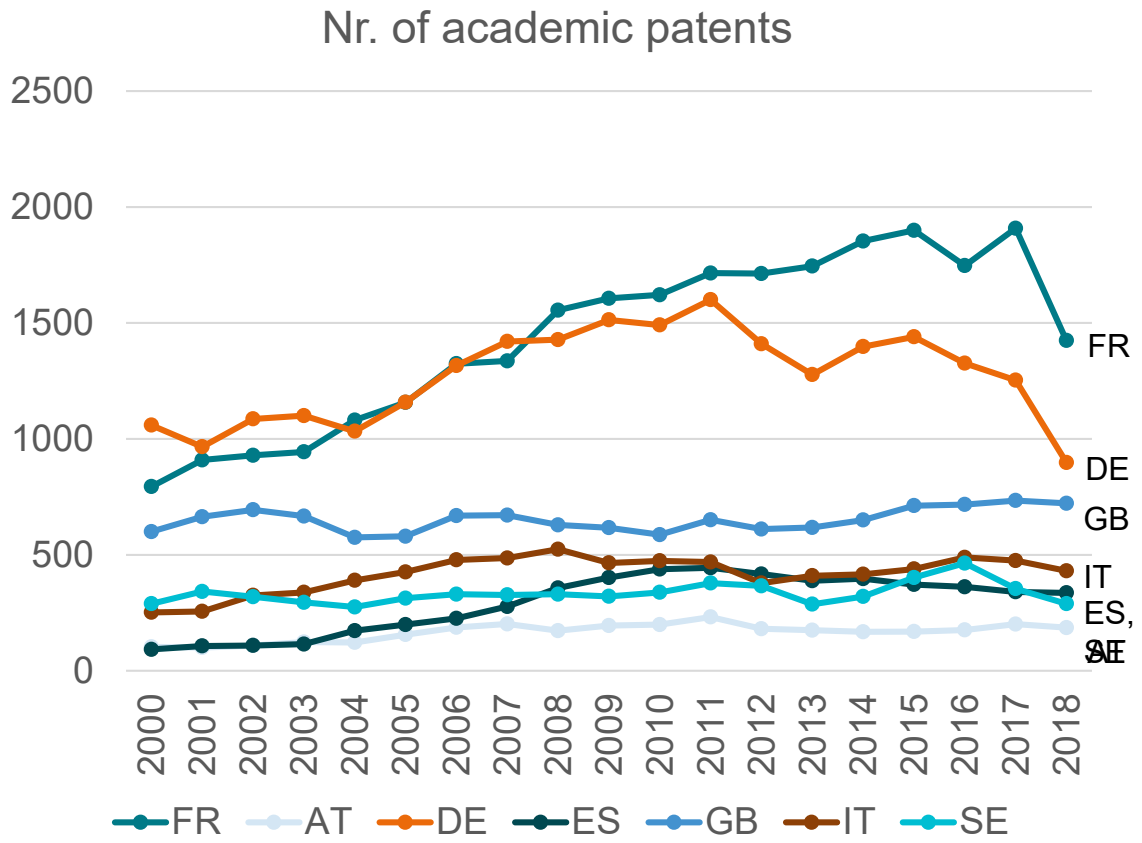
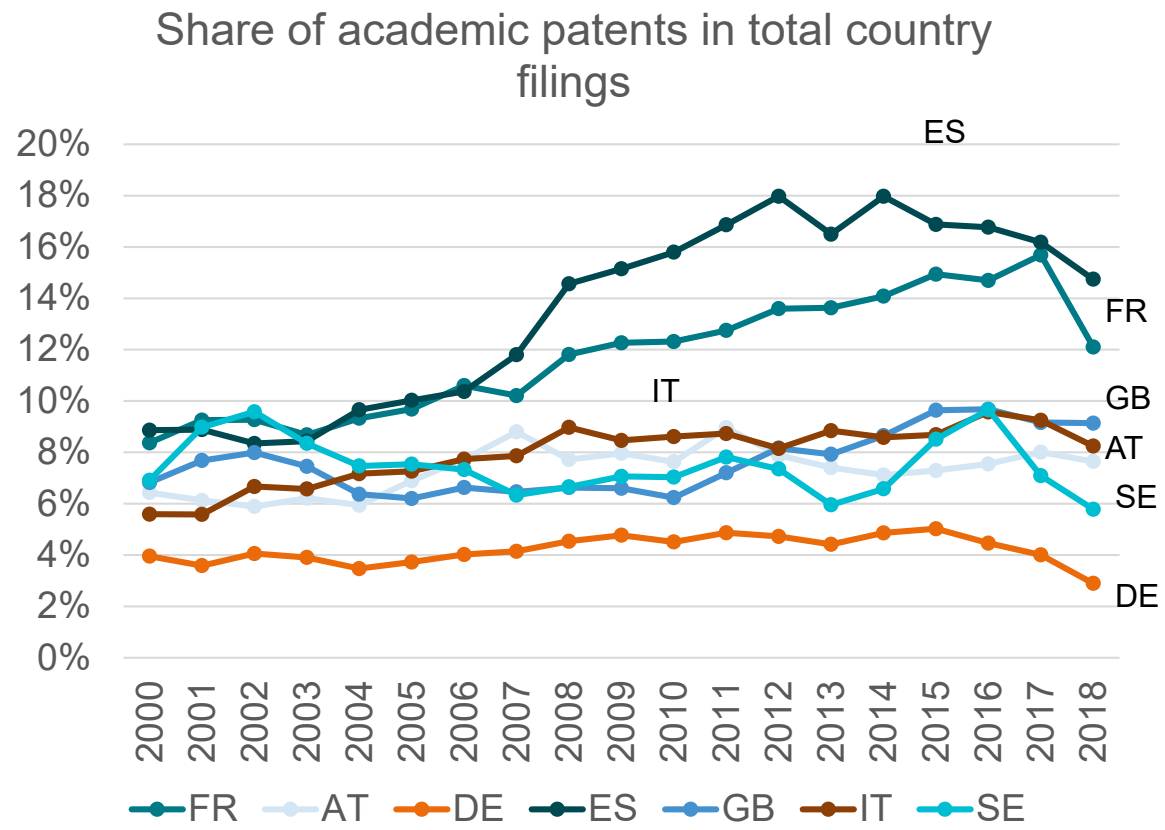
No. and shares of academic patents (universities), filings at the EPO





Source: Scopus, EPO-PATSTAT; Fraunhofer ISI calculations.

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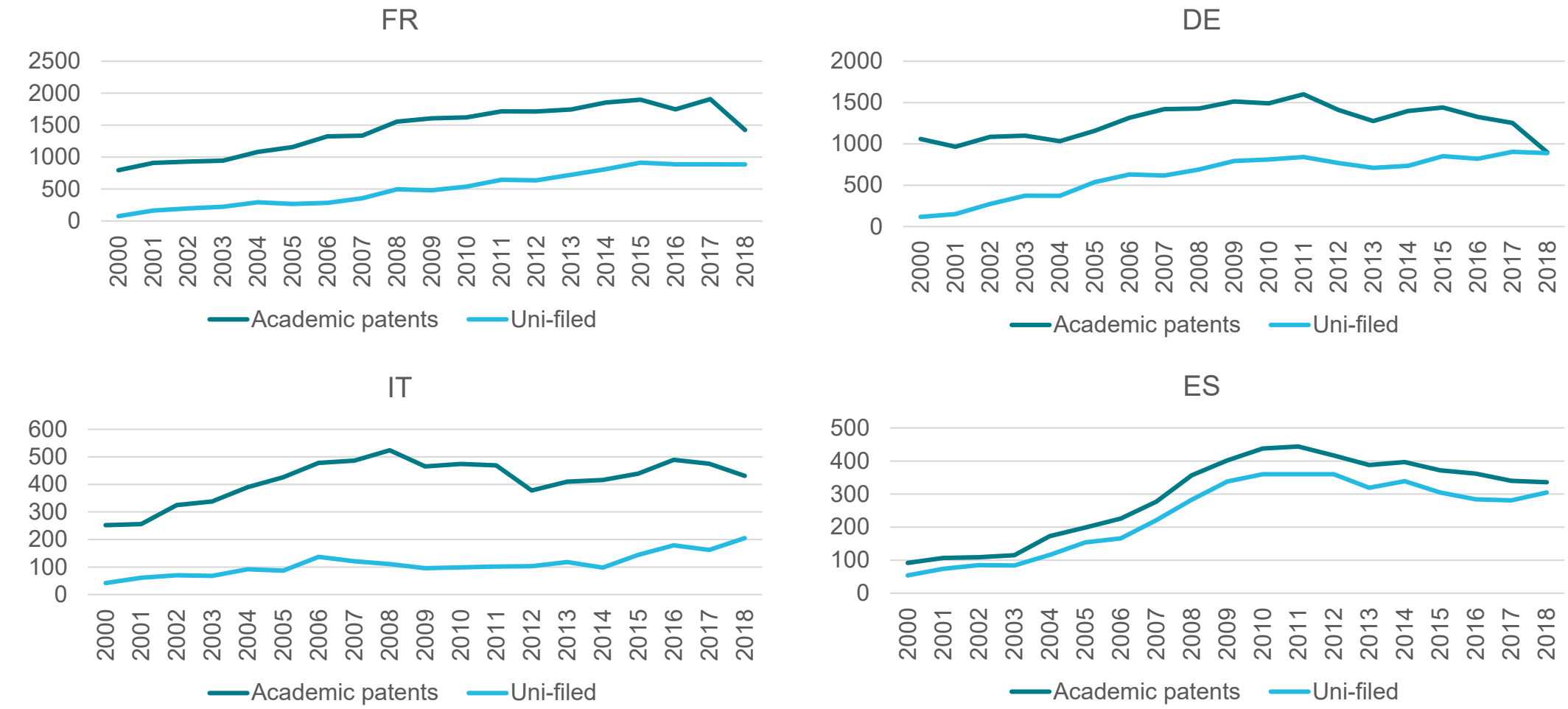
Numbers of academic patents relative to university-filed patents, fiings at the EPO



Source: Scopus, EPO-PATSTAT; Fraunhofer ISI calculations.

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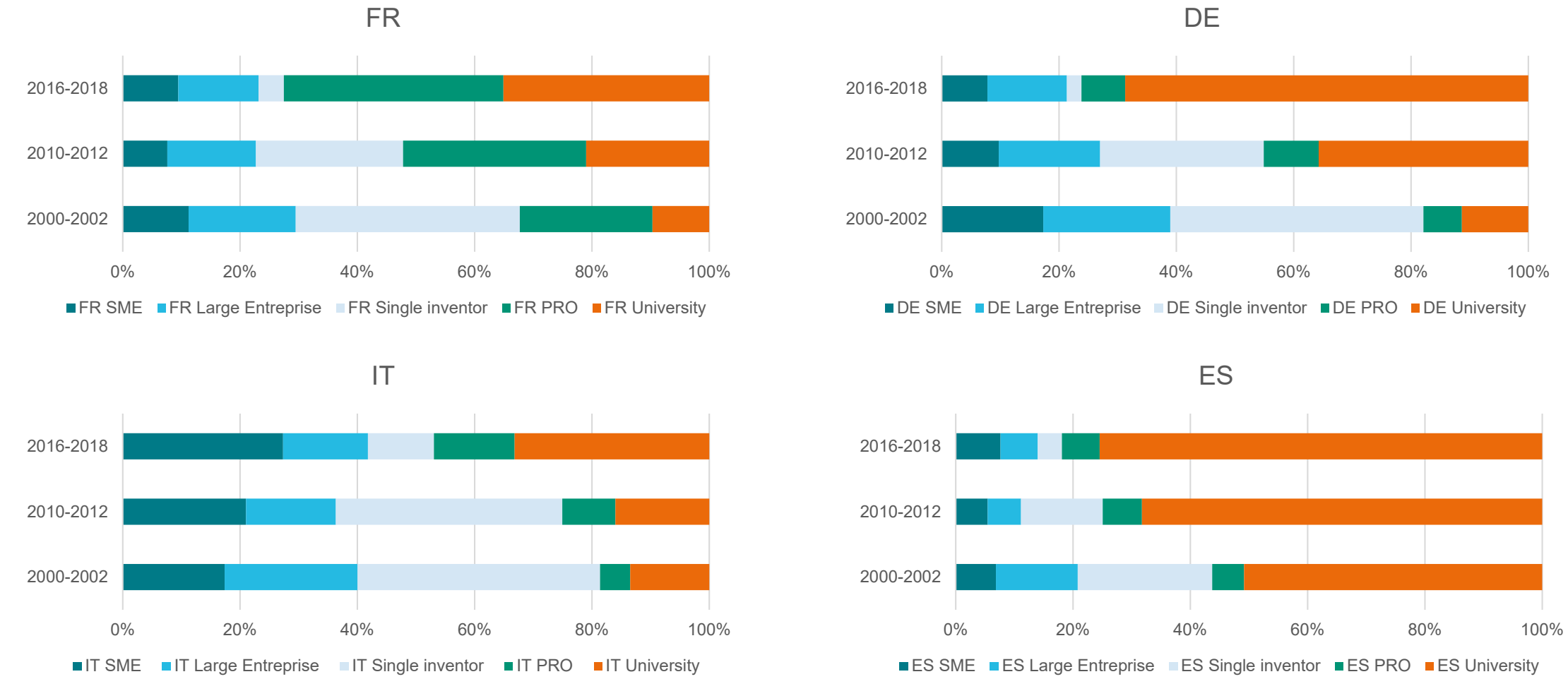
Owners of academic patents by country, filings at the EPO



Source: Scopus, EPO-PATSTAT; Fraunhofer ISI calculations.

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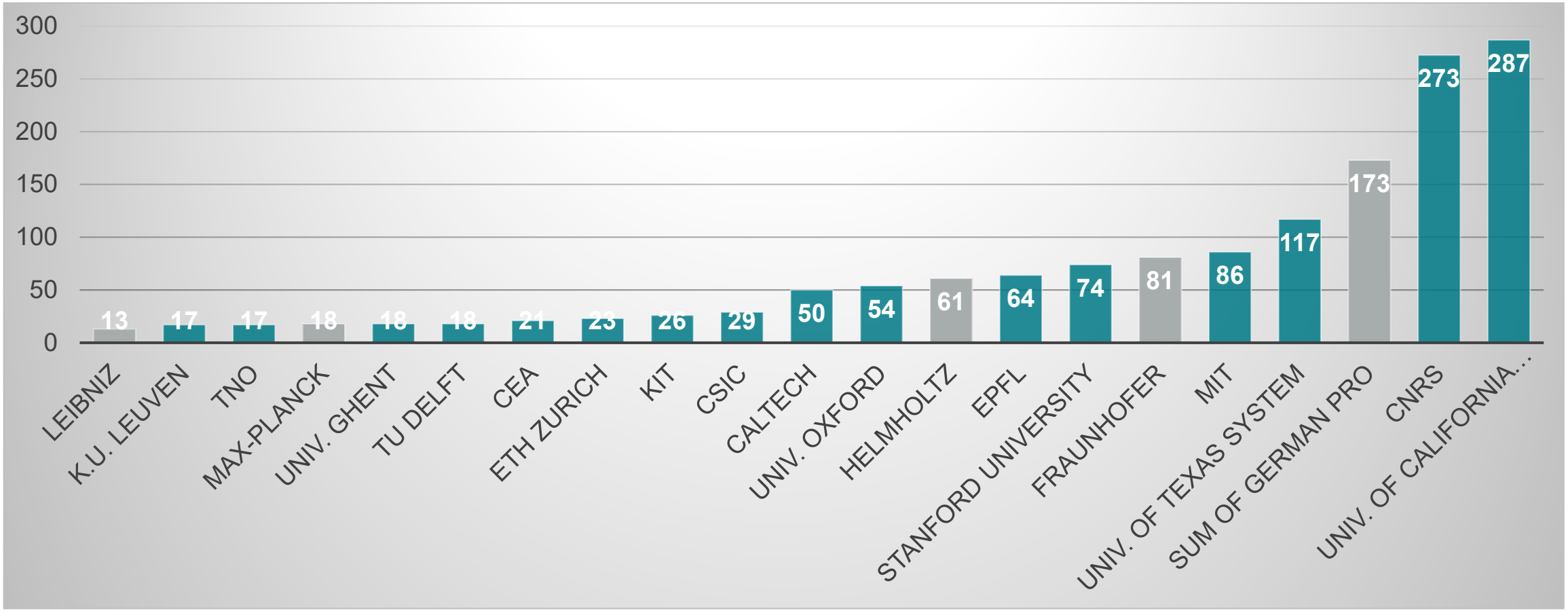
IP-BASED AND KNOWLEDGE-BASED SPIN-OFFS

Core messages:

- the number of IP-based spin-offs varies between organizations due to their role in technology production
- the number of knowledge-based spin-offs is considerably higher and focused on ICT and technical services

Absolute number of IP-based spin-offs for a selected set of national and international organisations, 2017-2019



Absolute numbers for CNRS are partly interpolated and are estimated based on incomplete time series and general information in annual reports.
Source: Frietsch et al. 2021; data sources: AUTM, annual reports of the organizations; GWK 2020.

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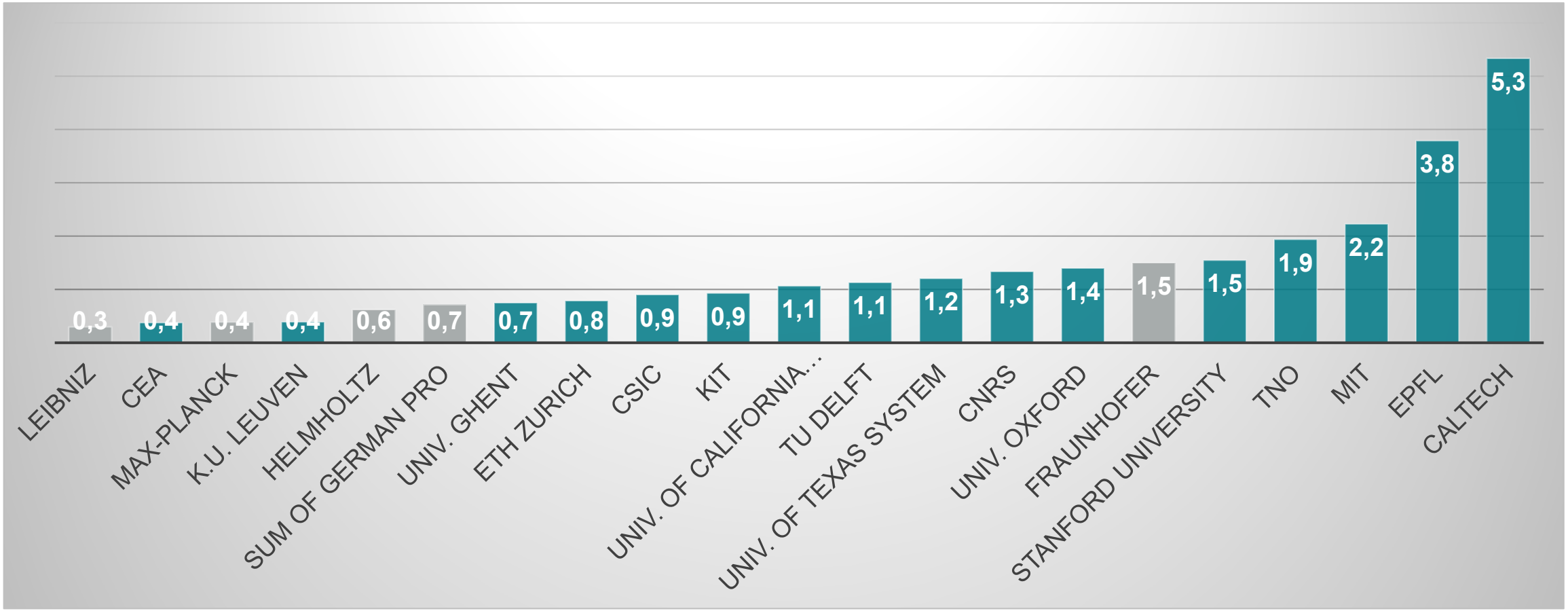
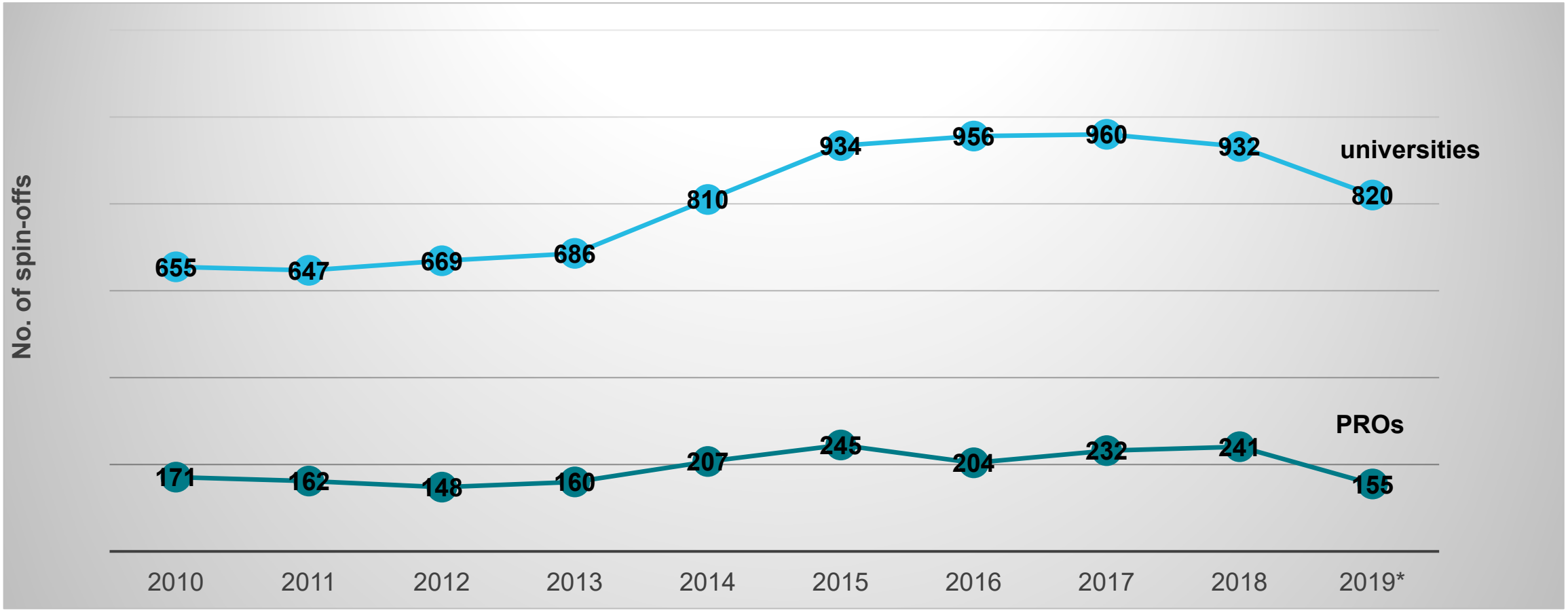
Avg. No. of IP-based spin-offs per 1,000 employees for a sel. set of national and international organisations, 2017-2019



Absolute numbers for CNRS are partly interpolated and are estimated based on incomplete time series and general information in annual reports.
Source: Frietsch et al. 2021; data sources: AUTM, annual reports of the organizations; GWK 2020.

Number of knowledge-based spin-offs from German PROs and universities 2010 to 2019



* Data for 2019 incomplete.
Source: Frietsch et al. 2021; data sources: AUTM, annual reports of the organizations; GWK 2020.

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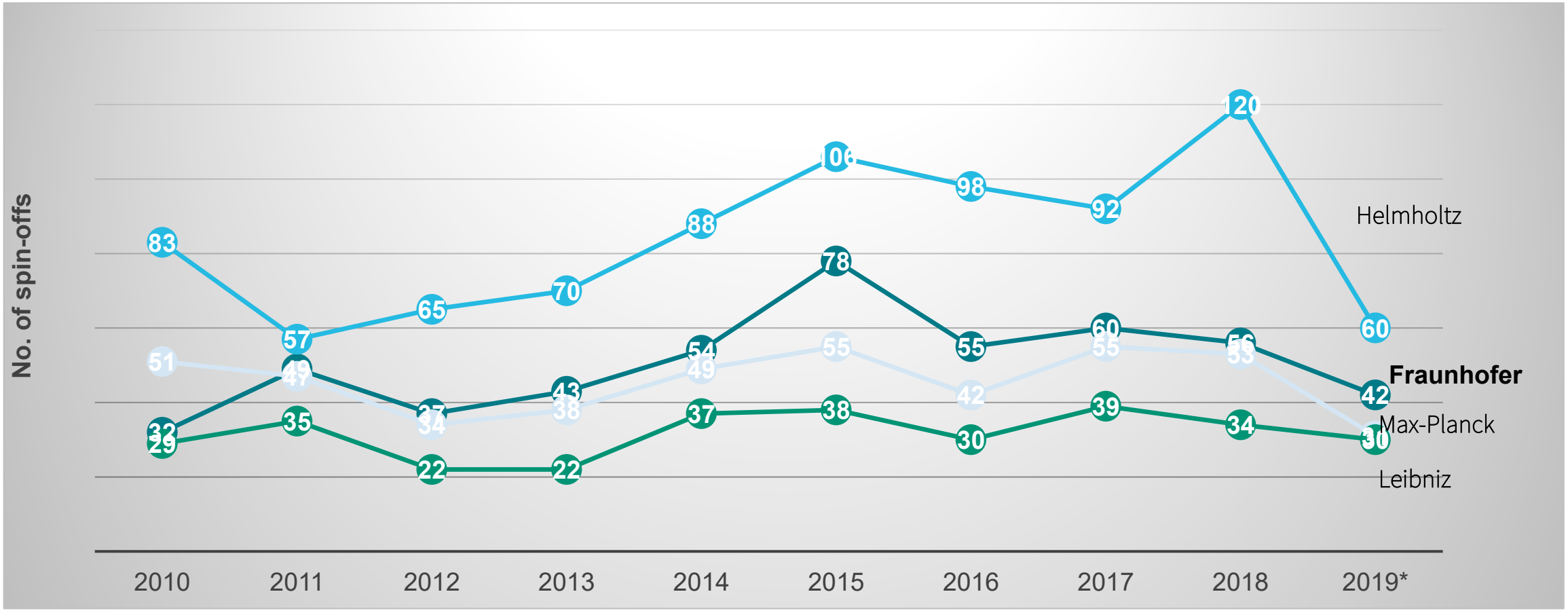
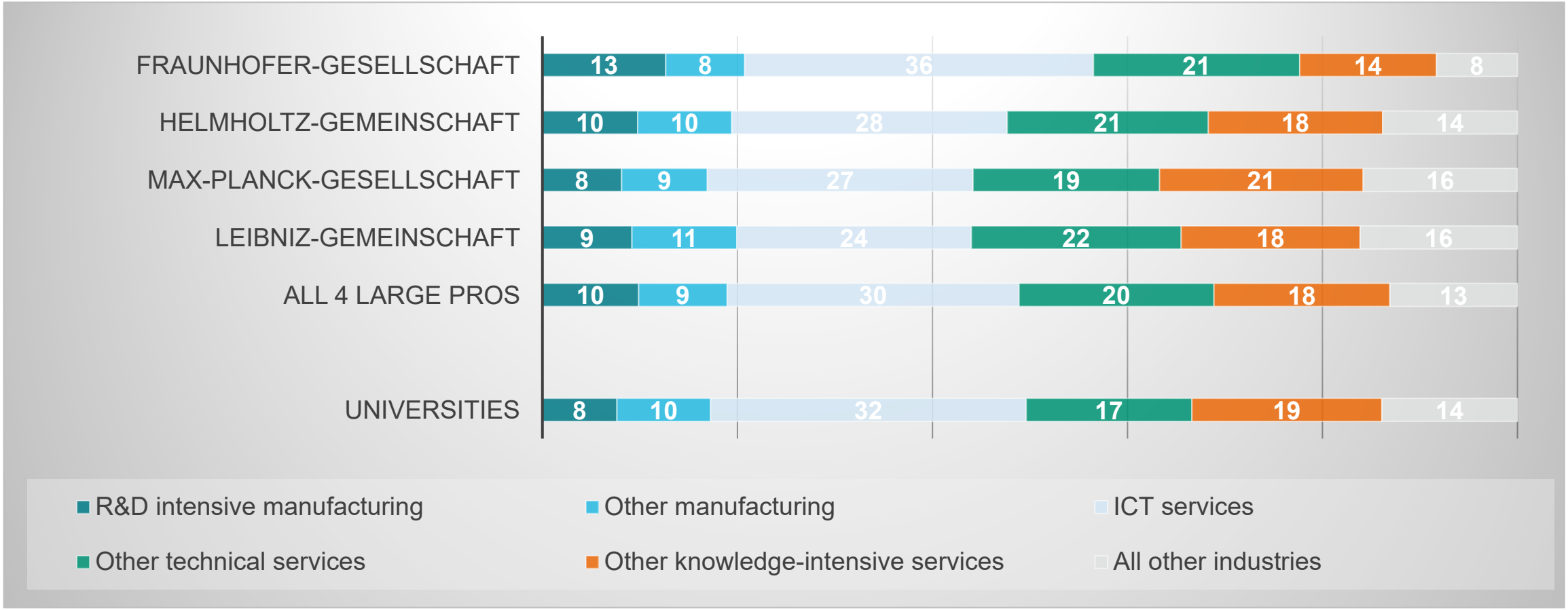
Number of knowledge-based spin-offs from German PROs 2010 to 2019 by PRO



* Data for 2019 incomplete.
Source: Frietsch et al. 2021; data sources: AUTM, annual reports of the organizations; GWK 2020.

Industry distribution of knowledge-based spin-offs from German PROs and universities founded during 2010 and 2019



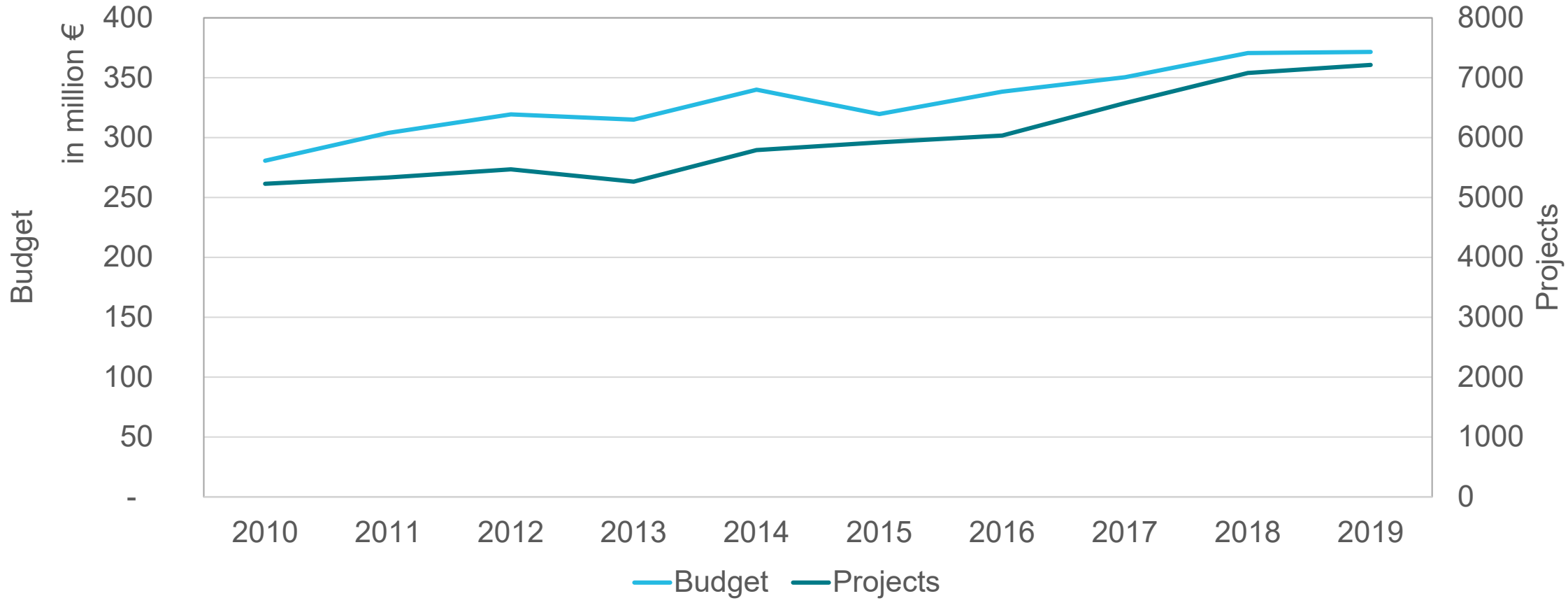
Source: Frietsch et al. 2021; data sources: AUTM, annual reports of the organizations; GWK 2020.

THE ECONOMIC IMPACT OF THE FRAUNHOFER GESELLSCHAFT

Core messages:

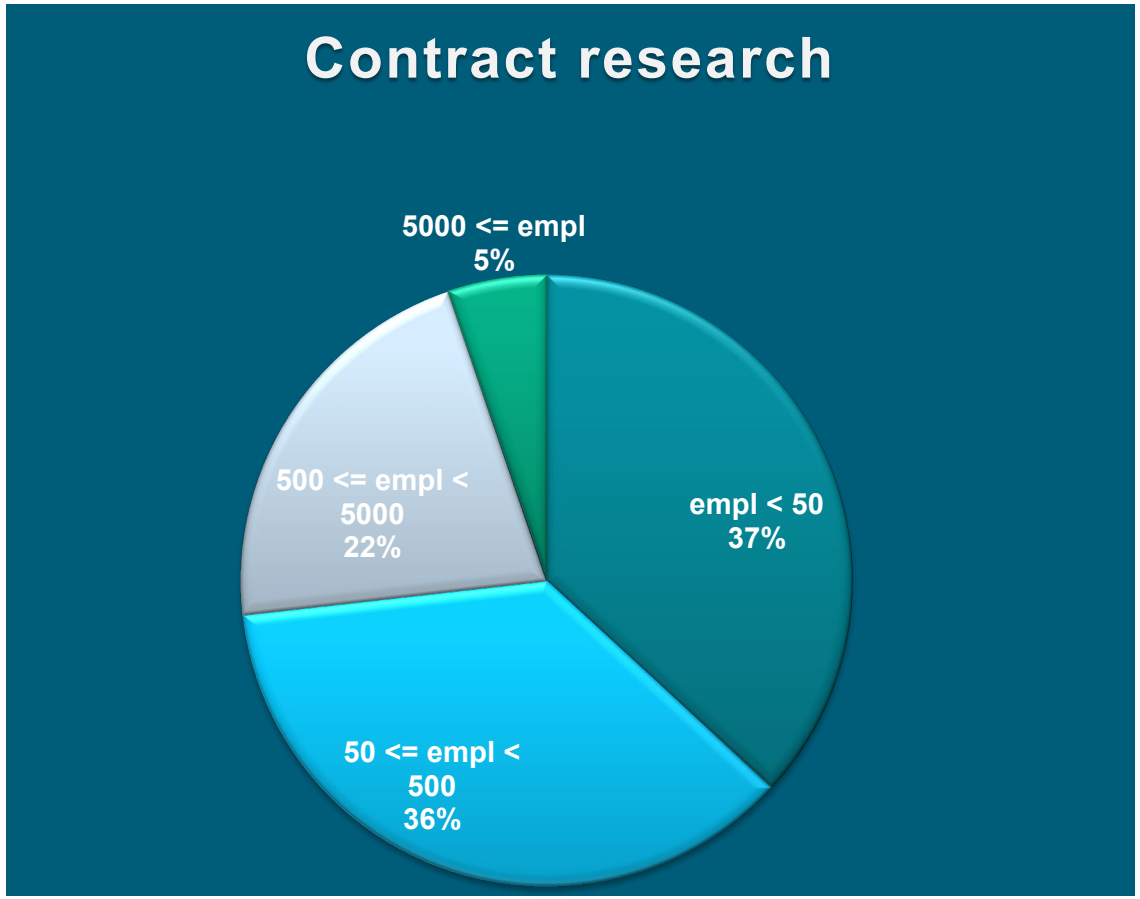
- Fraunhofer partners considerably benefit from collaboration
- Focus on SMEs in terms of the numbers of projects
- Fraunhofer contributes considerably to GDP, especially by indirect knowledge-effects

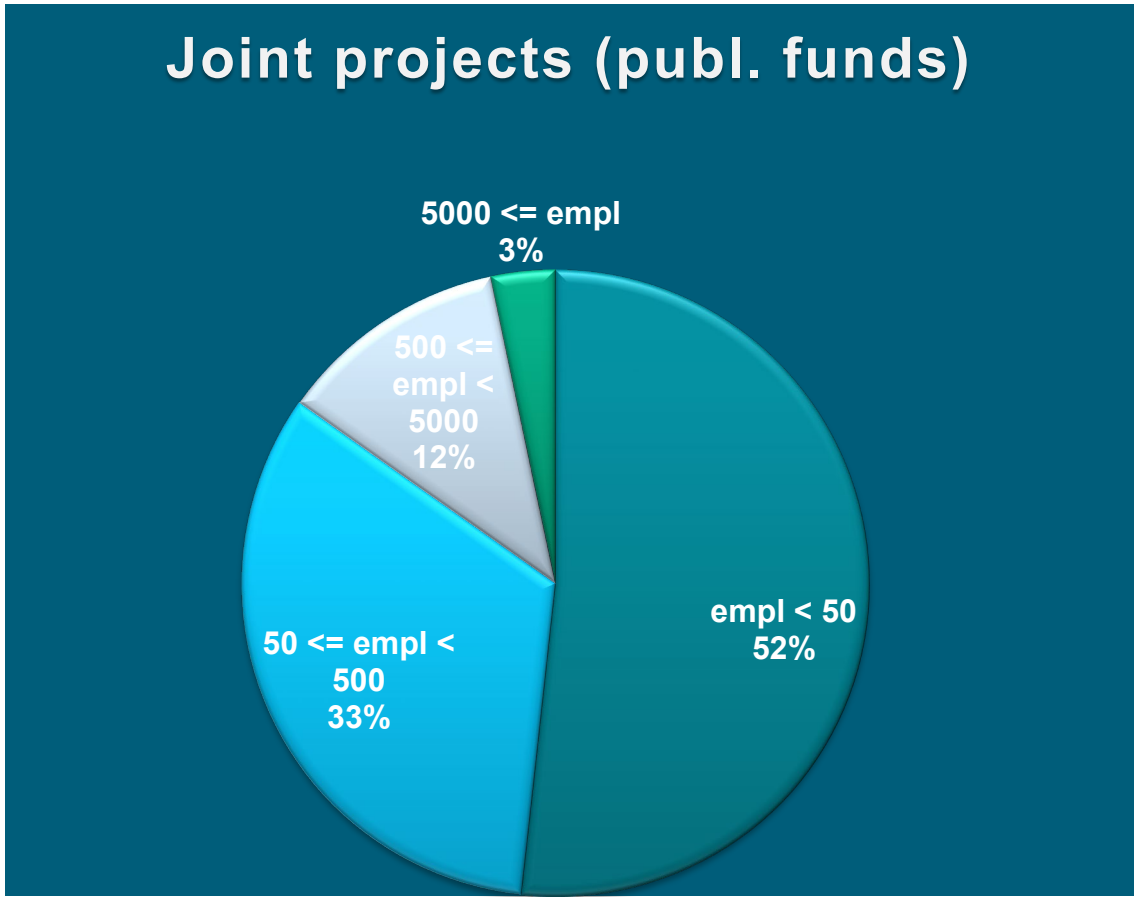
Fraunhofer‘s budget and N of projects of contract research with industry (German companies only)



Source: Frietsch et al. 2022; data sources: Fraunhofer internal data, BvD – Orbis, Bisnode - Hoppenstedt.

Size groups (employment) of Fraunhofer‘s company partners, 2015-2020





Source: Frietsch et al. 2022; data sources: Fraunhofer internal data, BvD – Orbis, Bisnode - Hoppenstedt.

Economic impacts of Fraunhofer on industry partners

- The project-based collaborations of Fraunhofer with industry take at least two forms: direct contract research and publicly funded joint research
  - the numbers and volumes of both forms are increasing over time, so Fraunhofer is reaching more and broader sets of economic actors
  - SMEs are the largest group of partners (especially medium-sized)
  - broad coverage of (mainly R&D-intensive) economically relevant sectors in Germany: transport, chemistry, materials, machinery, IT, ...
- Fraunhofer partners can be characterized as being medium-sized, R&D active companies with a complex product portfolio and semi-standardized production lines
- **The collaborations with Fraunhofer (and also other PROs) have positive impacts on the performance (labour productivity, EBIT, turnover) of the partner companies; SMEs benefit relatively more and significant**

Summarizing Conclusions

- There are much more transfer channels from public organizations to industry than (simple) IPR-based measures
- The IPR focus leads to underestimations of the contribution
- Some transfer channels are in the main responsibility of the science system, some of industry, and some require joint efforts
- The national system and especially the missions of the research organizations play a major role in the selection of relevant (proper) transfer channels
- Transfer should not be seen as an act of handing things over or a stage-gate-process, but rather as a joint process and joint effort of science and industry => the earlier they join forces, the higher is the probability of successful transfer processes

Contact

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Further reading

- https://rcf.risis2.eu/dataset/5/metadata
- https://www.isi.fraunhofer.de/content/dam/isi/dokumente/cci/2021/Report_Allianz-Studie_final.pdf
- https://www.fraunhofer.de/en/research/range-of-services/impact-of-fraunhofer-research.html
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