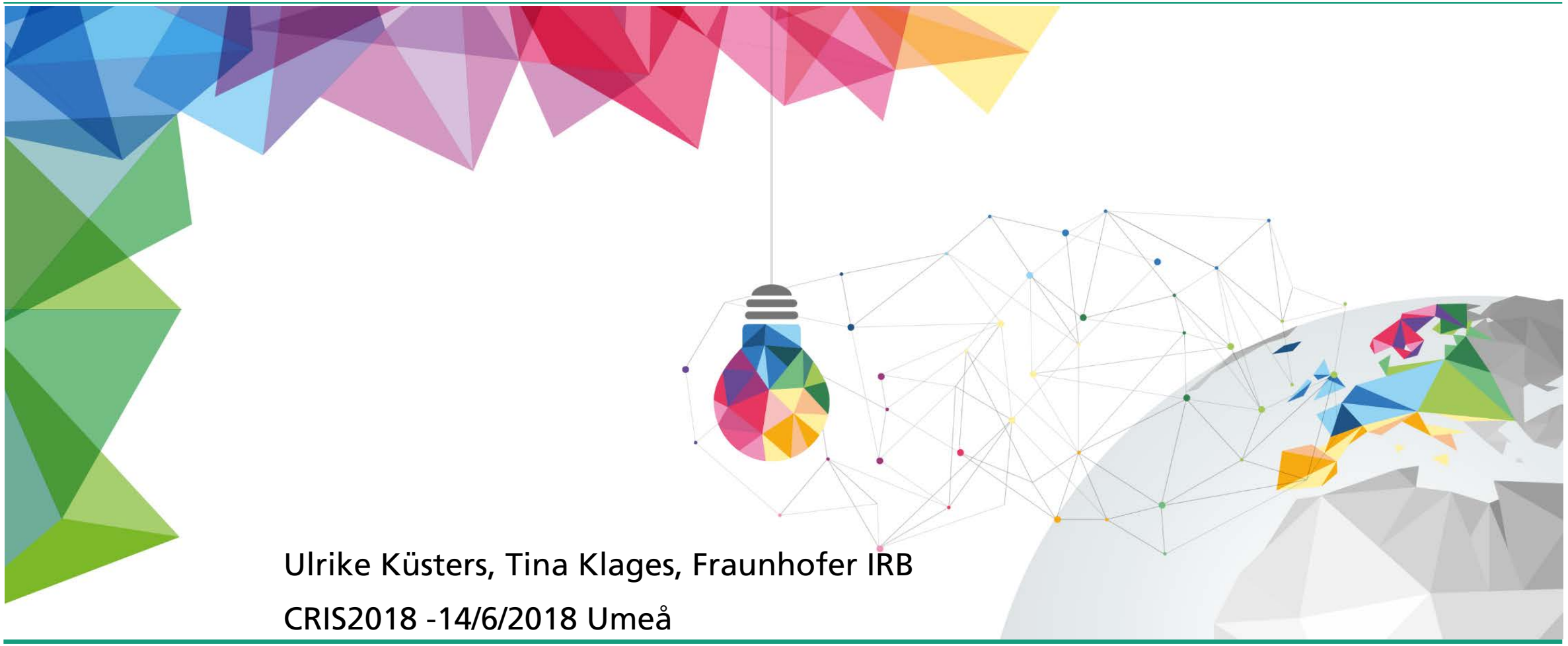
FOSTERING OPEN SCIENCE AT FRAUNHOFER



Ulrike Küsters, Tina Klages, Fraunhofer IRB

CRIS2018 -14/6/2018 Umeå

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AGENDA

- **Fraunhofer Facts & Figures**
- **The academic side** – university relations, education, disemmination
- **The RTO side** – applied research, industry relations and IP
- **Introducing a CRIS** – corporate responsibility and scientific integrity
- **The Open Science journey** – policies, infrastructure, accompanying research
- **Conclusions**

FRAUNHOFER FACTS & FIGURES

Josef von Fraunhofer (1787 – 1826)

- **Researcher**
  Discovery of “Fraunhofer Lines“
  fundamentals in optics & spectral analysis
- **Inventor**
  New methods of lens processing
- **Entrepreneur**
  Head of royal glass factory

The "missing colors" of the sun

Fraunhofer Lines: *absorption lines in the solar atmosphere caused by chemical elements*

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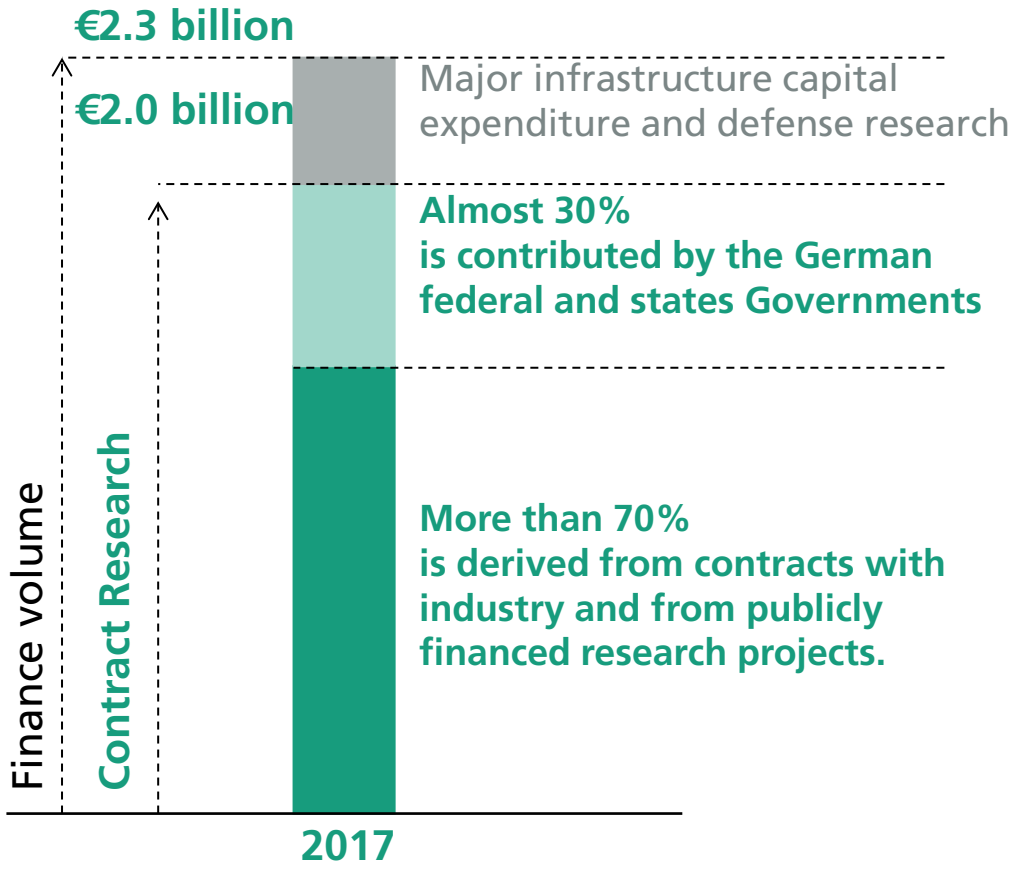
Fraunhofer today at a glance

25,327 staff

72 institutes and research units



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Fraunhofer worldwide

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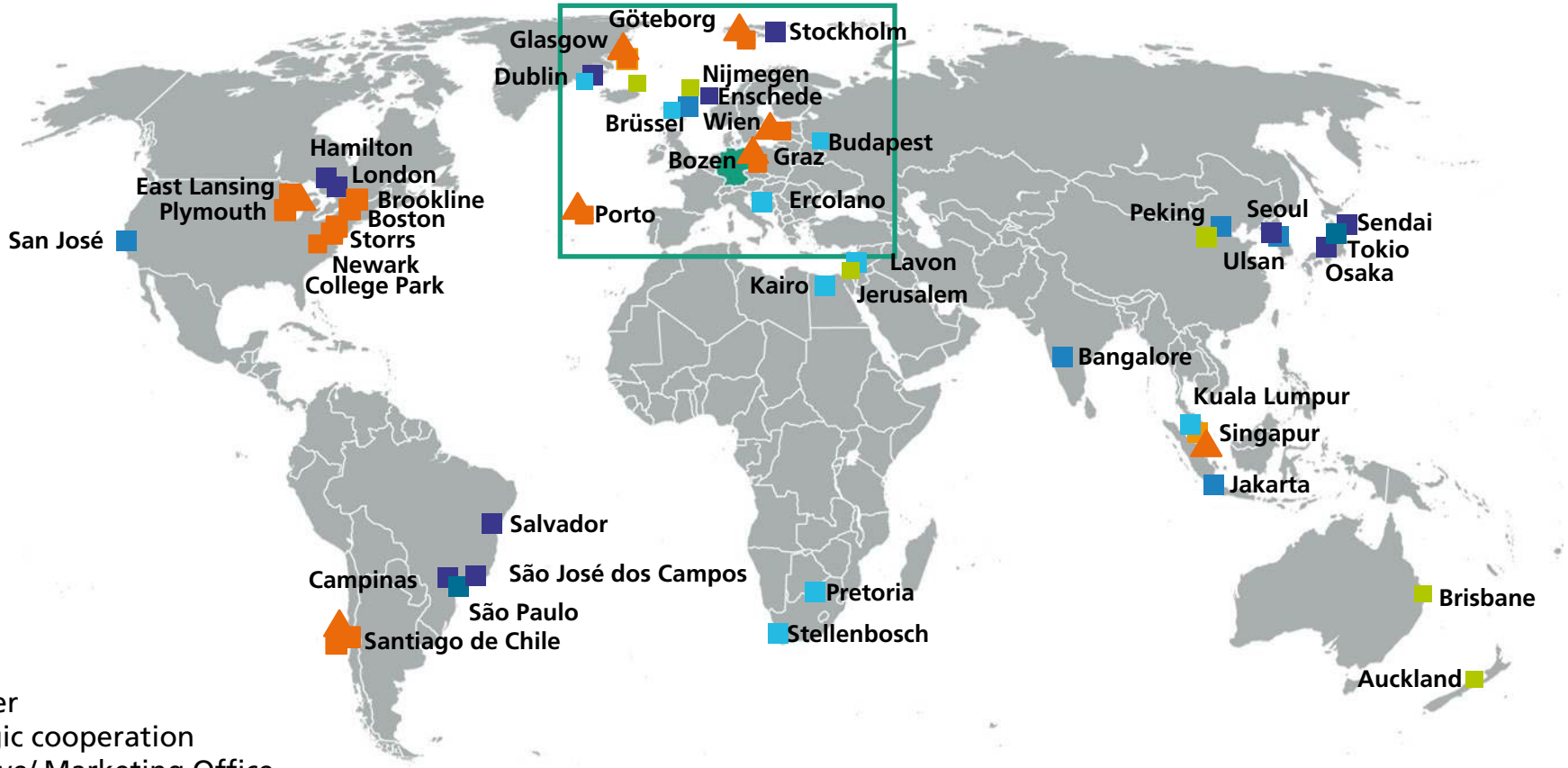
Fraunhofer worldwide



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Fraunhofer research networks

Innovation Research

IAO, IMW, INT, IRB, ISI

Microelectronics

EMFT, ENAS, FHR, HHI, IAF, IIS, IISB, IMS, IPMS, ISIT, IZM
Guests: AISEC, ESK, FOKUS, IDMT, IKTS, IMWS, IZFP

Information and Communication Technology

AISEC, ESK, FIT, FKIE, FOKUS, IAIS, IDMT, IESE, IGD, IOSB, ISST, ITWM, IVI, MEVIS, SCAI, SIT
Guests: HHI, IIS, IAO

Production

IAPT, IEM, IFF, IGCV, IGP, IML, IPA, IPK, IPT, IWU, UMSICHT

Life Sciences

EMB, IBMT, IGB, IME, ITEM, IVV, IZI

Defense and Security

EMI, FHR, FKIE, IAF, ICT, INT, IOSB
Guests: HHI, IIS, ISI

Light & Surfaces

FEP, ILT, IOF, IPM, IST, IWS

Materials and Components – MATERIALS

EMI, IAP, IBP, ICT, IEE, IFAM, IKTS, IMM, IMWS, ISC, ISE, IWES, IWM, IZFP, LBF, WKI
Guests: IGB, IIS, ISI, ITWM

[1]

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FRAUNHOFER's ACADEMIC SIDE

Academic research structures

72  ∞ **64** Universities

48 Univ. of Applied Science

- Extensive interrelations with Universities
- 80 Fraunhofer Directors hold chairs at universities
- Direct involvement into academic lecture content
- Fraunhofer Institutes offer PhDs **2016** > **2053** dissertations, **2853** ongoing
- x72: all institutes have own library and personel (scientific information manager)
- x1: central institutional repository, library and publication support services (at IRB)

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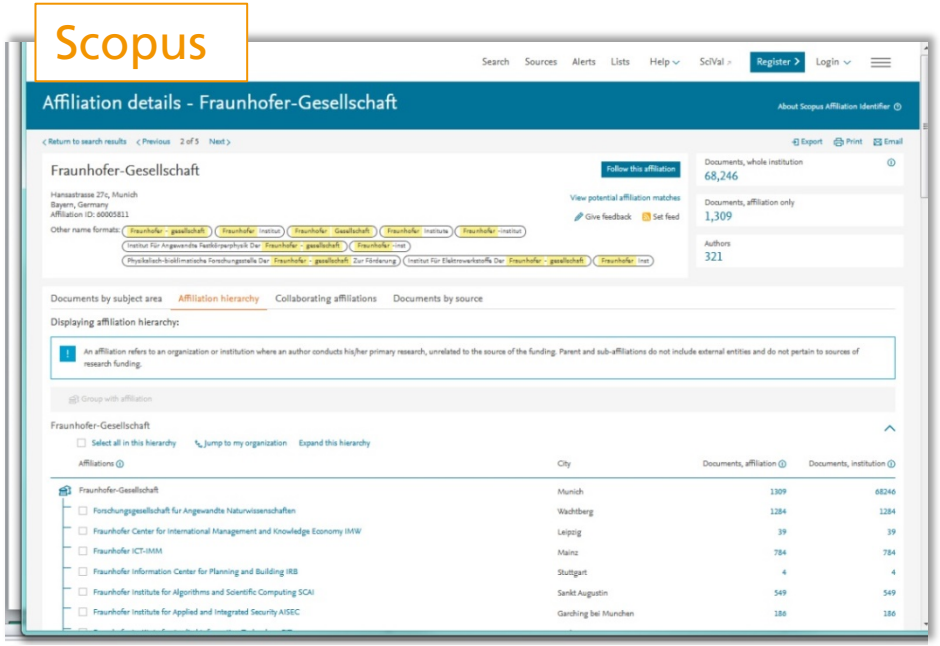
Academic research structures



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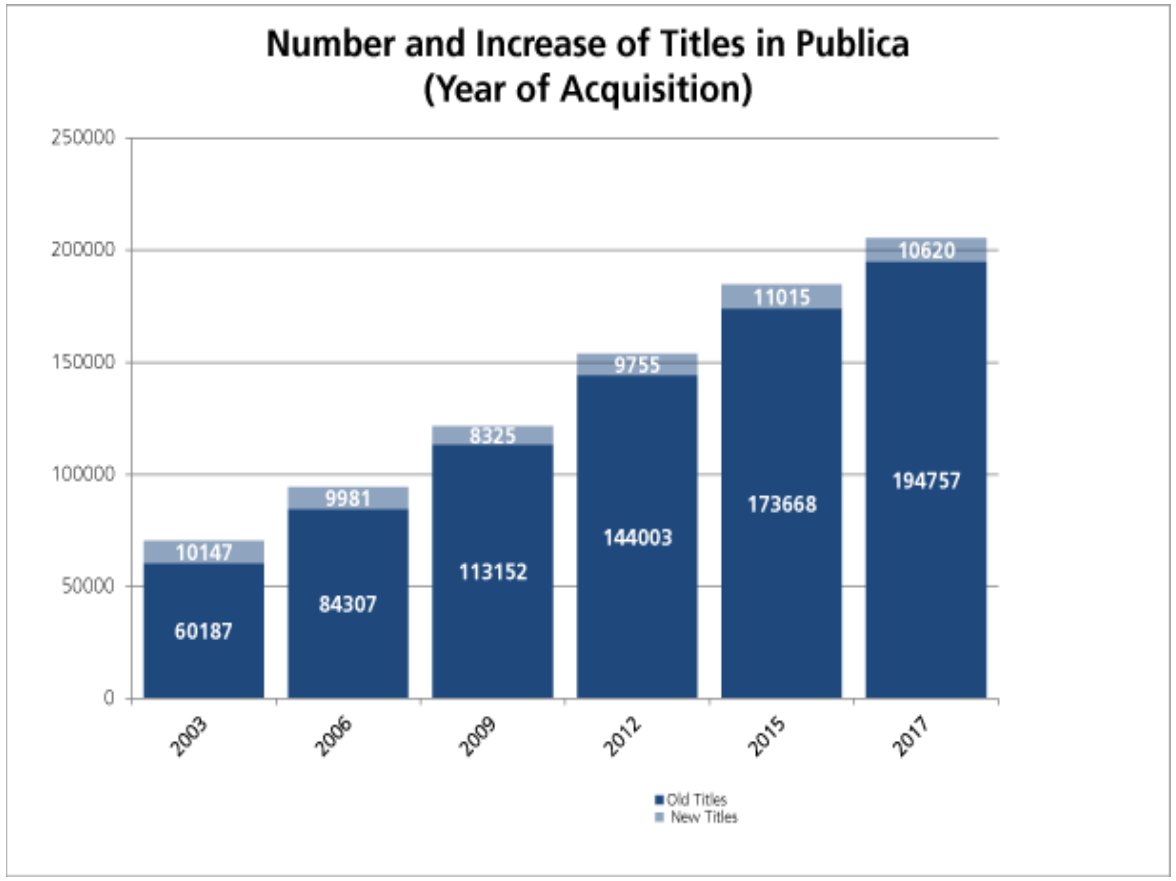
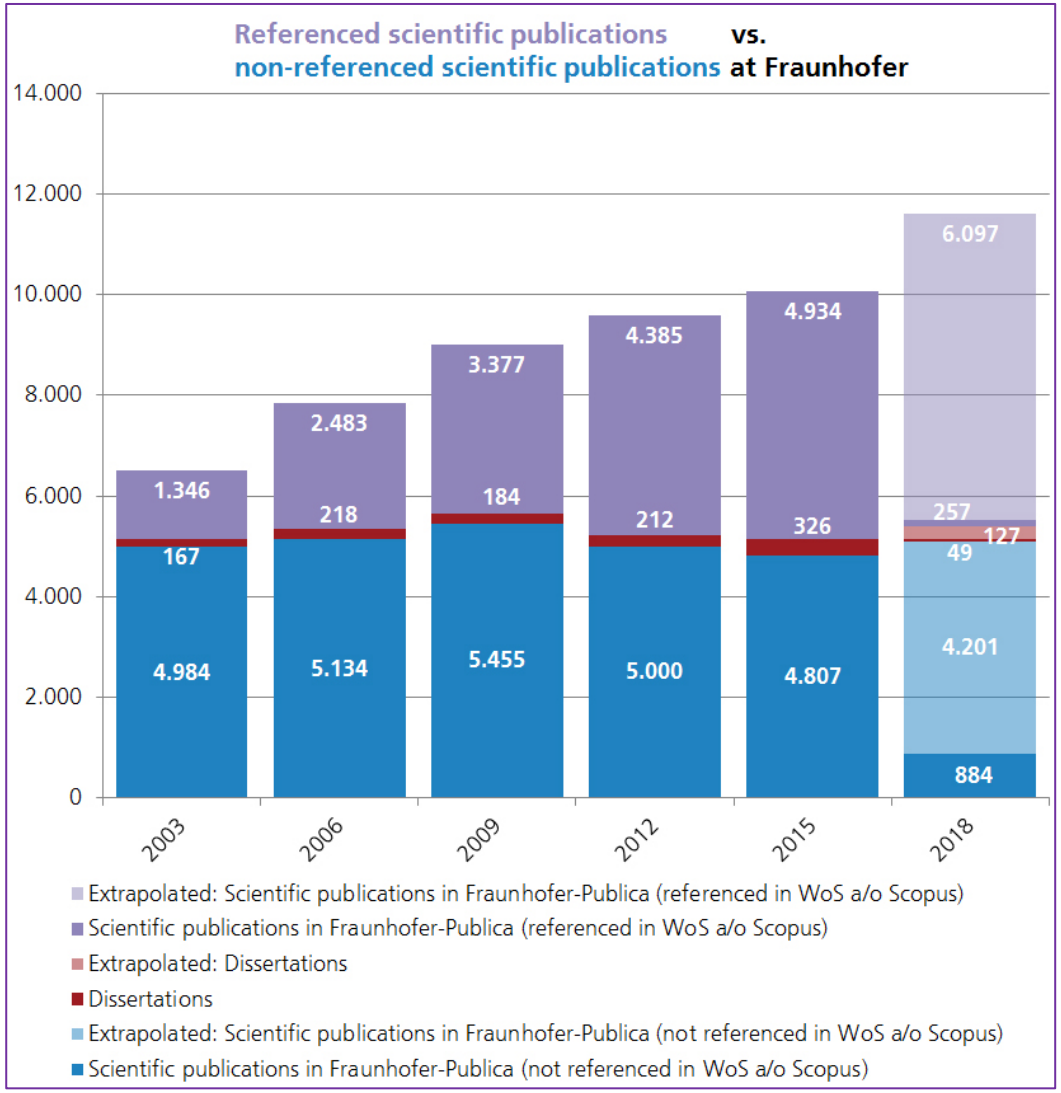
Academic research structures





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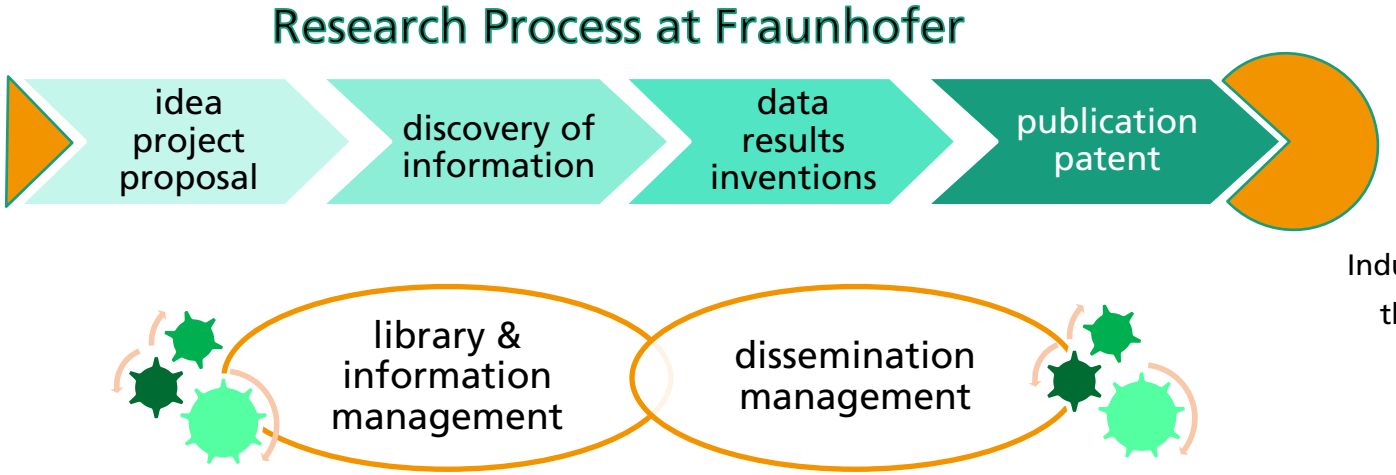
Academic research structures

Scientists



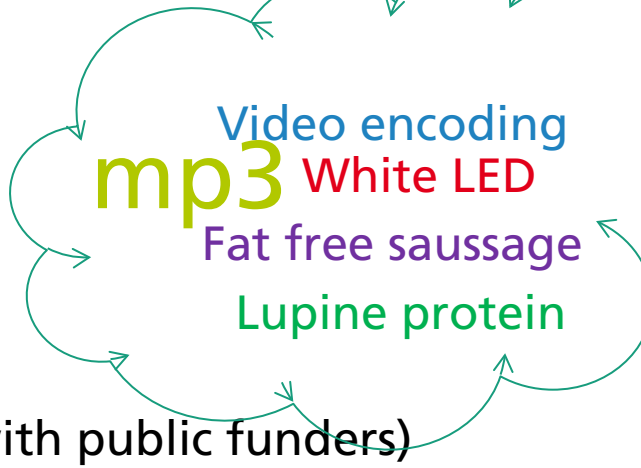
Industry / Market

the Public

FRAUNHOFER's RTO SIDE

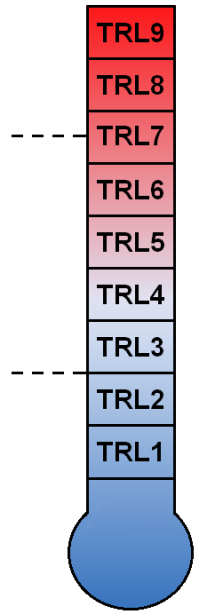
Research and Technology Organisations of Europe (EARTO)

FRAUNHOFER's RTO SIDE



Patenting, IP and industry relations

- RTOs are bridging the gap between basic research and market
  2017: 11,000 projects of applied research with industry partners (7,500 with public funders)
- RTO Mission is about adapting inventions to industry use and to innovations
  Among »Top 100 Global Innovators« (3 other German companies: BASF, Bayer, Merck)*[2]
- Collaborations with industry mostly confidential, exploitation interests
- Different Stakeholders and their requirements: Industry, Science, Society, Politics
- Tension field between open and closing –
  high obligation to succeed economically and innovate with industry,
  vs. transfering knowledge to society, politics and science



	2015	2016	2017
Active patent families at year end*	6573	6762	7036
Invention disclosures reports per year	670	798	756
Patent applications per year	506	608	600

* Portfolio of active rights (patents and utility models) and patent applications at year end.

*[2] Clarivate Analytics, 2017 [2]

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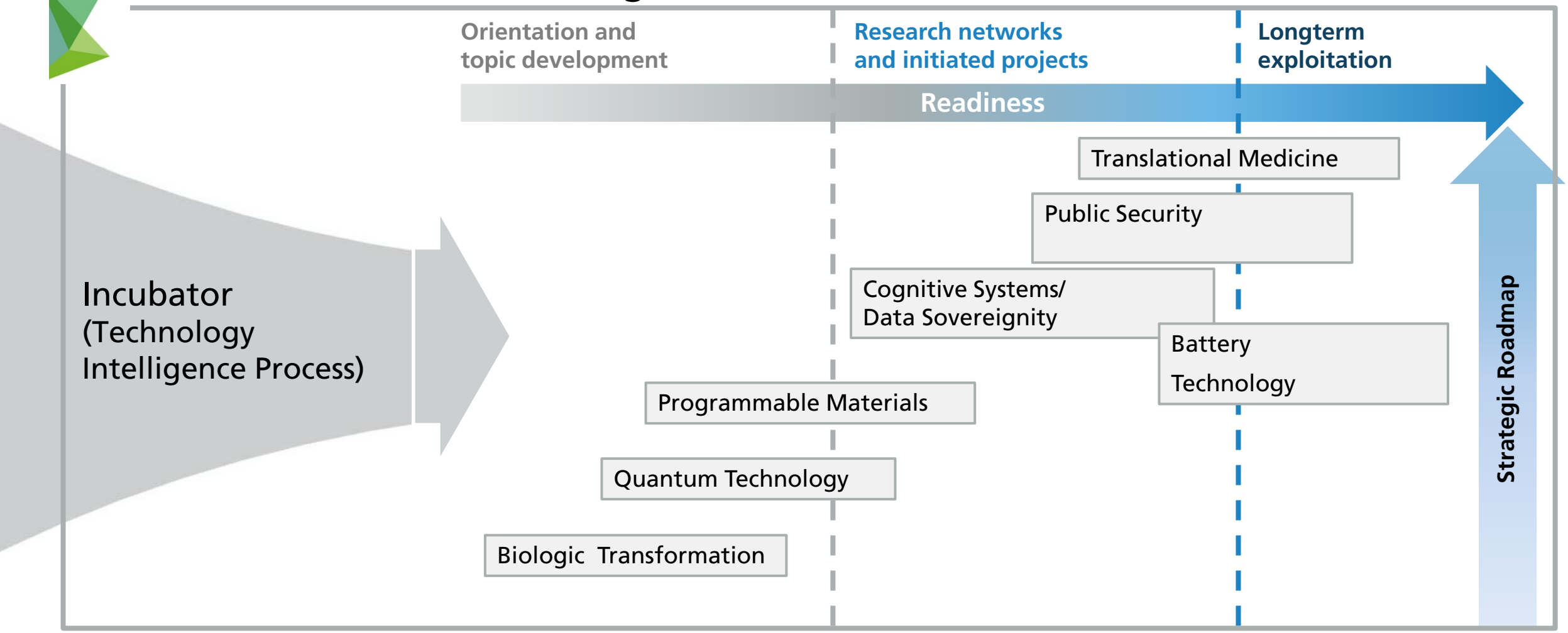
RTO view of recent strategic research areas



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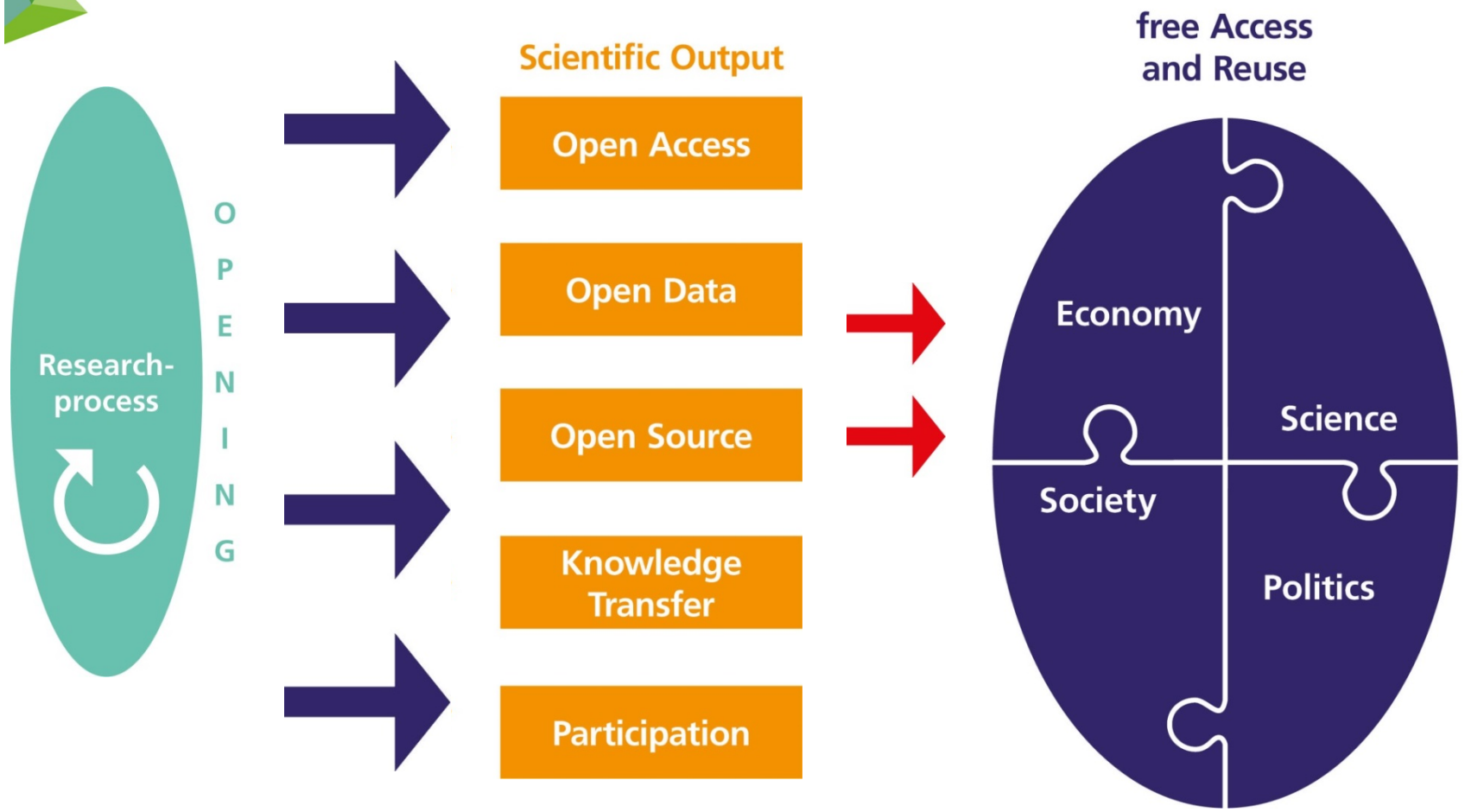
Benefits of opening research for RTOs and it's stakeholders

- SCIENCE
  Contributing to scientific communities, accelerating scientific progress, claiming scientific results
- INDUSTRY
  Input for open innovation processes – shorten innovation cycles
- SOCIETY
  Transfer of scientific results to society, create participation opportunities, societal engagement
- POLITICS
  Support agenda setting processes through scientific knowledge
- FUNDERS
  Compliance with open strategies and requirements
- ECONOMY
  Fostering economic progress

OPEN SCIENCE VISION

Vision for Open Science at Fraunhofer



- efficient knowledge transfer
- shorter innovation cycles
- accelerate scientific progress
- interdisciplinary resuse
- new business models
- democratisation of knowledge
- transparence of science
- enhance research quality
- ensure research integrity

INRODUCING A CRIS

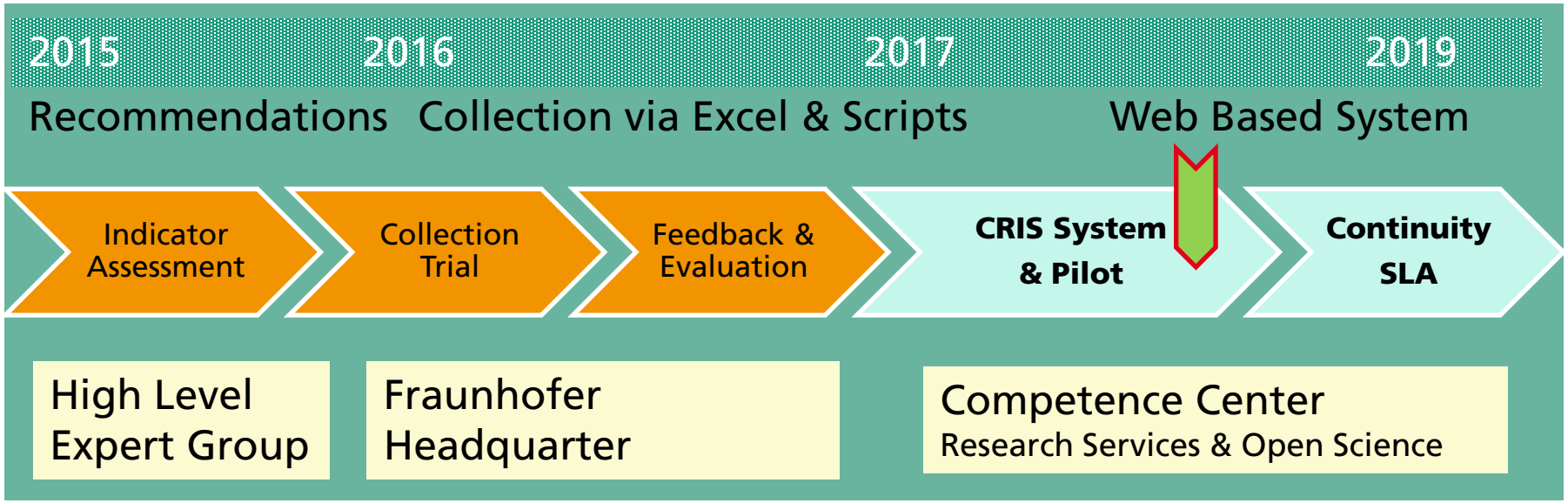
Motivators & Goal setting

- Fraunhofer-Modell: complex benchmark system in place but so far “freedom of science”
- Corporate responsibility: safeguarding scientific integrity
  Company directive scientific integrity | Ombudsman in every institute | ethics commission
- Since 2012 implementation of a measuring system scientific indicators = CRIS
  enable comparability | introduce new collection process | analyze research processes

SCIENTIFIC INDICATORS

- SCIENTIFIC OUTPUT:
  Scientific publications, intern. co-publications, citations/excellence rates, patents
- ACADEMIC QUALIFICATION
  Doctoral theses, master theses
- SCHOLARLY ACKNOWLEDGEMENT & ACADEMIC NETWORKING
  High-level awards, spokesmanships, projects of excellence

Implementation process



- Structure follows strategy: CRIS tool & software came late in the project
- DSpace-CRIS was selected and is implemented with external support
  5 pilot institutes response to data validation, data collection and support requirements
- More technical info on DINI-FIS-Blog : „DSpace-CRIS @ Fraunhofer“ [3]
  http://blogs.tib.eu/wp/fis (German only)

Accompanying factors and effects of a CRIS - our findings so far

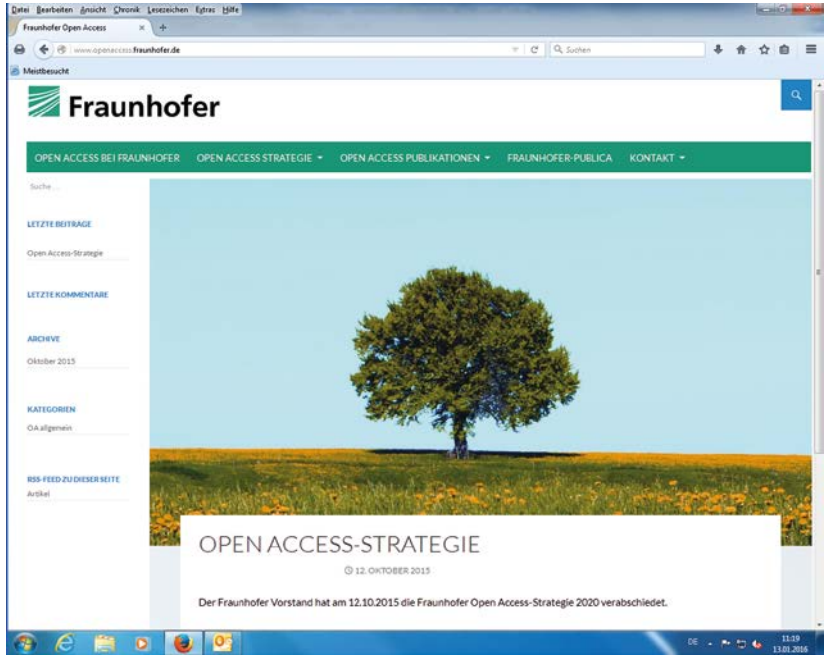
- Have corporate responsibility be the driver, not infrastructure governance
  make compromises to data collection processes rather than scientific integrity
- Academic administrative data are very heterogeneous and difficult to collect
  all data should be standardized | embrace initiatives like <cerif> and KDSF [4]
- Our existing ERP systems are long standing, vast and highly regulated
  CRIS implementation needs to compromise and accept a slow BI-adaptation process
- Does CRIS implementation invite long-term socio-scientific aspects?
  Are we creating a self referential system or a structure for linear process improvement?
  - We notice a higher attention to valid publication data and proccesses
  - Authors start to look more into their academic profile and want to perfect it
  - Endanger freedom of science: scientists may begin to feel patronized and controlled
  - Would a merit system positively support the scientific indicators?

OPEN SCIENCE JOURNEY

Open Access

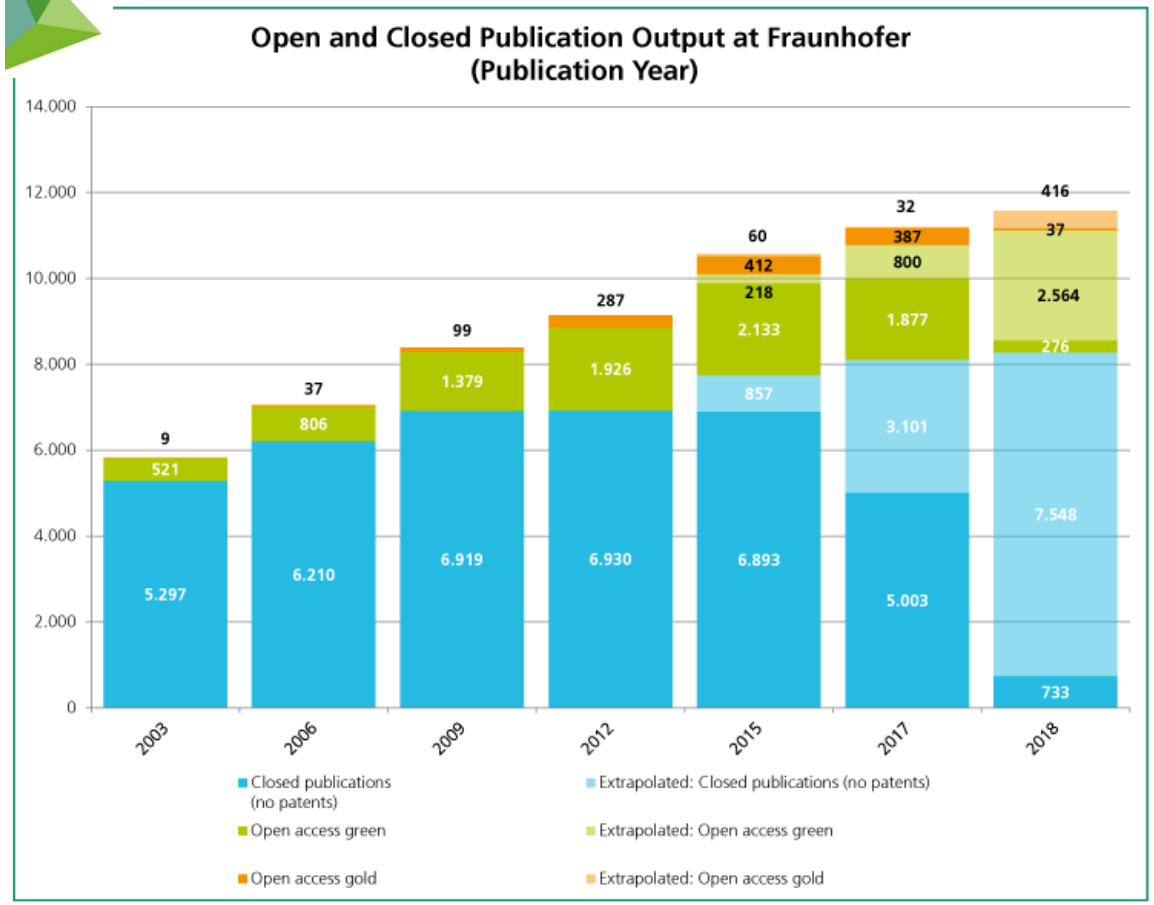
- 2003: among first signatories of Berlin declaration
  early phase of information and community engagement, stakeholder assessment…
- 2006: Fraunhofer-Publica: Open Access view »Fraunhofer-ePrints« [5]
  DINI-certificate, first steps of an Open Access infrastructure, communication concept…
- 2009: Open Access Policy, introduction af a central support team
  Company wide wiki, brochures, information talks & workshops, congresses…
- 2012: Extended publication support, deposit workflows, community engangement
  H2020, OA-publication analysis (top ten journals per institute)…
- 2015: Open Access Strategy and Goals: 2020->50% OA, OA Rate is reported to Ministry
  publication process as a business process, disemmination strategies… [6]
- 2018: Consolidation of OA- management, own OA-research projects
  project „OA- Transformation“, central publication fund, ORCID, Open APC…[7]

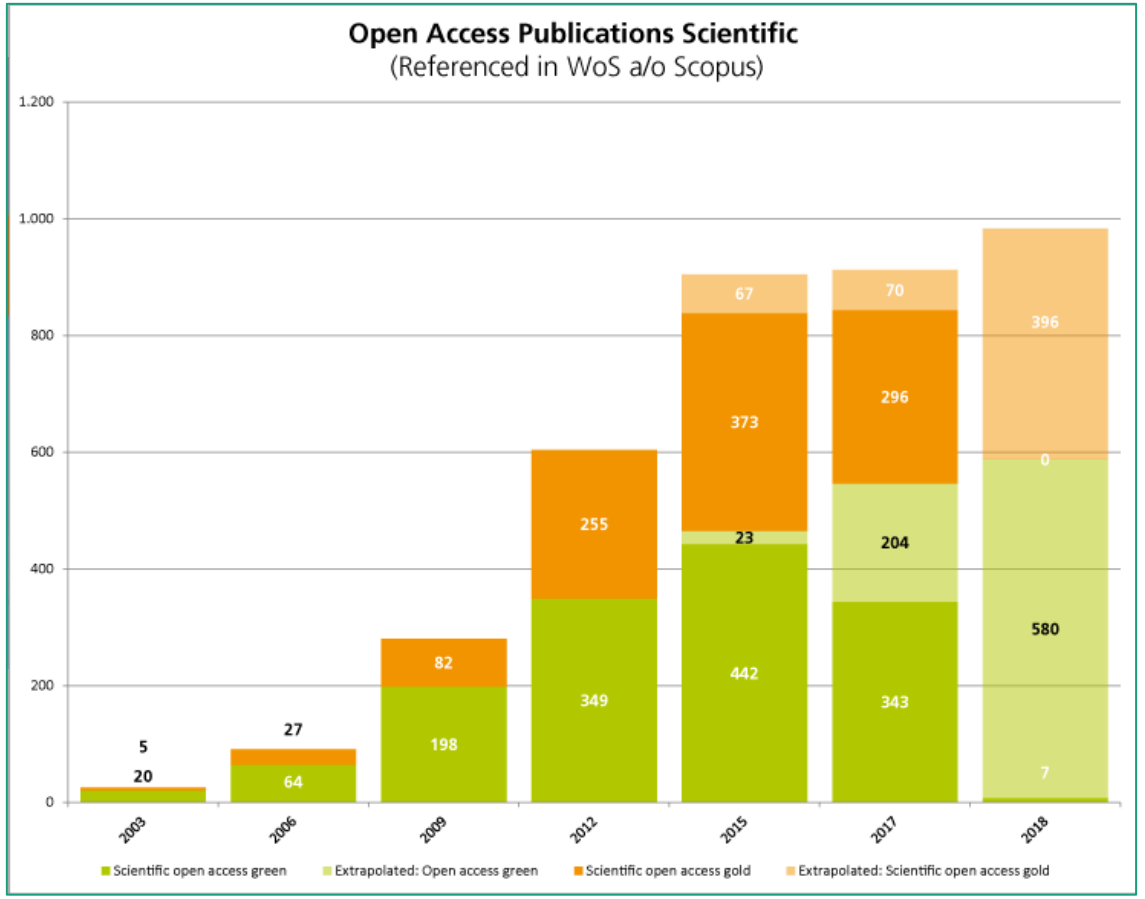
Open Access development



www.openaccess.fraunhofer.de

Open Access development





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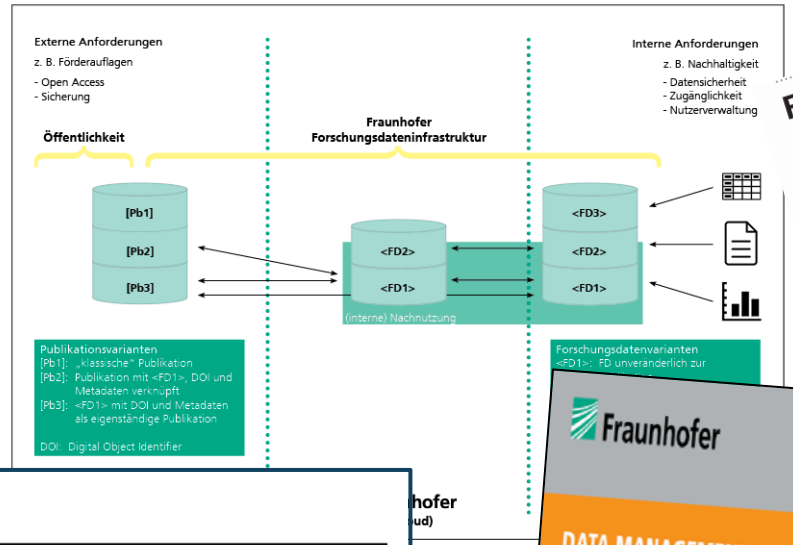
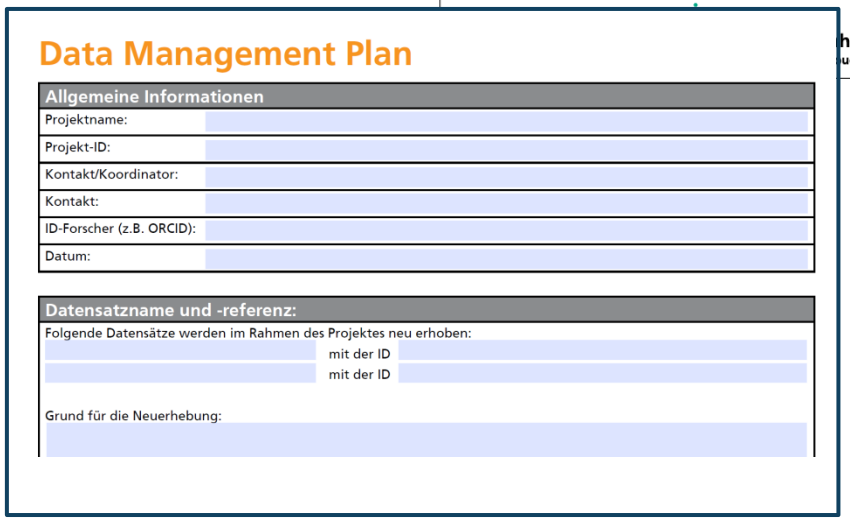
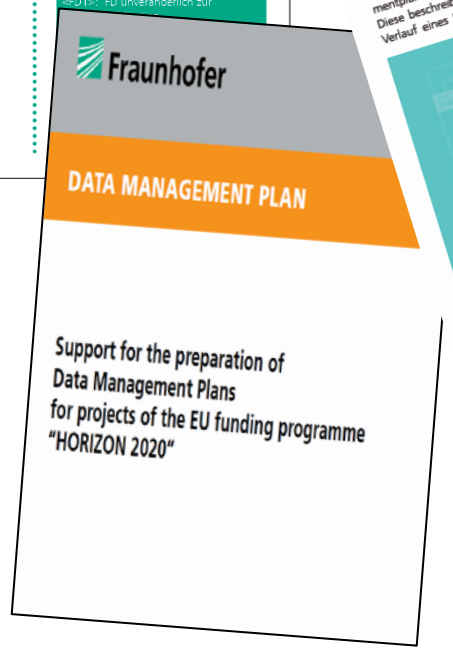
Open Data

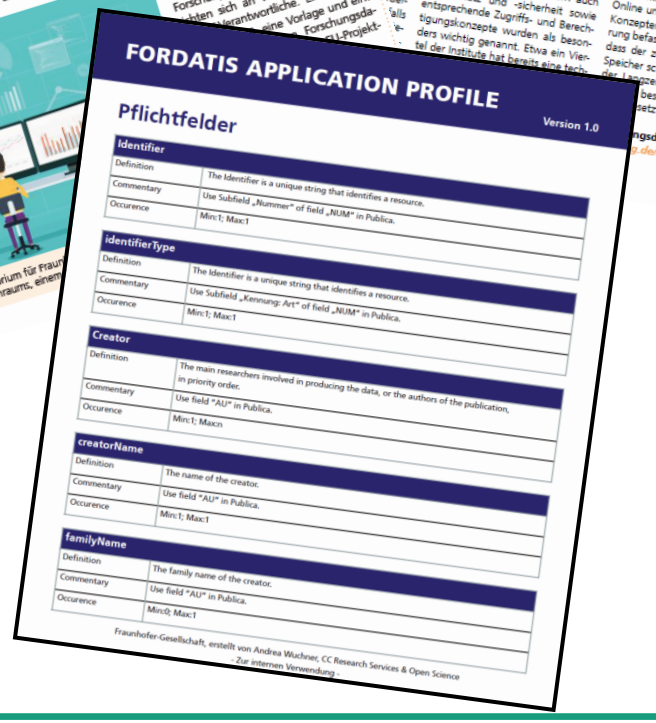
- 2014: H2020 Open data pilot | DFG Guidelines on the Handling of Research Data [8]:
  infrastructure expansion plan, information and community engagement…
- 2015: Evaluation project research data management
  FODRATIS concept and internal fundraising…
- 2016: FORDATIS project gets a go along with H2020 Research Project JERRI
  information & support structures, first aid kit DMP, Fraunhofer wide survey [9] …
- 2017: Extended publication support, deposit workflows, community engagement
  Implementation preparations for expansion of repository infrastructure…
- 2018: Information workshops and training on research data management
  DSpace Implementation ongoing, JERRI results will help with institutionalization…

Open Data









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Fraunhofer Open Science Infratructure

INPUT

OUTPUT

Livecycle & Processes

1 2 3

controling >>>
collection >>>
curation >>>

Fraunhofer Dataspace

Research data

ERP
administrative data

Deposit & Submission

aided >>>
automated >>>
authorized >>>

Library Services @ Fraunhofer

eLib
discovery
resolving

OPAC
library
information
systems

Fraunhofer Publishing House

books, ebooks

editing >>>
printing >>>
distributing >>>

Fraunhofer virtual private cloud

DSpace farm

FIS
CRIS
scientific
indicators

validation >>>
enrichment >>>
standardisation >>>

Publica
bibliography
patents
search

ePrints
Open Access
full texts
search

Fordatis
Open Data
data sets
search

reports

analysis

Gitlab
scientific
software
search

Fraunhofer Open Science Space

FAIR

search / discover
scientific results

Google
BASE

OpenAIRE
ORCID

Reports & Analysis

FHG

Fraunhofer
internal & external

Distribution & Marketing

Fraunhofer websites
publication lists,
project lists,
other

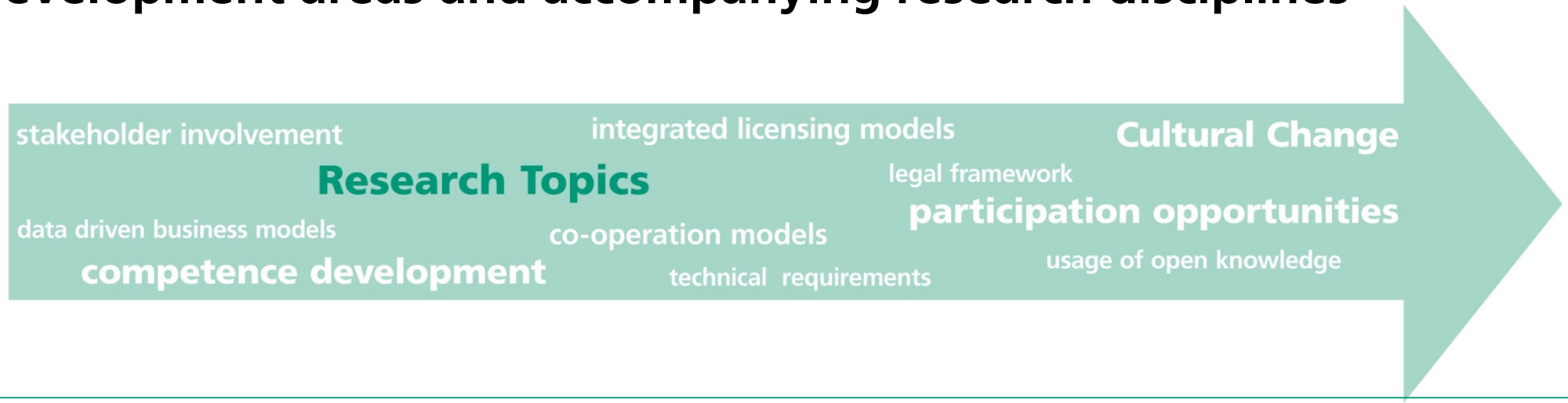
Exploitation & Impact

innovation
commercialization
societal impact

Open Science as a research topic

- 2017: new Fraunhofer Group for Innovation Research socioeconomic and sociotechnical research, providing guidance to decision-makers in politics and industry [10]
  - JERRI (H2020 Project): www.jerri-project.eu (together with TNO) aims to contribute to deeply institutionalizing practices and attitudes of Responsible Research and Innovation (RRI) in 5 key dimensions (dimension 3: Open Access / Open Data), focus on RTOs needs extensive reports on our deliverables online [10]
  - HEFE Project (funded by German Ministry of Education and Research) aims to develop data governance for analytic, planning and real time data
  - Citizen Sensor (funded by German Ministry of Education and Research) aims to develop a white book of citizen science [11]

Development areas and accompanying research disciplines



computer science

library information science

communication science

economics

sociology

legal norms

science of science

Political science

bibliometrics

psychology

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CONCLUSIONS

- RTOs have very specific needs and perspectives to implement Open Science
  The benefits start to become clearer but the change at RTOs is just beginning
  Our Motto will be: „AS OPEN AS POSSIBLE AND AS CLOSED AS NECESSARY!“
- Our academic side pushes us to quickly realize Open Science
  with infrastructure uptake, the process will accelerate even more
- Open Access and Open Data mechanics are not yet fully understood by our scientists
  we need to start over explaining and not cease to explain and support our scientist
- The need for research intelligence information to support management is growing
  CRIS systems have multiple uses, can aid both CR, BI and research marketing
- Open Science development is too scattered and lacks overall plan
  many local initiatives, no central steering, no true stakeholder engagement
- Open Science merit system is missing but would help (OA rate per institute, author, …)
  The scholarly world is still running on the old merit system (bibliometric factors)

CONTACT

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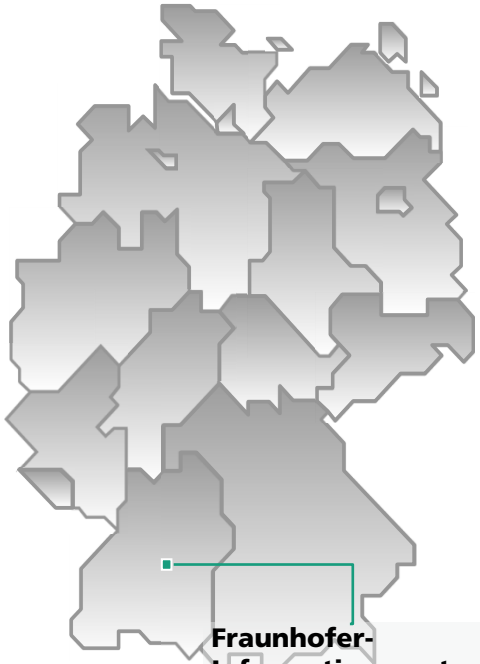
CC Research Services & Open Science

Expertise:

- Open Science @ Fraunhofer
- Indicators
- Dissemination-strategies
- Publication Support
- Repository Managment
- Community Engagement



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THANK YOU!

Tack så mycket!

Danke!

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References

[1] http://www.standortkarte.fraunhofer.de/main.jsp?lang=en&topic=institutes&topicvalue=&focus=germany&focusvalue=
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