



FIZ Karlsruhe

Leibniz Institute for Information Infrastructure

ADVANCING SCIENCE

ANNUAL REPORT

20

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ADVANCING SCIENCE

ANNUAL REPORT

**20
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Prof. Dr. Wolfram Horstmann,
President & CEO, FIZ Karlsruhe

Dear readers,

Science thrives on open exchange, reliable infrastructure, and the responsible use of new technologies. This annual report shows how FIZ Karlsruhe brought these principles to life in the reporting year. Whether in artificial intelligence, which has become deeply embedded in everyday social and scientific life, the international open science movement, whose role is being redefined in times of major geopolitical shifts, or in the sustainable design of data-driven infrastructures and research. Our aim is not only to provide and further develop scientific information, but also to respond to scientific, social, and political changes.

A particular focus was placed on openness and sustainability in science. Our contributions to the Barcelona Declaration, the continuous growth of zbMATH Open and RADAR, and our involvement in the NFDI illustrate that sustainable information infrastructures can only succeed through the cooperation of many players. At the same time, we have provided important impetus for quality, integrity, and legal certainty in science with studies on publication manipulation in mathematics, ethical and legal issues of AI and data science, and Creative Commons licenses.

Artificial intelligence was once again a key topic this year. We participated in the European discussion on the regulation of universal AI models and at the same time demonstrated the potential that AI can offer for science and society. This ranges from the digital indexing of historical files for dealing with Nazi injustice to new forms of analysis and use of large data sets. In this way, we combine technological innovation with social responsibility.

My thanks go to all our employees, whose expertise, commitment, and curiosity make this work possible. Together with our partners, we will continue to work to make knowledge accessible, trustworthy, and effective.

I invite you to view this annual report as an insight into our work and an invitation to dialogue.

Enjoy reading!

Yours

President & CEO FIZ Karlsruhe

1

AT A GLANCE

1.1 MISSION AND OVERALL CONCEPT 9

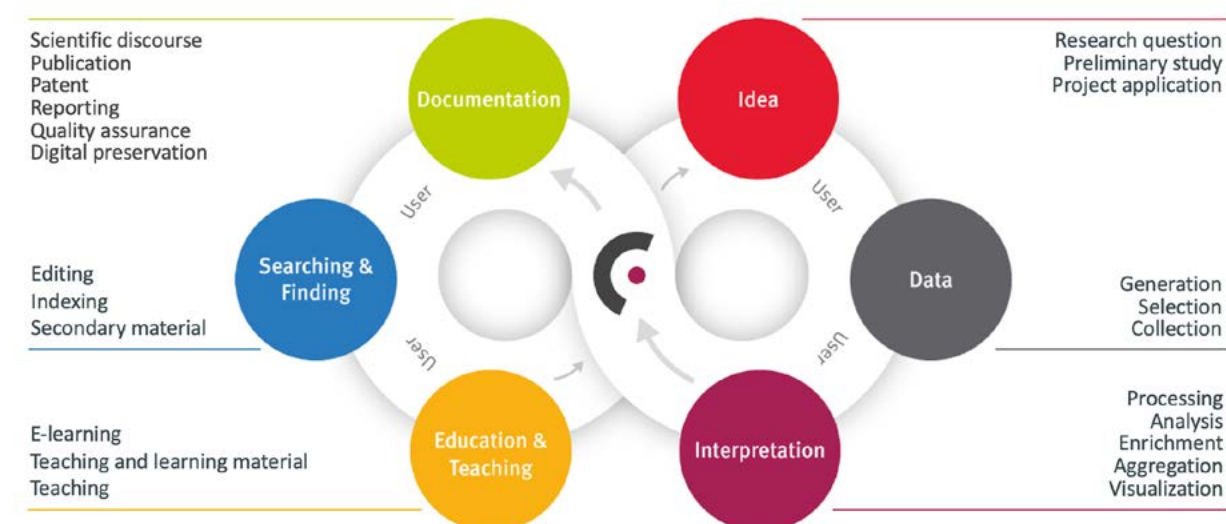
1.2 FACTS AND FIGURES 14

1.1 MISSION AND OVERALL CONCEPT

FIZ Karlsruhe – Leibniz Institute for Information Infrastructure GmbH is one of the largest non-university infrastructure facilities for scientific information in Germany. Our statutory mission is:

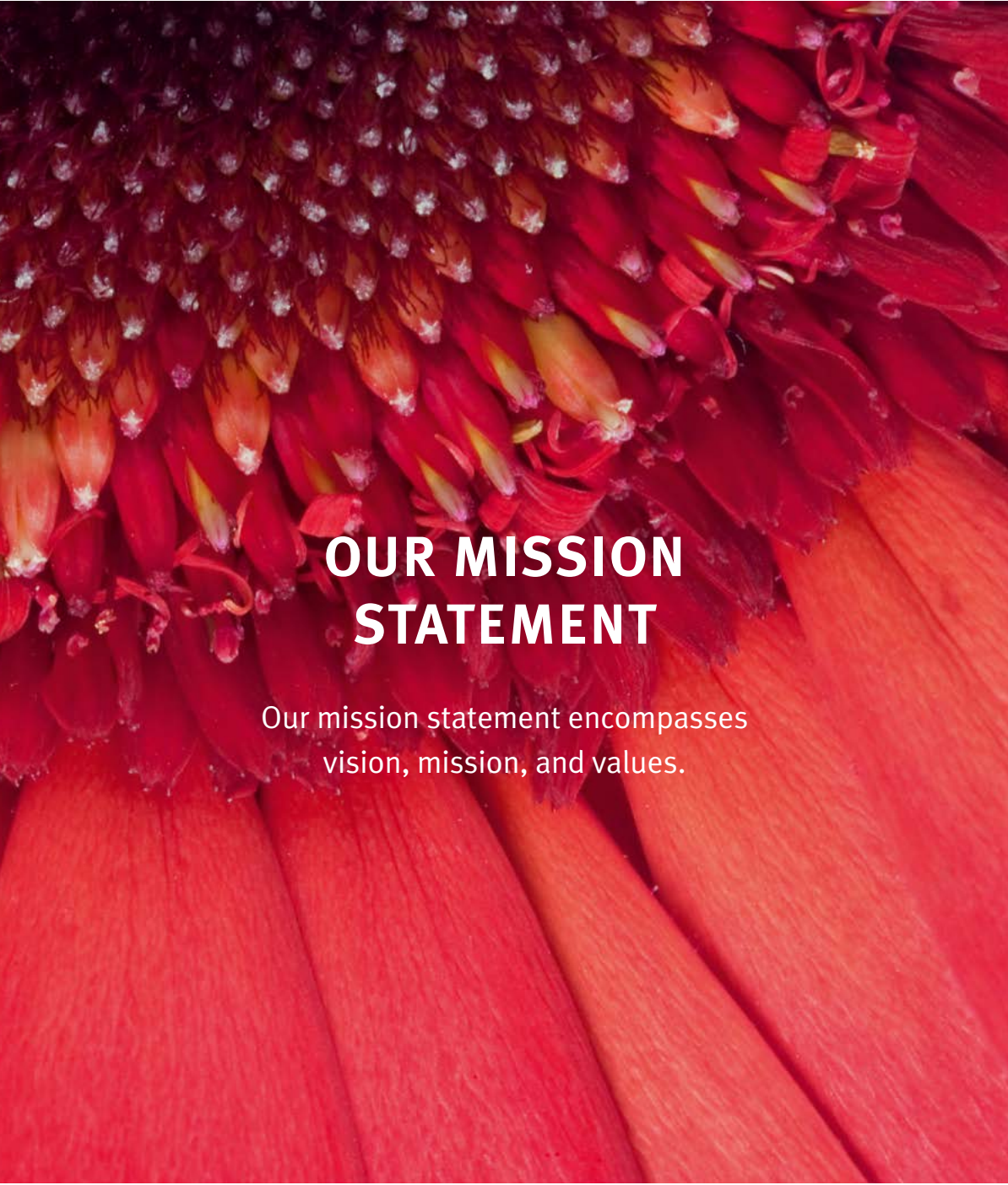
»... "to provide science and research with scientific information, to develop corresponding products and services [...] and to make them publicly available. To this end, it [the company] also carries out its own research and development projects. The aim is to strengthen national and international knowledge transfer and to support innovation and cooperation *in science and research*«^{*}

We understand »information infrastructure« as the totality of people, processes, and technologies that enable knowledge to be generated, disseminated, and preserved. Therefore, our overall strategy is to support the scientific value creation cycle – from the idea to data and evaluations to the dissemination and enrichment of scientific information (see Fig. 1).



Supporting the entire scientific value creation cycle

^{*} Articles of Association of FIZ Karlsruhe, version dated July 28, 2017, Section 2, Paragraph 1.



»Actors in the science and innovation system have reliable access to all digital information and tools relevant to them at any time and anywhere.«



We research, develop, and operate methods, processes, and services for a sustainable information infrastructure.

We offer data, information, knowledge, software, and services via open and legally compliant platforms.

We make them discoverable, accessible, interoperable, and reusable.

We support the value creation process in science and innovation at all levels.

We enable research questions to be answered and new ones to be asked. In doing so, we follow our »Advancing Science« motto.



Responsibility
determines our actions both internally and externally.

Respect
means mutual respect and trust, fairness, and recognition.

Integrity
ensures our credibility both within and outside the company.

Quality
is a central aspect of our work.

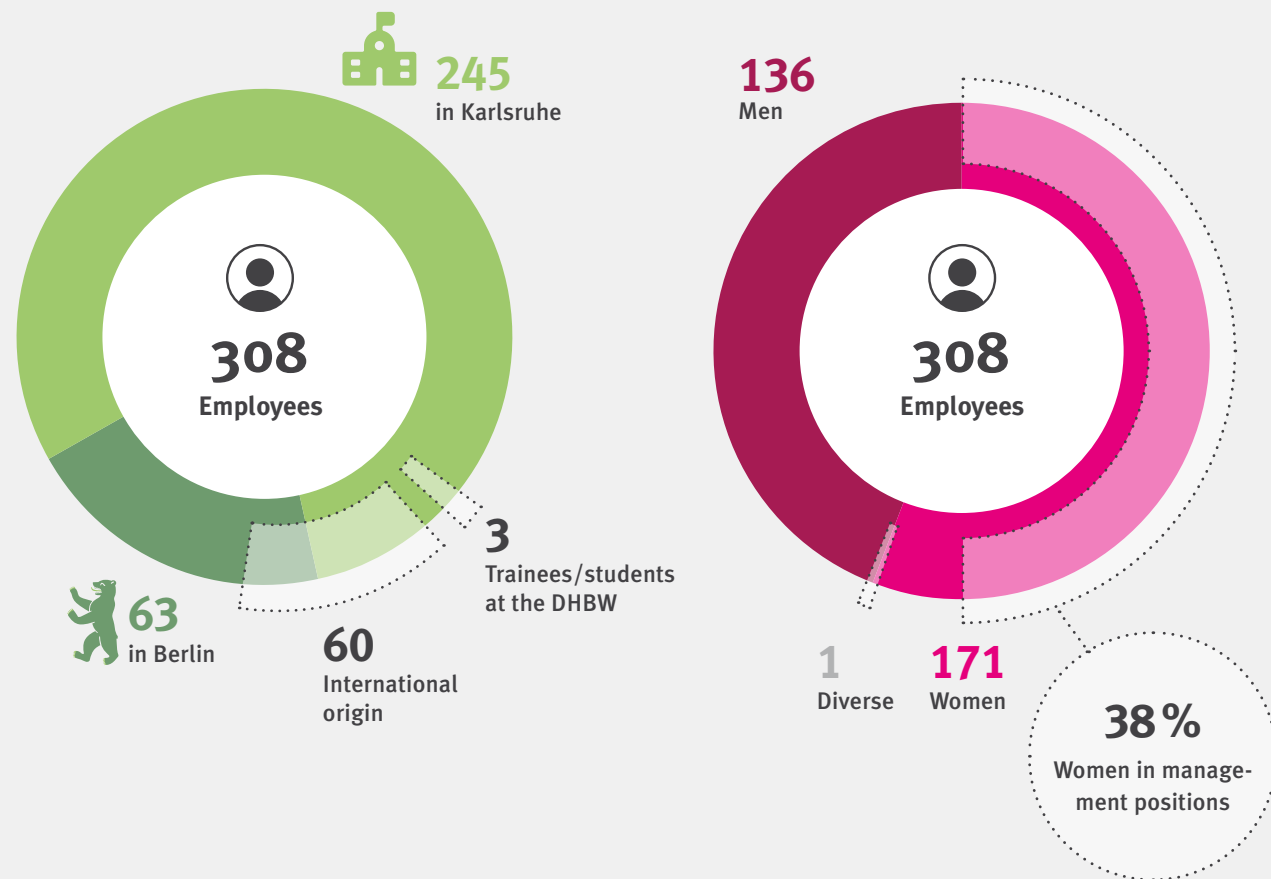
Openness
characterizes our attitude towards new ideas and those who bring them forward.



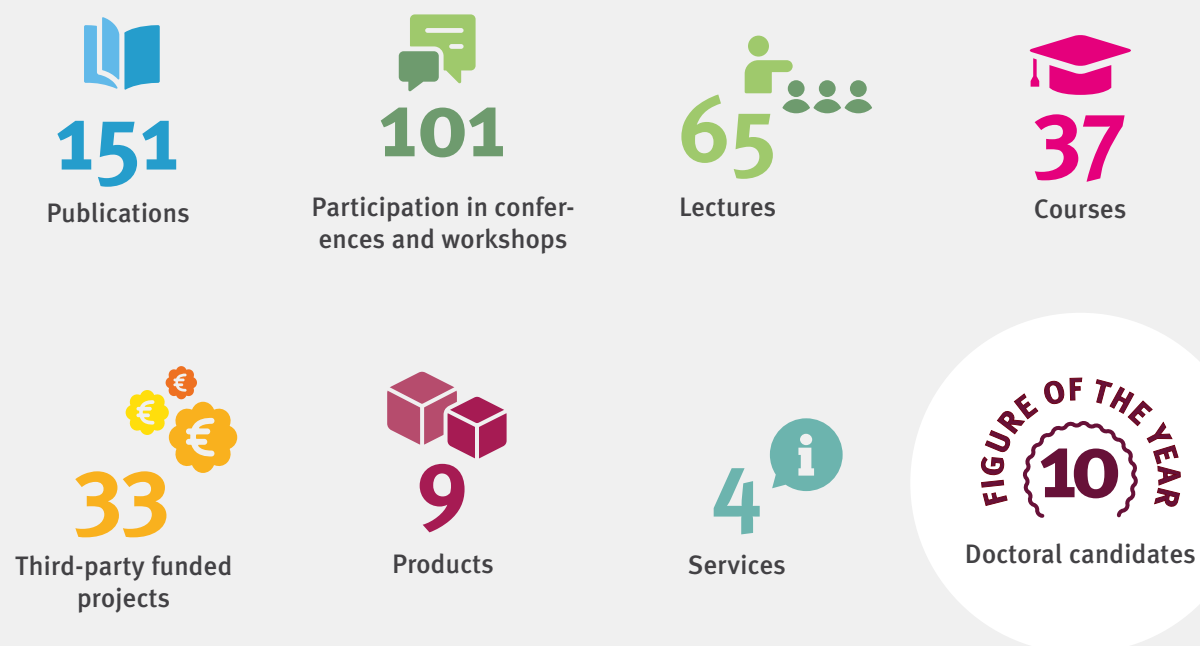
PORTFOLIO STRATEGY	We are expanding our portfolio of services to include services for additional scientific fields. We are improving existing services and developing new ones for the retrieval, analysis, and networking of information. We are strengthening the use of patent information in the academic environment through new projects and products.
RESEARCH STRATEGY	We are continuing to expand our research in all areas. This enables us to create innovations for existing and new services. We are strengthening our transfer services and contributing our legal, AI, and IT expertise to the public discourse.
AGILITY STRATEGY	We operate as a flexible and fast-moving organization so that we can respond to the dynamics of our entire environment. We optimize our digitalized processes and make them more adaptable and resilient to new or unplanned developments.
OPENNESS STRATEGY	We are developing our services – taking into account the prevailing conditions – toward open, networked platforms. We are strengthening our open policy (open access/open source/open science) and expanding our science communication.
COOPERATION STRATEGY	We strengthen our networking with partners in science and industry. We enter into new types of cooperation with our existing and future partners and adjust roles and responsibilities as necessary.
SUSTAINABILITY STRATEGY	We are committed to the fundamental principles of sustainability. We handle material and non-material resources responsibly. We consider sustainability in our decision-making processes. We are developing into a climate-neutral institution.

1.2 FACTS & FIGURES

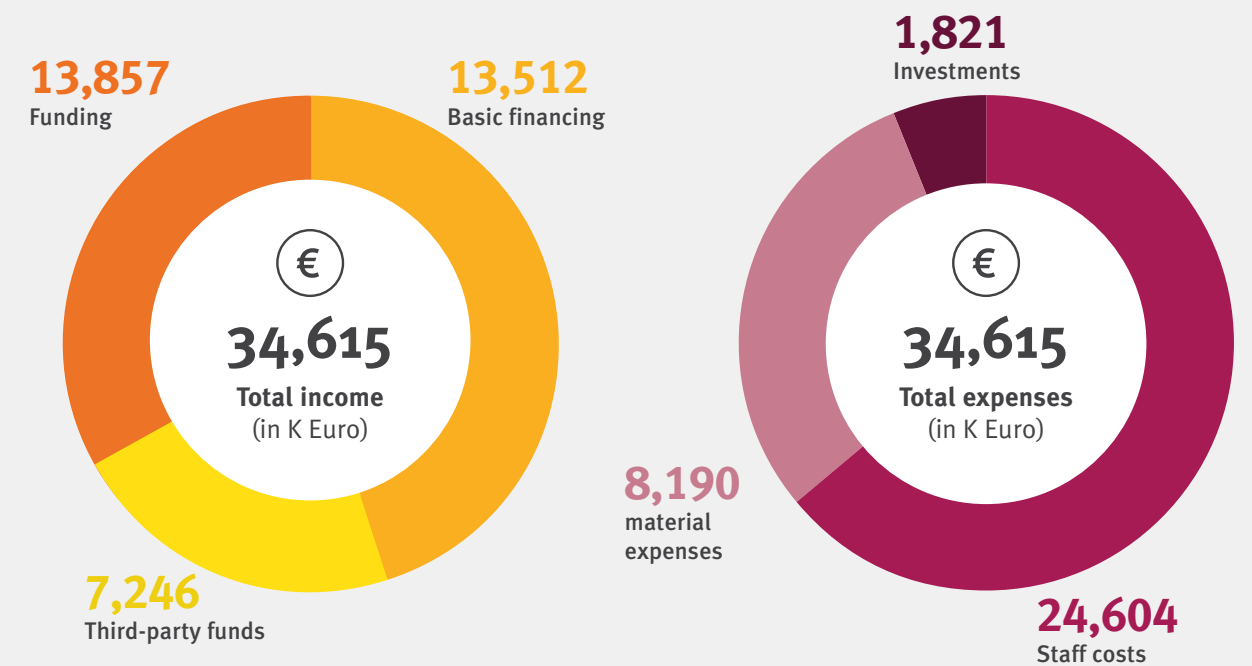
STAFF



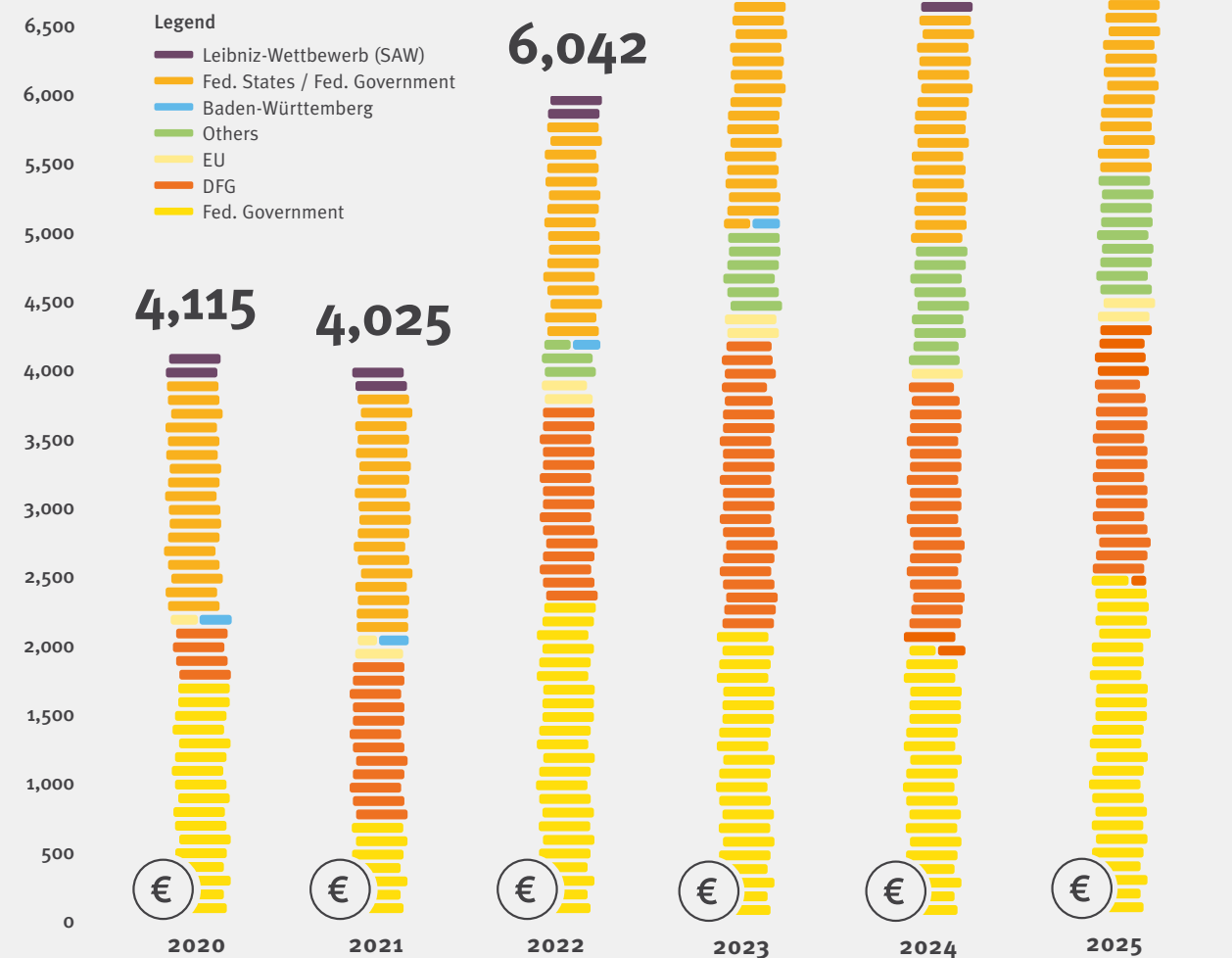
SERVICES



FINANCING 2024



Development of third-party funds by source (in K Euro)



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THE INSTITUTE

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3.1 ORGANIZATIONAL STRUCTURE

Our institute is undergoing dynamic development. We are strengthening our scientific focus while diversifying our portfolio. Accordingly, we regularly adapt our organizational structure to these internal and external developments.

The work is carried out in four »Program units« (see also organizational chart), in which we implement our overall strategy.

- 1 Patent & Scientific Information**
Information services to support research, innovation, and patenting processes
- 2 Subject-Specific Services**
Information services for the fields of mathematics, crystallography, and energy
- 3 e-Research**
Infrastructure-oriented services in research data management and the digital humanities

- 4 Information Service Engineering**
Research in the fields of symbolic knowledge representation, machine learning, and AI.

- 5 Intellectual Property Rights**
Research on data privacy, data law, and copyright law.

The program units are supported by two service units that work across the FIZ to support all activities:

- 6 IT Systems and Data Networks**
- 7 Administration.**

ORGANIZATIONAL CHART

with organizational units and fields of work/research

December 2025

Works Council

Special Representatives

- Budget
- Data Protection
- Equal Rights
- Fraud Detection & Prevention
- Inclusion
- Information Security
- Ombudsperson
- Sustainability

Internal Audit

Scientific Advisory Board
Prof. Dr. Wolfgang E. Nagel

Staff Unit

- Chief Information Officer (CIO)
Matthias Razum
- Communications
Dr. Babett Bolle
- Project Management Office
Dr. Christiane Noe
- Sustainability Officer/CSR
Micaela Münter

ShareholderRepresentatives Board

Supervisory BoardMinR'in
Marion Steinberger (BMFTR)

President & CEOProf. Dr.
Wolfram Horstmann

ExecutiveManagement Team

Research and Projects
Prof. Dr. Harald Sack

Sustainability Committee
Micaela Münter

Legend

Division

Department

Team

PROGRAM UNIT 1	PROGRAM UNIT 2	PROGRAM UNIT 3	PROGRAM UNIT 4	PROGRAM UNIT 5	SERVICE UNIT
Patent & Scientific Information Dr. Josef Eiblmaier Requirements Analysis & Product Management Dr. Birgit Knauer Data Analysis & Management Martin Hengesbach - Database Development - ETL Development FizPro - Mapping Service Development & Operations Sebastian Wanisch - Cooperative Development - STN Operations - Services & Projects Customer Relations & Support Dr. Elke Müller - Helpdesk & Search Service - Customer Agreements - Training & Sales Patents4Science Dr. Hidir Aras	Subject-Specific Services Silke Rehme Editorial Silke Rehme (interim.) Mathematics Dr. Olaf Teschke - Development & Systems zbMATH Open - Editorial, Data Processing & Indexing Research & Projects Mathematics Dr. Moritz Schubotz Crystallography Silke Rehme	e-Research Matthias Razum e-Humanities Frank Schwichtenberg Research Data Dr. Felix Bach	Information Service Engineering Prof. Dr. Harald Sack Knowledge Graphs Dr. Jörg Waitelonis Machine Learning Dr. Genet Asefa Gesese	Intellectual Property Rights Prof. Dr. Franziska Boehm Data Protection Dr. Diana Dimitrova Intellectual Property Dr. Dr. Grischka Petri	IT Systems & Data Networks Hans-Jürgen Rudolph - Server & Storage - Data Networks & IT Security - Internal Services - Desktop Services Administration Andreas Schwartz Finance Viola Fina - Customer Management - Financial Accounting Controlling Michael Balzer Human Resources/ Facility Management Nadine Lambert Legal Counsel Michael-Olivier Müller

3.2 COMMITTEES

The committees have an advisory function and support the President & CEO and the executive management team in decisions of cross-institutional relevance. They are composed of members from different departments and locations. The four committees currently support the management of FIZ Karlsruhe in all important cross-institutional strategy, planning, and decision-making processes. Their members come from all hierarchical levels. They are thus also an essential element of our participatory management culture.



Research and Projects Committee

The Research and Projects Committee coordinates research strategy, planning, and crossdepartmental networking. Each department provides information on ongoing projects, thereby improving transparency and external communication. The integration of science communication enhances the visibility of research.

Early exchange with the Project Management Office and third-party funding management facilitates planning. Important topics include the internal coordination of NFDI activities and the coordination of cross-consortium tasks in order to leverage synergies. One focus in 2025 was the cross-departmental coordination of submissions for the DFG call for proposals »Data Corpora for AI.«



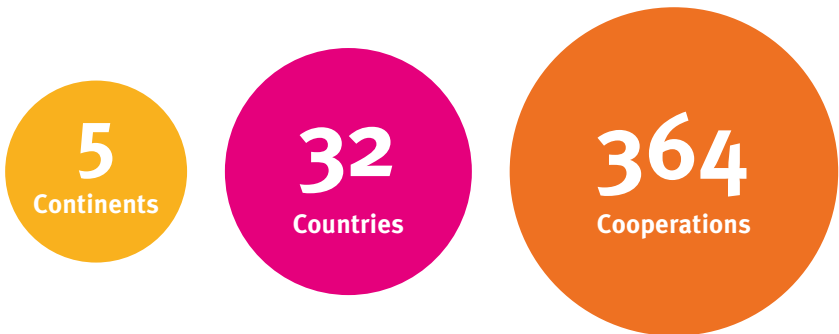
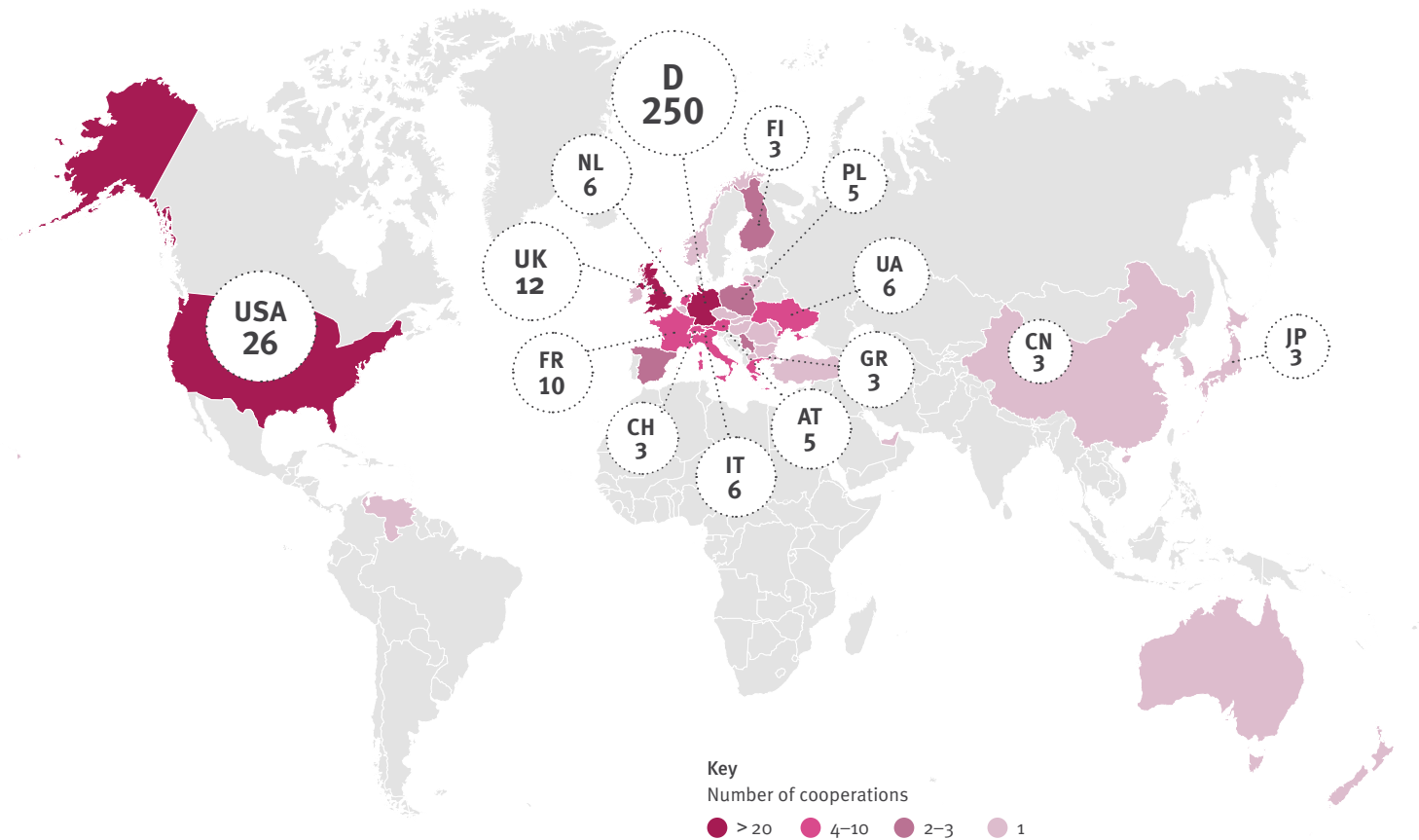
Sustainability Committee

The Sustainability Committee supports and coordinates the complex topic of sustainability. Its goal is to support and guide the cross-departmental transfer process at FIZ Karlsruhe toward becoming a sustainable institution. The committee oversees the conceptual preparation of reporting and supports the Sustainability Officer in compiling the sustainability report, which is available for download on the FIZ Karlsruhe website.

In addition, the committee deals with energy-saving measures, such as renovation measures and the use of renewable energies, as well as issues relating to sustainable procurement and disposal and social topics. Last year, for example, one focus of its work was the analysis of the Energy Efficiency Act and its impact on and requirements for FIZ Karlsruhe. A key issue is how sustainability can be more strongly integrated into the corporate culture.

3.3 COOPERATIONS

To achieve our strategic goals, we maintain numerous cooperative and business relationships with renowned research institutions, internationally important information providers, publishers, and domestic and foreign users in science and industry.

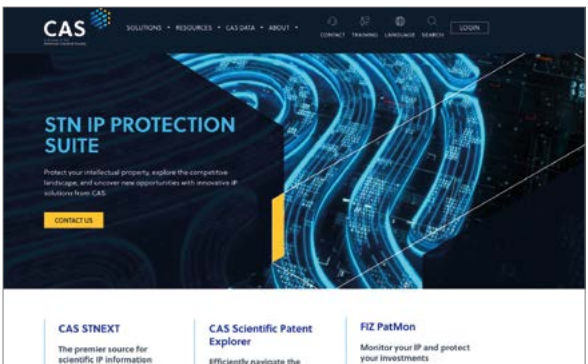


In cooperation with universities, non-university research institutions, and scientific societies, we conduct research on current topics related to information infrastructure in research and development projects. Furthermore, we develop and test innovative concepts with the aim of developing new, research-based services for science. We place particular emphasis on transfer in line with the goals of the Leibniz Association and our statutory mission. Our networking is also reflected

in the global network of approximately 8,000 reviewers in mathematics and a steadily growing community in the context of the zbMATH Open information service. Activities in the two research areas of Information Service Engineering (ISE) and Intellectual Property Rights (IGR) strengthen cooperation in the scientific field in general, as well as with the Karlsruhe Institute of Technology (KIT), with which the corresponding joint appointments, courses, and projects have been realized.

The following cooperation and business partners are of particular strategic relevance (in alphabetical order):

CAS (CHEMICAL ABSTRACTS SERVICE)



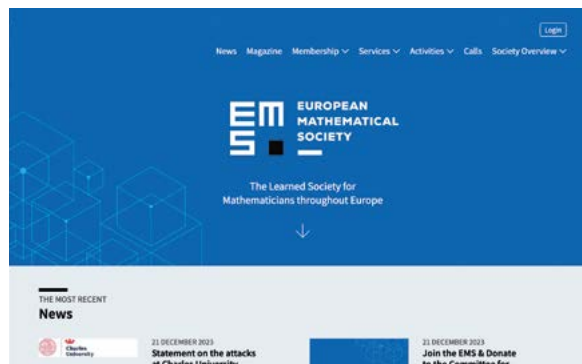
CAS and FIZ Karlsruhe have strategically realigned their partnership, which has been in place since 1984, with a new cooperation agreement at the beginning of 2022 to secure the future of STN and work on joint projects beyond STN. In accordance with the long-term roles and responsibilities agreed upon, CAS will assume commercial responsibility toward customers and database suppliers, while FIZ Karlsruhe will focus on data and product management in the field of scientific and patent information, sales and customer support, and the development of new services based on joint research-related projects.

GERMAN NATIONAL LIBRARY (DNB)



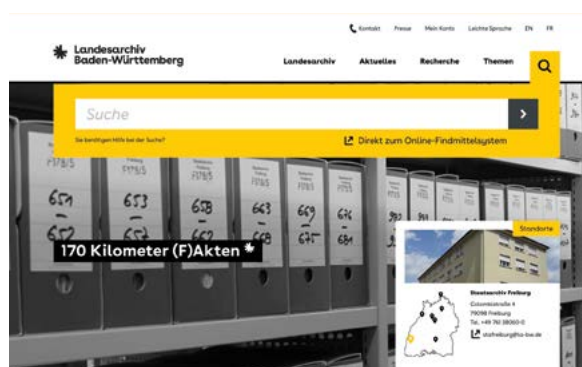
Together with the DNB (and the Prussian Cultural Heritage Foundation), we operate the German Digital Library (DDB) as part of a trilateral public-public partnership. The aim of the DDB is to provide free access to Germany's cultural and scientific heritage via the Internet. As a central national portal, the DDB aims to link the digital offerings of all German cultural and scientific institutions. In addition, we cooperate in several NFDI consortia (NFDI4Culture, Text+, NFDI4Memory) and in joint DFG projects.

EUROPEAN MATHEMATICAL SOCIETY (EMS)



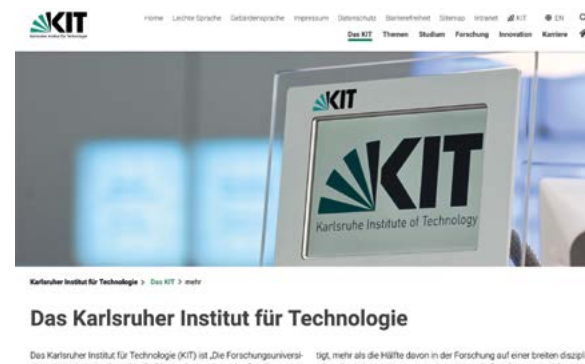
The EMS publishes zbMATH Open in collaboration with FIZ Karlsruhe and the Heidelberg Academy of Sciences. The collaboration with the EMS ensures the quality of the platform, strengthens its roots in the European mathematics community, and promotes its expansion. In addition, this experience is incorporated into the EMS guidelines for scientific publishing. FIZ Karlsruhe also plays a key role in the work of the society through its chairmanship and membership in several EMS committees.

STATE ARCHIVE BADEN-WÜRTTEMBERG (LABW)



The LABW preserves, catalogs, and utilizes historical and socially significant collections beyond the borders of Baden-Württemberg. For years, it has been cooperating with FIZ Karlsruhe in research and development projects, such as the Archivportal-D, thematic portals on Nazi injustice and right-wing violence, and the development of a new archival information system in a public-private partnership.

KIT (KARLSRUHE INSTITUTE OF TECHNOLOGY)



FIZ Karlsruhe and KIT cooperate closely in research and teaching, e.g., through two jointly appointed W3 professorships in ISE and IGR and numerous courses. The collaboration extends to e-research solutions such as RADAR and has been further strengthened through projects and the NFDI. The Leibniz Science Campus DiTraRe will expand the partnership and strengthen Baden-Württemberg as a center of science.

LEIBNIZ-INSTITUT FÜR WERKSTOFFORIENTIERTE TECHNOLOGIEN (IWT)



Leibniz-IWT in Bremen conducts research in the field of new materials, new processes, and optimized components. We cooperate with IWT in the Leibniz Research Alliance »Advanced Materials Safety,« the projects »MaterialDigital« and »Patents4Science,« and in the NFDI consortium NFDI-MatWerk; follow-up projects are also planned.

3.4 CROSS-SECTOR ACTIVITIES

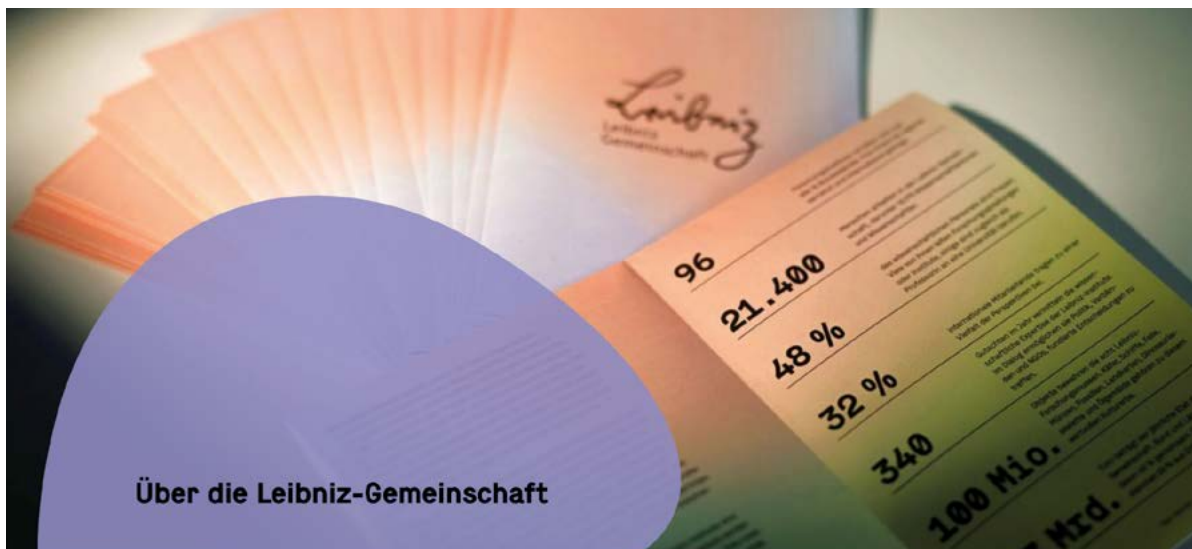
We can only achieve our goal of providing the best possible information infrastructure for research in industry and science by working together with other partners in an (inter)national network. That is why we are involved in cross-disciplinary committees, initiatives, and policy consulting in order to further promote networking – in line with our guiding principle of »Advancing Science«.

NATIONAL RESEARCH DATA INFRASTRUCTURE (NFDI)

The National Research Data Infrastructure (NFDI) systematically catalogs scientific and research data, secures it for the long term, makes it accessible, and connects it (inter)nationally. It was created in a science-led process as a networked structure of subject-oriented consortia. With expertise

in our three research-based fields of research data management, knowledge graphs, and law (copyright and data protection law), FIZ Karlsruhe is a partner in nine of the 27 consortia approved by the Joint Science Conference.





LEIBNIZ ASSOCIATION AND SCIENCE SYSTEM

Within the Leibniz Association, we participate in various initiatives to support the strategic goals of the Leibniz Association and advise the Presidium and committees.



INTERNATIONAL ACTIVITIES AND EUROPEAN UNION

At the international level, FIZ Karlsruhe employees are involved in numerous scientific and legal committees and working groups.

3

THE PROGRAM AND SERVICE AREAS

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4.1 PATENT & SCIENTIFIC INFORMATION

In the Patent & Scientific Information (PSI) program unit, we develop and operate information services to support research, innovation, and patenting processes.

Our services include the analysis, structuring, and indexing of information from scientific publications and patents. We also conduct research into new methods of knowledge extraction and networking. We offer scientific and technical consulting to our international customers. Our target groups include companies and research institutions in industry and science.

The range of tasks includes:

- Tasks related to the development and operation of the CAS STNext® information service in cooperation with our US partner CAS, as well as projects for the evaluation and development of new services
- Establishment of an innovative Patents4Science information infrastructure geared toward the scientific use of patents
- Activities in the Bibliometrics Competence Network to establish bibliometric databases and develop bibliometric analysis tools.

STN

STN is a key service of the program unit. Trustworthy, quality-assured information is the basis for business-critical decisions in research, e.g., when it comes to developing new drugs. Patent and information experts in global companies in the chemical, pharmaceutical, and technology industries, in patent law firms, in patent offices, and in research institutions use STN as one of their key sources of knowledge for economically and legally relevant issues.

In our collaboration with CAS on the operation and further development of the STN system, we focus on these three areas:

- Data and product management of scientific and patent information
- Support for customers in EMEA (EMEA Customer Center), also through the search service (CAS IP Service EMEA), support for sales, and
- Development of new services, e.g., research-based R&D projects using AI applications.



»The flood of information from patents and scientific publications is growing rapidly. At the same time, new technologies are emerging that we use to generate comprehensible and networked knowledge for research and innovation.«

Dr. Josef Eiblmaier, Vice President Patent & Scientific Information

PATENTS₄SCIENCE

In the »Patents₄Science« research area, we work on innovative approaches using artificial intelligence (AI) and develop new methods and processes to better semantically extract the knowledge contained in patents and link it to other sources of information, such as scientific literature or subject-specific data. Our goal is to provide researchers in university and non-university environments with simple, efficient, and sustainable access to patent knowledge via dedicated information services.

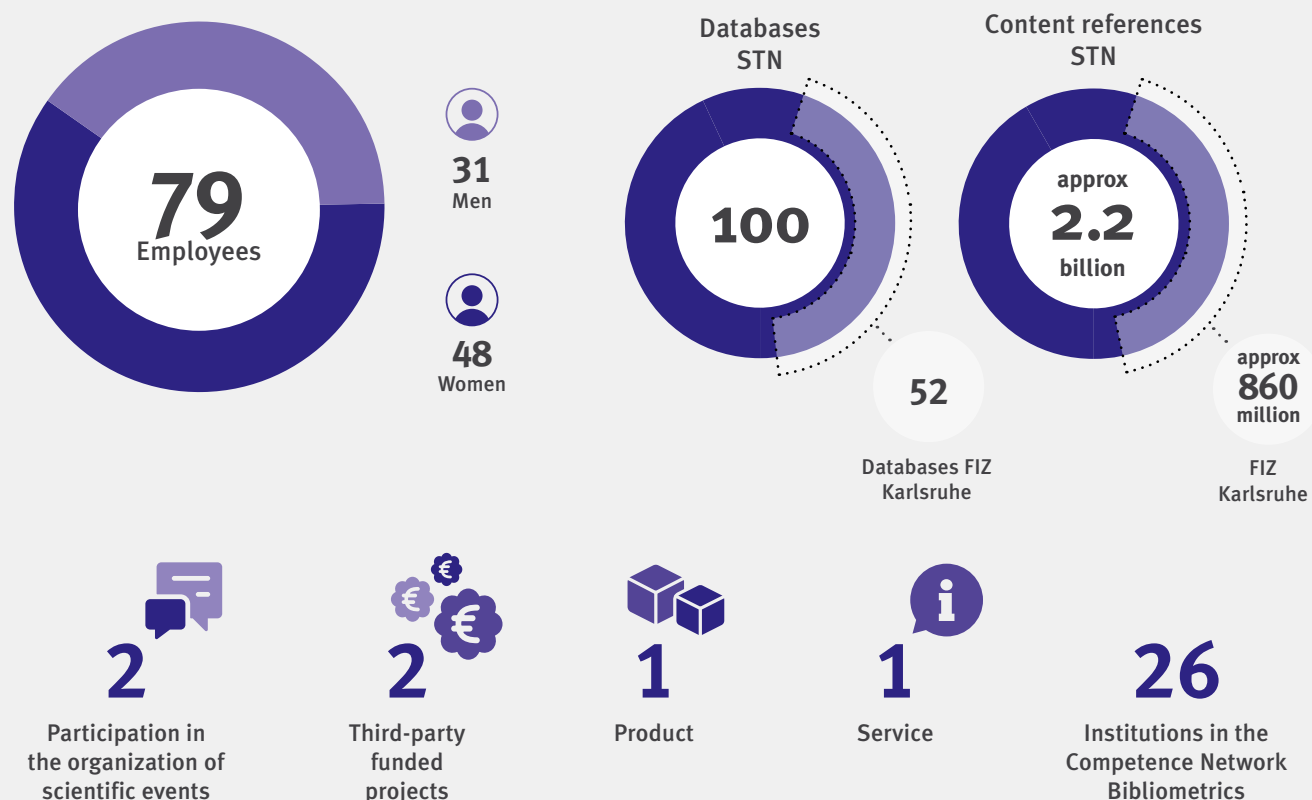
COMPETENCE NETWORK BIBLIOMETRICS

The third focus of the program unit »Patent & Scientific Information« represents the activities in the Bibliometrics Competence Network (KB). The scientific publication system is one of the central sources through which the dissemination and validation of scientific findings is organized. Bibliometrics uses the information about authors, journals, institutions, sponsors, and topics that is generated during the publication process and transforms it into indicators, structural representations, and key figures.

4.2 SUBJECT-SPECIFIC SERVICES

In the **Subject-Specific Services (FS)** program unit, we develop and operate globally recognized information services for the fields of mathematics, crystallography, and energy. To this end, we index and aggregate relevant sources. All services are aimed at scientists in research.

PATENT & SCIENTIFIC INFORMATION IN FIGURES



Our two core products are zbMATH Open and ICSD (Inorganic Crystal Structure Database). These are regarded by the respective scientific communities as high-quality, comprehensive, and indispensable sources of knowledge for their research processes.

CRISTALLOGRAPHY

ICSD is an information service in the field of crystallography with the world's largest database of fully determined inorganic crystal structures and complementary simulation and visualization tools. Crystal structures have a significant influence on the physical properties of a compound. Therefore, the further development of the product focused, among other things, on making relevant structures as comprehensive as possible and linking them to external sources that offer additional information on chemical and physical properties.

MATHEMATICS

zbMATH Open is an international, open, and free service for mathematics that provides uninterrupted access to the world's mathematical research literature published since 1868. It contains nearly five million bibliographic entries with reviews or abstracts. In addition to publications, zbMATH Open provides information about authors and their networks, journals and their content focus, software, and references to research data.

EDITORIAL

Another focus of the »Subject-Specific Services« program unit is editorial work. Its core tasks are the procurement, collection, analysis, structuring, standardization, enrichment, and networking of data and information. The expansion of digital workflows and the optimization of existing interfaces for data processing are key tasks.

Other tasks of the program unit include representing the Federal Republic of Germany at the International Atomic Energy Agency (IAEA) for the development of the freely accessible literature database INIS, managing FIZ Karlsruhe's publications, acting as open access officer, including the administration of DEAL contracts, representing FIZ Karlsruhe in various Leibniz committees, statistically evaluating and preparing publication figures for committees, and external relations.

SUBJECT-SPECIFIC SERVICES IN FIGURES



Production figures

133,975
zbMATH Open

20,621
ICSD

43,000
swMATH

Access figures

approx 140 million
zbMATH Open

approx 18 million
swMATH

approx 2.6 million
ICSD

9
Third-party
funded
projects

5
Products

24
Publications



»Quality assurance and automation of our processes are not a contradiction for us. Our research and development teams support us in reconciling the two.«

Silke Rehme, Vice President Subject-Specific Services

4.3 E-RESEARCH

In the **e-Research (ER) program unit**, we develop and operate infrastructure-oriented services in research data management and the digital humanities.

This is mainly done within the framework of interdisciplinary research projects and commercial contracts. Particularly noteworthy are the German Digital Library (DDB) and the RADAR research data repository as central research infrastructures around which other services are grouped.

Users and cooperation partners include research institutions, universities, memory organizations, scientific societies, and publishers. We offer them consulting, requirements analysis, implementation, and operation of robust and productive e-research solutions from a single source.

DIGITAL HUMANITIES

With the German Digital Library (DDB), FIZ Karlsruhe has been operating the central portal for German cultural and scientific institutions since 2012

and has been responsible for all essential aspects of software development since 2018. The DDB has established a comprehensive network of partner-

ships with libraries, archives, and museums. From this network, we have worked with various partners over the past few years to develop and successfully implement further projects related to the DDB, such as the Archivportal-D and the German Newspaper Portal. An entire ecosystem of subportals offering sector or topic-specific access is now based on the DDB's shared backend.

With thematic access points such as the portal »Collections from Colonial Contexts« and the »Themenportal rechte Gewalt« (Right-wing Violence Theme Portal) project, we actively support the socio-political goal of highlighting contexts of injustice and strengthening democracy through remembrance culture initiatives.

RESEARCH DATA MANAGEMENT AND LONG-TERM ARCHIVING

Our core product here is the generic research data repository RADAR, which is now used by 24 universities and research institutions.



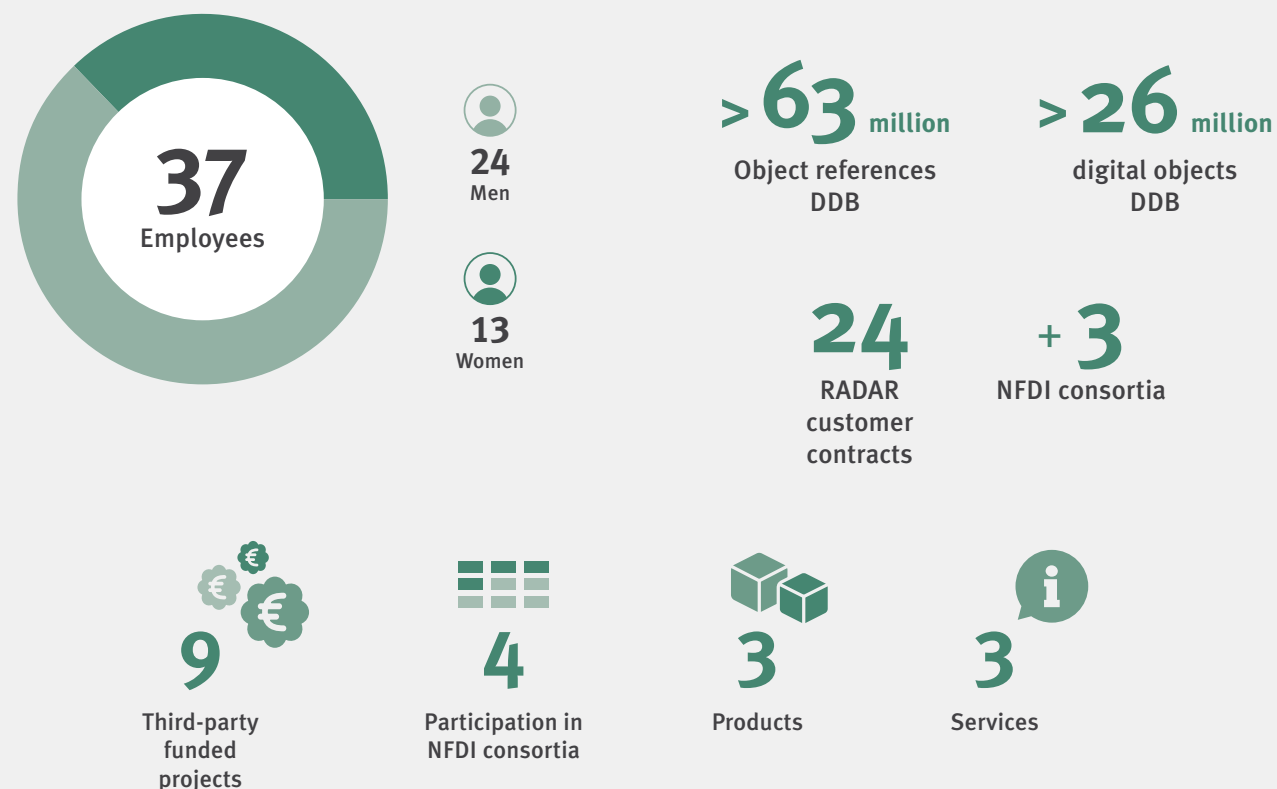
»Infrastructure is a basic prerequisite for the functioning of our society, for example, in the areas of transportation, energy, and administration. We create important infrastructure in the digital space.«

Matthias Razum, Vice President e-Research

We are also establishing a network of related services around RADAR. With funding from the BMBF, universities in Brandenburg are using RADAR to set up a state-wide research data management service. For the NFDI consortia NFDI4Chem, NFDI4Culture, and NFDI4Memory, we operate the subject-specific instances RADAR4Chem (chemistry), RADAR4Culture (art history, musicology, theater and media studies, and architecture), and RADAR4Memory (historical research).

In addition, we contribute our expertise to thematically relevant initiatives and working groups, such as the Allianz focus on digitality in science, the Leibniz Association's working group on research data, and the working group on long-term archiving of the NFDI section »Common Infrastructure.«

E-RESEARCH IN FIGURES



INFORMATION SERVICE ENGINEERING

The **Information Service Engineering (ISE)** unit focuses on neurosymbolic technologies, i.e., technologies at the interface between symbolic AI, such as ontologies and knowledge graphs, and subsymbolic AI, such as deep learning and large language models. Innovative solutions for the intelligent extraction, linking, and searching of heterogeneous data sources are developed in order to translate methodological advances directly into practical applications.

KNOWLEDGE GRAPHS

Ontologies and knowledge graphs: The backbone of research data management

Knowledge graphs (KG) form the technological foundation of modern, highly networked information systems. For FIZ Karlsruhe, the focus is particularly on implementing the FAIR principles within the framework of the National Research Data Infrastructure (NFDI). Through its participation in five NFDI consortia, the Information Service Engineering (ISE) unit is significantly advancing the semantic indexing of interdisciplinary research data.

Methodologies for collaborative ontology design

A central focus of our work is on the development and optimization of methodologies for ontology design. To ensure that knowledge models accurately reflect the subject-specific reality, we rely on participatory approaches: We involve subject experts from the fields of digital humanities, cultural heritage, and materials science directly in the modeling process.

Intelligent knowledge extraction and KG optimization

Knowledge graph population is increasingly being automated through innovative methods of information and knowledge extraction. We extract structured knowledge directly from unstructured sources such as scientific publications and reference books. We also develop advanced methods for knowledge graph completion.

Knowledge graph-based information systems

Knowledge graphs enable intuitive and semantically deep access to information. Through entity linking and semantic annotation, we implement powerful search functions that go far beyond purely keyword-based methods.

Knowledge transfer and networking

We improve our international visibility by co-directing the International Semantic Web Research Summer School (ISWS) together with the University of Bologna.

One example of our transdisciplinary work is the Leibniz Science Campus DiTraRe, where we investigate, together with the Karlsruhe Institute for Technology (KIT), the effects of digitization on the research process and bundle solutions in knowledge graphs.

MACHINE LEARNING

Knowledge-driven AI and knowledge graph embeddings

The statistical analysis of huge knowledge graphs (KGs) often presents conventional algorithms with scaling problems. FIZ Karlsruhe is therefore increasingly focusing on knowledge-driven AI in its basic research: We combine the robustness of symbolic knowledge representation with the learning ability of neural networks.

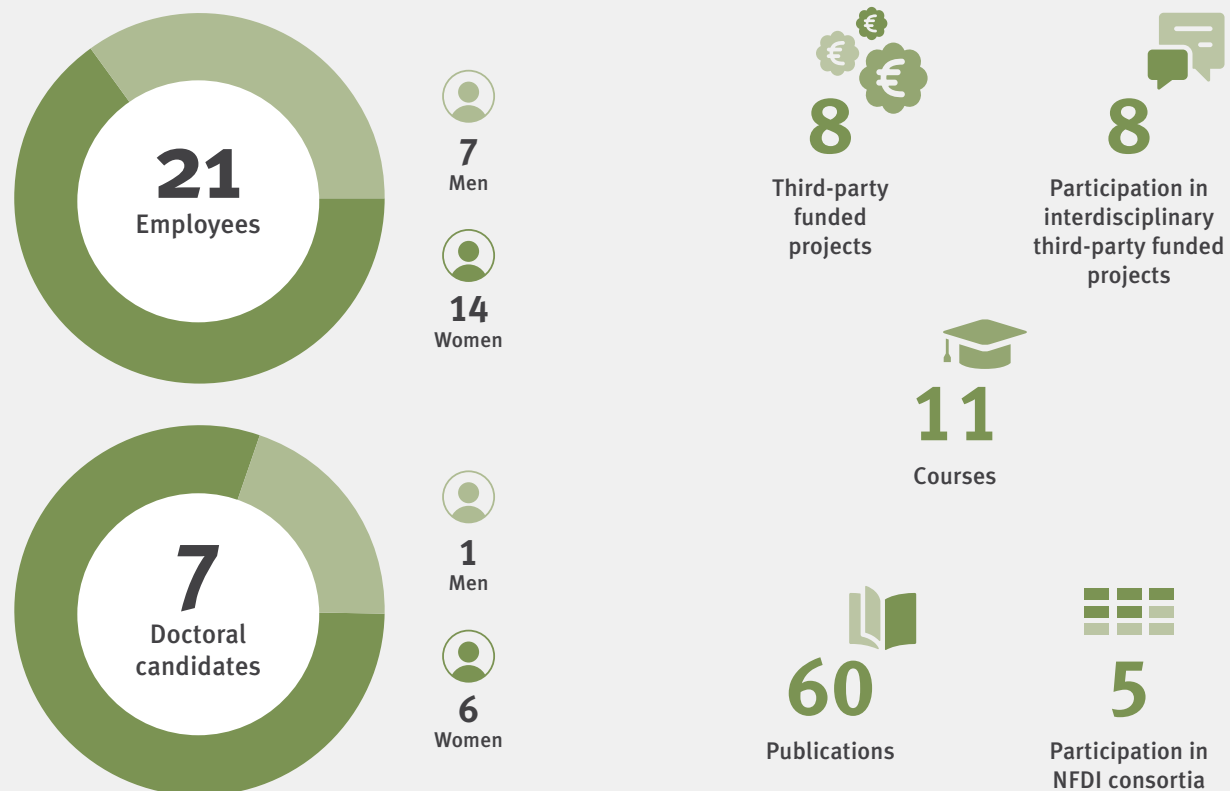
Neurosymbolic AI: Paving the way for explainable AI

Modern deep learning methods and large language models (LLMs) excel at pattern recognition, but often act as a »black box«: their results are difficult to understand and hallucinations pose a serious risk. Symbolic AI, on the other hand, based on ontologies and knowledge graphs, provides explicit, logically verifiable knowledge. Our research in the field of neurosymbolic AI aims to complement both worlds.

Multimodal LLMs in practice: Compensation topic portal

We demonstrate how powerful these new approaches are in the project »Thematic Portal for Compensation of Nazi Injustice.« Here, multimodal LLMs are used for end-to-end information extraction from historical case files.

INFORMATION SERVICE ENGINEERING IN FIGURES



»We combine the structured logic of knowledge graphs with the creative power of large language models to create AI systems that not only recognize patterns but truly understand contexts.«

Prof. Dr. Harald Sack, Vice President Information Service Engineering

INTELLECTUAL PROPERTY RIGHTS IN DISTRIBUTED INFORMATION INFRASTRUCTURES (IGR)

Digital transformation poses various social and legal challenges for information infrastructures in the field of research data management. The research topics in our **Intellectual Property Rights in Distributed Information Infrastructures (IGR)** unit focus primarily on data protection, data ethics, copyright, and AI law issues in this context and beyond.

Data protection and (data) sovereignty issues, as well as data ethics classifications, play a major role across the board. For example, the collection and long-term provision of scientific data raises different questions than data on cultural assets, which often entails licensing issues. Research questions relating to AI law are increasing rapidly and are linked to data law issues. These topics are reflected in our research collaborations, publications, and projects.

Helpdesks and knowledge transfer

The cross-departmental information service provided by the Legal Helpdesks for the NFDI consortia FAIRAgro, NFDI4Culture, and NFDI4CS, which is operated by IGR, continues to be in high demand. From individual researchers to cultural institutions and broad-based research projects, the information provided by the helpdesks covers a wide range of topics.

A cross-cutting issue of growing importance in the help desks and in the research projects supported by IGR is the use of AI techniques. The EU's AI Regulation came into force in the summer of 2024.

Although its legal implications focus on data protection and personal rights, references to copyright law are also currently the subject of heated debate. We are involved in the ongoing debate through our lectures, courses, workshops, and publications, and contribute our expertise to working groups in academia and policy advisory bodies.

DATA PROTECTION AND DATA ETHICS

Information infrastructures operate in an increasingly networked, increasingly global digital environment. Research data often contains personal or business-related data that is processed in different jurisdictions and is sometimes subject to strict legal restrictions. Such data is not always easy to anonymize because it needs to be reusable, interpretable, and, if necessary, identifiable for further research. Data is also increasingly being processed with the help of AI solutions. IGR makes an important contribution to the development of services that cover all phases from data creation to the provision of research data and make the data shareable and reusable for research and beyond.



»Data protection and copyright are central prerequisites for reliable scientific work in the digital space – especially in view of current political and social developments.«

Prof. Dr. Franziska Boehm, Vice President Intellectual Property Rights

We support technical projects and services by providing recommendations on the data protection-compliant and privacy-friendly design of new technologies and make recommendations on data protection-compliant research activities, for example when sensitive health-related data is processed for research purposes. In the area of promoting young scientists, we support the Data Protection Scholar Network (DPSN) and are involved in the EDPL Young Scholar Award.

We have also further strengthened academic networking through lectures, seminars, and consulting on data protection research issues.

RESEARCH DATA AND COPYRIGHT

In the area of copyright, we continuously monitor developing case law on AI issues in order to derive recommendations for digital science and its infrastructure and cultural heritage institutions.

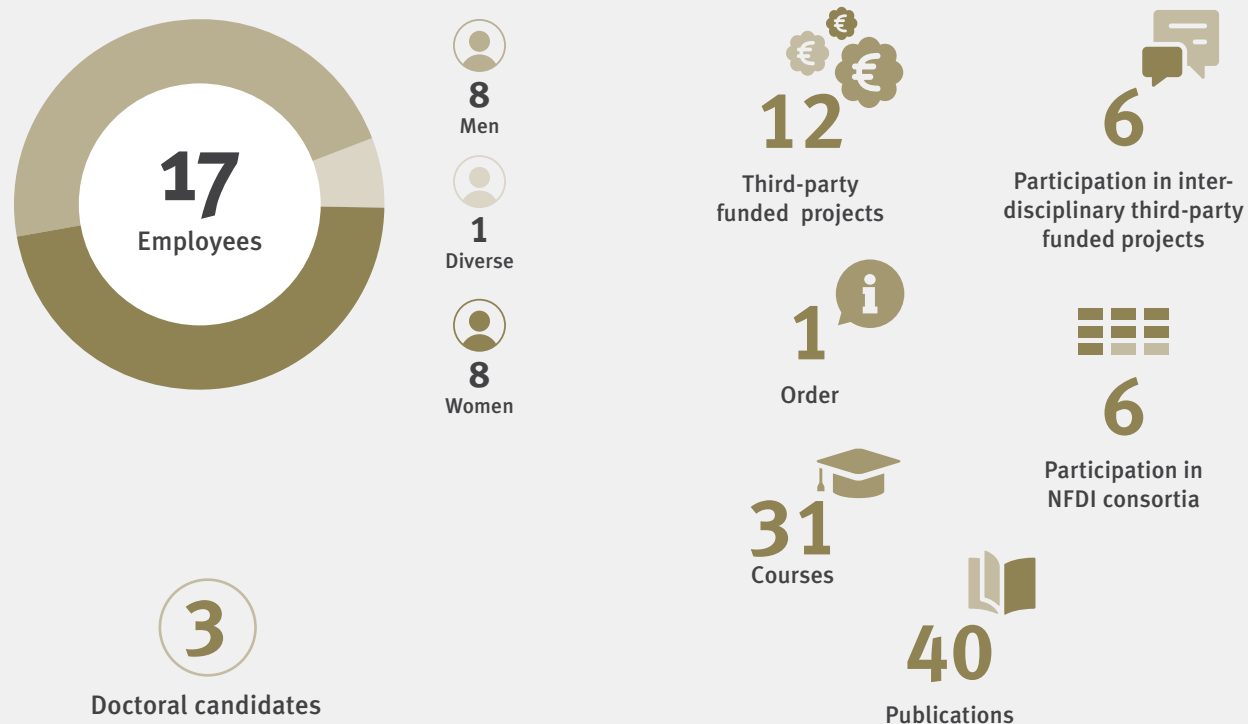
We are also involved in projects related to copyright, e.g., issues of copyright and ancillary copyright in music editions.

Among our publications, the completion of the commentary on Creative Commons licenses, with numerous individual contributions from the IGR team, is a highlight. In addition, a number of essays and articles have been published, including on legal issues relating to open science.

Projects and commissions

In 2025, a total of three new projects (Virhox, Primus, and SecureNeuro AI) were launched; further projects were acquired. We took on and completed a contract as part of the FAIR Data Publisher project that makes data findable, shareable, and reusable across sectors and countries. FIZ Karlsruhe was one of the legal partners and primarily analyzed FDO usage rights from a copyright perspective.

INTELLECTUAL PROPERTY RIGHTS IN FIGURES



4.5 IT SYSTEMS AND DATA NETWORKS

FIZ Karlsruhe develops innovative information services and operates them in an **IT infrastructure** in its own data center in Karlsruhe in combination with cloud services. The IT systems and applications form the technical basis for internal purposes, for the operation of »open« and »closed« platforms, and for the implementation of collaborative projects.

The IT Systems and Data Networks (ITS) unit provides the IT infrastructure necessary to fulfill the strategic goals of FIZ Karlsruhe. This includes the operation of workstation, server, storage, and network systems, as well as the applications based on them, in our own data center, as a cloud service, and on the basis of managed services. The central guidelines are to guarantee information security, ensure high availability, and comply with applicable compliance requirements. ITS thus makes a significant contribution to achieving FIZ Karlsruhe's goals.

One focus of activities in the ITS service unit was on organizational and technical preparations for hybrid IT operations as part of the »IT Transformation« project. The aim is to optimize IT use by utilizing hybrid technologies. Applications are operated on IT systems in our own data center, in the cloud, or on the basis of IT services provided by suitable providers as managed services. This approach enables maximum flexibility, scalability,

and resilience of applications and data, but also requires changes to processes and responsibilities.

A large part of our IT systems will be moved to the co-location data center of TelemaxX, a provider of data center and internet services located in Karlsruhe. This provides a modern and secure operating environment and enables compliance with legal requirements.

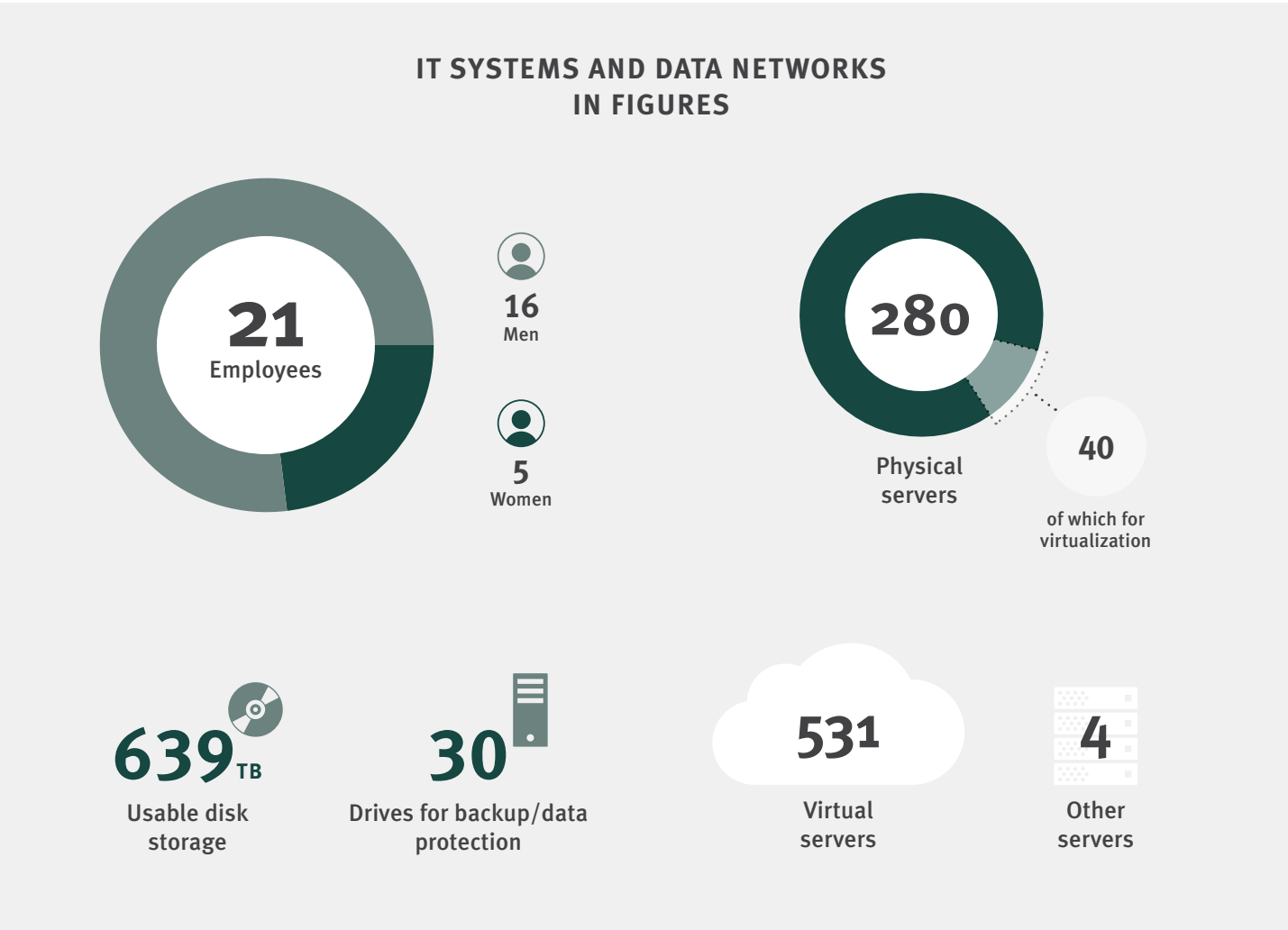
At the same time, plans for the operating environment of the IT systems remaining in the FIZ buildings were pushed forward. Up to four racks with separate power supply and cooling and no connection to the outdated existing air conditioning and power supply systems are planned. This will significantly reduce power consumption and the costs of operating and maintaining the systems.

Two-factor authentication is a basic component to guarantee IT security. After several months of testing, this login method was made mandatory for the entire institute.

To ensure IT security, several vulnerability scans were carried out on FIZ Karlsruhe's externally accessible systems and services in cooperation with the information security officer and an external IT security company, and most of the vulnerabili-

ties found were eliminated. We plan to carry out further scans once a quarter in the future.

IT service management was expanded to improve the quality of service in the IT systems and data networks unit. An internal incident management (ticketing) system for desktop services was introduced and will be extended to other teams in the service unit in 2026.



»Dynamically changing usage requirements call for dynamic technologies and adapted organizational structures. Flexibility, resilience, and security are the challenges for IT in the future.«

Hans-Jürgen Rudolph, Vice President IT Systems and Data Networks

4.6 ADMINISTRATION

The **Administration (V)** unit is responsible for reporting, finance, controlling, human resources, and infrastructure, as well as for the legal affairs of FIZ Karlsruhe. We provide services throughout the entire institute and act as a link between all levels of FIZ Karlsruhe.

In 2025, we focused on the ongoing digitization of administrative processes to make structures, workflows, and processes future-proof, to further increase transparency, and to sustainably improve service quality for employees.

An essential step to achieve this was the migration of our ERP system to a cloud-based, end-to-end, and more integrated SAP solution. This establishes a solid foundation for efficient management, reliable reporting, and sustainable resource management in the future.

With the successful implementation of Personio, a modern, digital, and cloud-based HR management system was introduced. The first phase involved the go-live of time tracking, including absences such as vacation and sick leave. Time tracking is available to all employees via various devices, thereby strengthening the self-service approach for staff. Subsequently, additional features and processes such as recruiting, onboarding and offboarding, performance reviews, and digital personnel files will be implemented step by step.

As part of this process, the 1993 company agreement on flexible working hours with automatic time tracking was replaced by the new comprehensive company agreement titled »Working Hours and Time Tracking«. Among other things, this agreement enables an even better work-life balance by allowing for flexible scheduling of individual working hours within the hours of 6:00 a.m. to 9:00 p.m.

The 2026 program budget continues to serve as a central planning tool, fully reflecting the strategic, substantive, and financial plans for the coming year. As part of our long-term goal of a sustainable building infrastructure, we have successfully implemented further measures: The commissioning of our PV system with a total capacity of 125 kWp in the spring, the installation of a new building connection station for district heating, and the conversion of the lighting technology will lead to significant energy savings in the future.



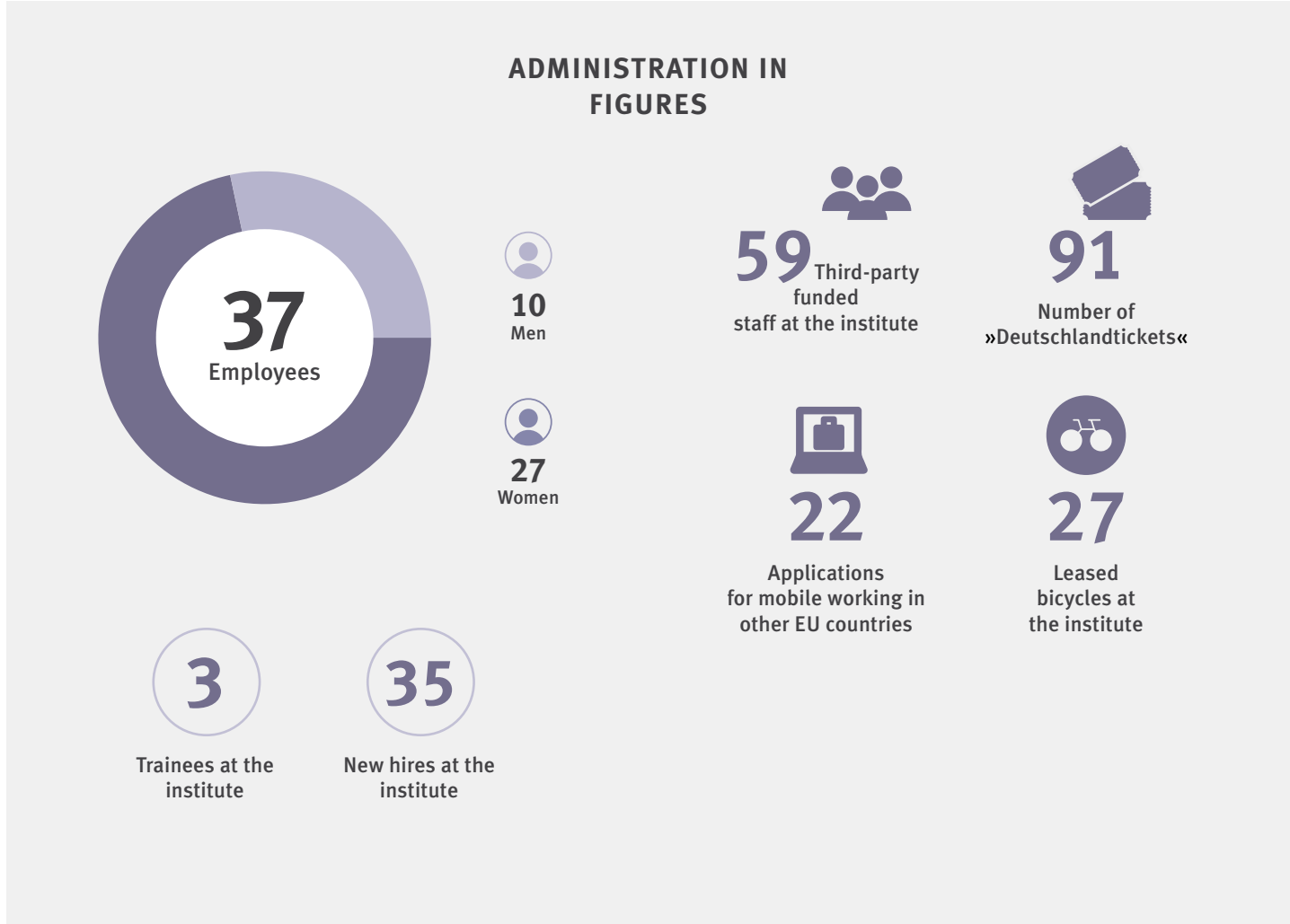
»By consistently digitizing our administrative processes, we are enhancing transparency, efficiency, and future viability, thereby making a key contribution to the strategic development of FIZ Karlsruhe.«

Andreas Schwartz, Vice President Administration

Our Future Work concept, which we understand as »New Hybrid Work«, is an essential element for attracting qualified specialists and retaining our employees in the long term. A key pillar of the concept is the general works agreement (GBV) »Mobile Working (Future Work)«, which has been in place since June 2022. An employee survey on mobile working conducted in the summer of 2025 showed a very high level of satisfaction with the regulations, so that the GBV was made permanent at the end of the year. New space concepts for

hybrid and modern working at our two locations in Eggenstein-Leopoldshafen and Berlin form another cornerstone of the Future Work concept.

Among the many benefits for our employees – besides promoting a good work-life balance – are the opportunity to lease a bicycle (»Jobrad«) and a subsidy for a railway ticket valid throughout Germany (»Deutschlandticket«).



LEGAL NOTICES

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Please follow the link:
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