



Annual report 2020

Data spaces for Germany and Europe

Preface

Dear Readers,

If there is one thing 2020 has shown us besides the vulnerability of humanity by way of the Corona pandemic, it is the strength of digitization: When working on site became a health risk worldwide in March 2020, it quickly became apparent just how effective and efficient digital solutions are at enabling processes and communication with customers, co-workers and partners.

We experienced this firsthand at Fraunhofer ISST – and still do: Most of the staff have been working from home since March 2020. Within a few days all colleagues were outfitted with the equipment and infrastructure required to complete all work from home just as effectively as at an office desk. We quickly developed new communication routines and adapted our procedures to the new situation. From the home office, my team managed to achieve the most successful financial year in the almost 30 year history of the institute. Something we are and should be proud of!

This great achievement shows how comfortable we are in the digital world and how easily we were able to adjust. But it also shows just how large the demand for digital innovations has become. With the developments around Gaia-X and the International Data Spaces, we at Fraunhofer ISST are helping to shape the infrastructure on which data exchange and data sovereignty take place and on which corresponding value chains can be established. And we also work on the concrete implementation of innovative data strategies in our logistics, healthcare and data economy business units. This annual report outlines what areas we focused on in 2020.

I hope that as you turn the digital pages of this document, you will discover aspects you wish to discuss further with us or which you want to flesh out together with us for your company. We look forward to working with you to turn your data into innovations!

Sincerely,
Boris Otto



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When innovations arise from data

#InnovationsFromData – Data driven creation of value as a driver of future economic growth

Fraunhofer ISST develops digital business and system solutions: We offer consulting, conceptual design, and implementation of data strategies as well as data management, software architectures, and digital business models. Our scientists determine the digital maturity of businesses and develop data processing procedures - among other things on the basis of artificial intelligence - and implement these.

Tangible goods were long considered to be the foundation for successful value creation by businesses. This is currently changing on a grand scale in the course of digitization:

175
Zettabyte of
worldwide
data traffic by
2025

Source: IDC - *The Digitization of the World (20)*



Nowadays products are linked with digital service offerings or are designed as a purely digital product right from the start. These days prosperity for our society is more likely to be created in data centers than factories.

First and foremost, digital services demand data availability. The required data can often not be generated by one company on its own,

but must rather be aggregated and combined by multiple business partners. Digital innovations can only arise from the combination of data. And in the end it is this innovation which enables sustainable development of business models, the future competitiveness of businesses and truly new services for all citizens.

Data driven innovations meet customer needs from end to end

Even if the specific details of how innovations arise from data vary among the individual domains, it is nevertheless possible to recognize basic patterns for data driven innovations which are the same across sectors: The digital services which are possible on the basis of data utilization meet a customer need from end to end. One example of this is intermodal mobility: For example, someone who wants to take part in a conference abroad has to keep many individual aspects in mind for this objective, such as booking train and flight tickets, comparing connections, reserving hotels and transferring the conference fees. A digital service which would greatly simplify the life of the conference participant should offer all these aspects as an integrated service from a single provider. Yet neither public transportation, nor an airline or a hotel chain would have all the data required in order to offer this end-to-end service – the complete “conference trip” package can only be offered through the combination of data. This also includes data about the customer themselves, who for example must contribute their travel preferences and credit card information, as well as contextual information such as weather or traffic data.



Because this basic pattern of innovative digital services is found in all sectors, it is necessary to make data available. But every data provider must be able to stipulate the conditions under which their data may be used. It is precisely this for which the International Data Spaces provide the necessary framework which allows conditions of use to be attached to data which is shared with others. The Fraunhofer Institute for Software and System Engineering ISST has for many years played a successful leadership role in developing this framework for data exchange. Because gaining the trust of all data providers requires understanding and controlling the complete data value chain. This also requires information technology solutions, which for example are developed within the framework of the IDS Association for various business sectors.

Gaia-X will enable trustworthy data exchange

In addition, the large Gaia-X project is creating the framework for developing a distributed, trustworthy data infrastructure in and for Europe, which will enable the controlled sharing of data and data sovereignty. Now this standard needs to be brought to life so that services which build on it can be used quickly and easily by customers – and so that value creation potential originating in Europe also remains in Europe. The Fraunhofer-Gesellschaft is a cofounder of Gaia-X and continues to further its development with great intensity.



Fraunhofer ISST is an experienced contact for the economy when it comes to implementation and utilization of the International Data Spaces and Gaia-X as well as data strategies, data management approaches, software architectures and digital business models based on them.

There will be
75
billions of IoT
devices world-
wide by 2025

Source: www.statista.com

More information

[Fraunhofer research on Data Spaces](#)

[International Data Spaces Association](#)

[Gaia-X](#)



Our Institute

The Fraunhofer Institute for Software and Systems Engineering ISST identifies and realizes the strategic value of data in partnership with companies – we offer complete system solutions for your company, from data preparation to the development of new business models.

Our experts research the value and sovereign handling of data for logistics, healthcare, and the data economy. We develop solutions for data management and the establishment of data architectures. In cooperation with our industry customers and as policy advisers, we are establishing an aggregate framework for the secure, controllable use of data across company boundaries with the International Data Spaces.

The Institute Management

Prof. Boris Otto became the executive director of Fraunhofer ISST on January 1, 2017. Prof. Jakob Rehof has also been with the institute since 2006. Flat hierarchies are important to both directors. They cultivate direct contact with all staff.

Prof. Dr.-Ing. Boris Otto, Executive Director



Prof. Dr.-Ing. Boris Otto (born 1971 in Hamburg) is the executive director of the Fraunhofer Institute for Software and Systems Engineering ISST in Dortmund and the Chair of Industrial Information Management at the Technical University Dortmund. He is also a member of the boards of directors of the Gaia-X, European Association for Data and Cloud, AISBL, the International Data Spaces Association (IDSA) and the Catena-X Automotive Network e.V.

After studying industrial engineering in Hamburg, Otto did his doctorate at the University of Stuttgart under Prof. Hans-Jörg Bullinger, former president of the Fraunhofer-Gesellschaft. He habilitated at the University of St. Gallen's Institute of Information Management, where he founded and managed the Corporate Data Quality competence center. His career path also included PricewaterhouseCoopers, SAP, and the Fraunhofer Institute for Industrial Engineering IAO. Furthermore, Otto was a Research Fellow at the Center for Digital Strategies, Tuck School of Business at Dartmouth College in New Hampshire, USA. He joined Fraunhofer ISST in 2014 with the founding of the Fraunhofer Innovation Center for Logistics and IT (FILIT). Otto's research focuses on the fields of industrial information management, business and logistics networks, and methods for the design of digital business solutions.

Prof. Dr. Jakob Rehof Director



Prof. Jakob Rehof (born 1960 in Denmark) has been the director of Fraunhofer ISST since 2006. Aside from studying computer science and mathematics at the University of Copenhagen and earning a doctorate in information science, he studied the classics (ancient Greek and Latin) and philosophy.

After several years in project management at Microsoft Research Labs in Redmond, USA, Rehof mainly dedicated his time at Fraunhofer ISST to networked and distributed software systems, cloud computing, the composition of software services, information logistics, workflow management, and the specification and implementation of business processes. As director of a Fraunhofer Institute, he is also a university professor: He holds the Chair for Software Engineering at TU Dortmund University.

Key figures for the institute

Fraunhofer ISST is funded through a combination of public financing, the so-called core funding, performing pre-competitive research, strategic projects and investments.

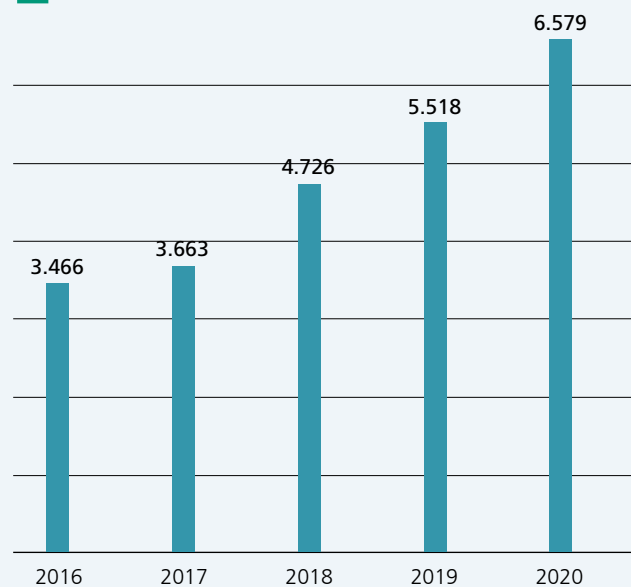
The Fraunhofer Institute for Software and Systems Engineering ISST identifies and realizes the strategic value of data in partnership with companies – we offer complete system solutions for your company, from data conditioning to the development of new business models.

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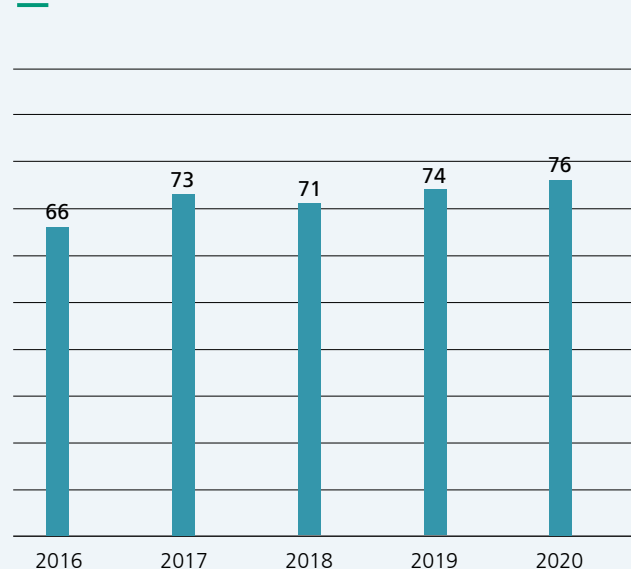
We consider promoting and educating new scientific talent to be one of our key tasks. Fraunhofer ISST had 118 employees (incl. 125 degree candidates) at the end of 2020. Some of our employees are full-time staff, others are student assistants and trainees.

Total expenditures for operating expenses and investments were about 6.6 million euros in 2020. Labor costs account for 76 percent of that. Fraunhofer ISST generated research and industry revenues of 5.6 million euros in the 2020 financial year. The Fraunhofer-Gesellschaft contributed 2.3 million euros in institute funding.

Costs in mio €

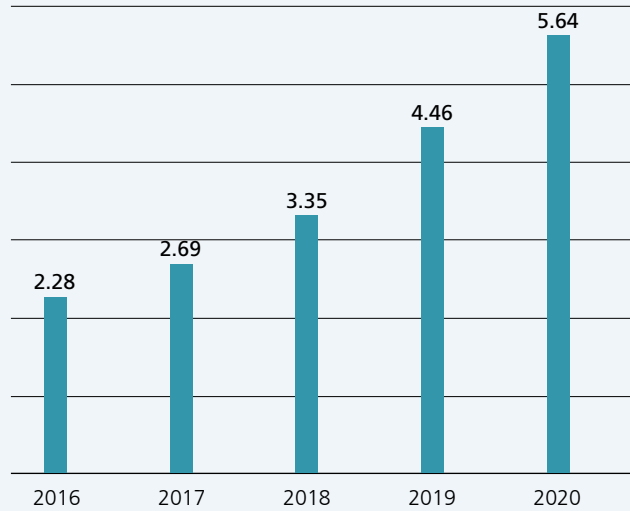


Personnel costs in %

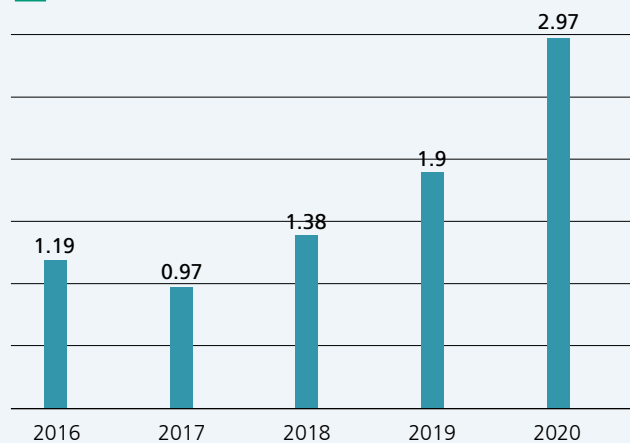


As an institute of the Fraunhofer-Gesellschaft and the associated focus on applied research and development, high priority is given to the acquisition and completion of industry contracts. Medium term planning at Fraunhofer ISST calls for continuous improvement and further development of the technological foundation and a sustainable increase of the industry proportion of financing.

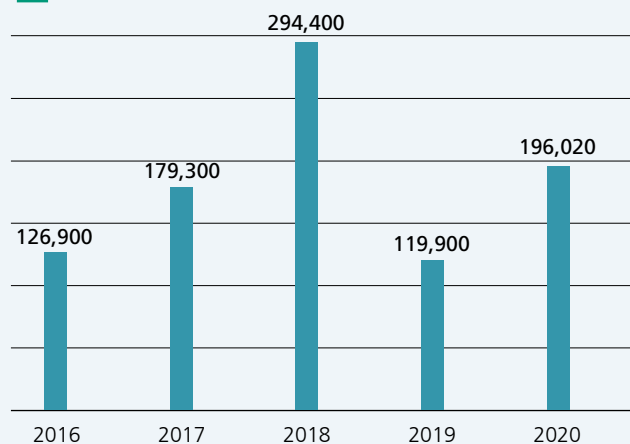
Industry and public revenue in mio €



Institutional funding in mio €



Invest in €



The Advisory Board

Fraunhofer ISST has an advisory board with members from industry, science, politics, and administration.

Paul Schwefer

Paul Schwefer, Management Consultant, Fair Sourcing, Hannover, chair of the advisory board

Dr. Reinhold Achatz

Coach Innovation, Technology, Entrepreneurship and Sustainability

Guido Baranowski

CEO of TechnologieZentrum Dortmund, Dortmund

Prof. Dr. Svenja Falk

Managing Director Accenture Research, Berlin

LMR'in Dr. Christiane Fricke

Director of the group "Außeruniversitäre Forschungsorganisationen, EU, Internationales" of the Ministry of Culture and Science of North Rhine-Westphalia

Prof. Dr. Volker Gruhn

Chair for Software Engineering at the University of Duisburg-Essen and chair of the supervisory board for adesso SE, Dortmund

Katrin Hinne-Mohrmann

Vice President Practice Transport and Logistics, Deutsche Bahn AG

Fabian von Kuenheim

Kuenheim Familiaris GmbH, Stuttgart

Prof. Dr. Christine Legner

Head of the Information Systems Department, Université de Lausanne, Lausanne

Volker Lowitsch

Head of the IT business area – management at Aachen University Hospital, and chair of the Verein elektronische FallAkte e.V

Dr. Sebastian Ritz

CEO of German Edge Cloud GmbH & Co. KG, Eschborn

Michael Schmelmer

Member of company management at C.H. Boehringer Sohn AG & Co. KG, Ingelheim am Rhein

Eva Schultze

Director Global Master Data Management Quality & Regulatory Affairs, Drägerwerk AG & Co. KGaA, Lübeck

Björn Stammer

Head of Logistics (ND-L), Nestlé Deutschland AG, Frankfurt am Main



Fraunhofer ISST on Social Media



@FraunhoferISST



www.linkedin.com/company/fraunhofer-institut-für-software-und-systemtechnik



www.youtube.com/c/fraunhoferISST

www.xing.com/pages/fraunhofer-institut-für-software-und-systemtechnik



Forms of collaboration

We want you to be successful with your digital business and system solutions. Our services surrounding the topic of innovations from data extend from consulting and conceptual design to implementation – whether in the data strategy, data management, software architectures or with digital business models. We offer a correspondingly broad range of cooperation models which we align with the individual requirements of our customers and partners.

From long-term partnerships to rapid optimization of individual processes, we are available for your development projects.

Innovation workshops

Do you have a particular idea and want to know if you can turn it into a successful product? Do you seek a manufacturer-neutral partner who advises you on a specific topic and supports you in the introduction of innovations?

Duration	Individual days up to 6 weeks
Result	<ul style="list-style-type: none"> AS IS analysis Feasibility studies Market studies Roadmap design
Your advantages	<ul style="list-style-type: none"> Manufacturer-neutral state-of-the-art consulting Tight-knit science network Current technology know-how

Individual research projects

Do you have specific research needs which you cannot or do not want to handle yourself? Are you looking for manufacturer-neutral consulting? From a one-day innovation workshop to development and implementation of new technologies, we are the right partner.

Duration	3 to 9 months
Result	<ul style="list-style-type: none"> Digital business engineering and digital product design Custom software development (Big) data analysis
Your advantages	<ul style="list-style-type: none"> Manufacturer-neutral state-of-the-art consulting Tight-knit science network Current technology know-how

Publicly subsidized research

Do you see a specific need for research and do you want to develop innovations for your sector together with science and industry partners?

Duration	3 years
Result	<ul style="list-style-type: none"> Pre-competitive research Project consortium enables multi-business use cases and joint commercial use
Your advantages	<ul style="list-style-type: none"> Own financial risk is minimized with investment in research and development through public financing

Enterprise Labs

Do you need support with strategic innovation processes in your company? Are you looking for an outsourced think tank to support strategic innovation processes in your company and advance these with foresight?

Duration	3 years
Result	<ul style="list-style-type: none"> Innovative MVP design and implementation Developing business models and support of spin-offs Technology analysis, selection, use, and transfer
Your advantages	<ul style="list-style-type: none"> Agile research on various topics Fast evaluation within the Enterprise Lab infrastructure Knowledge transfer between scientists and employees



Enterprise Lab with Fraunhofer ISST

Strategic innovation research for Boehringer Ingelheim Pharma GmbH & Co. KG

A fast and agile response to new digitization challenges is essential for an innovation-driven pharmaceutical company such as Boehringer Ingelheim. When it comes to reorganizing business processes or supporting them with new digital means, technology solutions to enable this are required quickly. Speed is also of the essence for new digital services so the system can be brought to market quickly. This is exactly what the Enterprise Lab offers: An agreed allotment of flexible research and development services over a period of several years, with flexible access.

The work content is largely defined on an as-needed basis according to the customer's current requirements and issues. Depending on the assignment, the team keeps changing with the appointment of the best experts for the respective topic. The project manager on the other hand is permanently assigned as the central contact for Boehringer Ingelheim. This "research master agreement" tremendously reduces the administrative effort for cooperation.

Services provided by Fraunhofer ISST

Fraunhofer ISST has developed numerous innovations for Boehringer Ingelheim within the Enterprise Lab framework. These range from visible results such as automated illness detection using AI-based analysis to innovations "under the hood" through the optimization and automation of data management tasks, for example in the areas of data quality and transparency.



With Gaia-X we are creating the conditions for a secure exchange of data in order to send a strong European signal in the competitive market for industrial cloud-based solutions.”

Prof. Dr.-Ing. Boris Otto

Director at Fraunhofer ISST and member of the Gaia-X AISBL Board of Directors

Gaia-X: Fraunhofer is one of the key players building a federated data infrastructure for Europe

When Gaia-X AISBL was officially launched in November 2020 as the “European Association for Data and Cloud”, this was a big day for data sovereignty of the citizens and businesses in Europe. In order to actively advance this important infrastructure project, Prof. Boris Otto assumed the role of interim CTO for the initial period. Because the Fraunhofer-Gesellschaft contributes an enormous wealth of experience and body of knowledge in the controlled sharing of data to Gaia-X through the extensive prior work on the International Data Spaces.

The vision of Gaia-X is easy to understand but technically highly complex: Since both businesses and private individuals are creating more and more data which they also want to share with others and use jointly, means are required to define conditions of use for data exchange and to monitor compliance with these conditions. At this time numerous international teams from over one hundred organizations are working together under the umbrella of Gaia-X AISBL (an international non-profit association under Belgian law) to implement this vision – creating an open, transparent and secure digital ecosystem in which data and services are made available, collated and shared in a

trustworthy environment. Gaia-X AISBL is therefore developing the technical framework for the sovereign data infrastructure, the Gaia-X Standard, and operates the services of the Gaia-X Federation. The objective is to enable new digital business models with the help of Gaia-X in order to strengthen Europe as a center of commerce and industry over the long term. A lot of preliminary work for this ambitious project was already completed leading up to founding of Gaia-X: The “International Data Spaces”, for example, which have already been integrated into the economy under the banner of Fraunhofer research, are a significant contribution to Gaia-X. They provide

the standard for “Data in use”, so for the manner in which data are exchanged. As interim CTO (until March 2021) of Gaia-X, Prof. Boris Otto, director at Fraunhofer ISST, played a substantial role in the technical development of Gaia-X. Fraunhofer ISST will also continue intensive collaboration on Gaia-X in the future: In June 2021 Boris Otto was elected to the Gaia-X AISBL Board of Directors in the course of an Extraordinary General Assembly.

Interview with: Prof. Dr.-Ing. Boris Otto

What is Gaia-X?

Gaia-X is the European answer to how collaboration between companies can work on the data level. In the distributed value chains that we see in the economy today and will see even more in the future, data must be exchanged between companies. However, this is a very sensitive issue for the economy. There must therefore be a framework for secure and fair data sharing where the data provider retains control over what happens to their data. Gaia-X creates this framework.

So is Gaia-X a kind of European cloud for exchanging data?

Gaia-X is not a European cloud, but an organization that sets the European standard for clouds. At the moment, the market for cloud services is being dominated by American providers. With Gaia-X, we want to set a standard for cloud platforms that meets our European values - openness, transparency, interoperability and trust - and fits our business models.

Why does an infrastructure for sharing data have to exist at all?

In an economic development characterized by distributed value networks, there is a business necessity for companies to share data. Modern products and services are created by the interaction of several players. In principle, things are no different here than at a good party: Everyone has to bring something to make it a success.

What is the current status?

At Gaia-X there is considerable enthusiasm, a very active community and we have now created the key structures. The interest is great! The process of certifying whether services are Gaia-X-compliant still needs some time. But we will see the first certified Gaia-X applications such as Mobility, Industry 4.0, Healthcare, Energy, Finance and Aerospace in the middle of 2021.



Director at
Fraunhofer
ISST and
member of
the Gaia-X
AISBL Board of
Directors

Is Gaia-X profit-oriented?

Gaia-X does not have its own profit-oriented business model. I think it would be completely wrong for us to influence business models that are developing in the market. Gaia-X effectively sets the road traffic regulations, but freight forwarders and bus companies are supposed to drive on the roads.

Why are corporations outside Europe among the founding members of the Gaia-X Foundation?

We don't want to isolate ourselves in Europe, but instead let everyone who adheres to the rules of the game in our country play along. Insofar it is of secondary importance where a cloud provider has its headquarters. What is important is that they adhere to our standards. Everyone who wants to do business with us in Europe must comply with the Cloud Act defined in Gaia-X. But we also see a genuine and constructive interest on the part of international providers in doing so.

Are companies already willing and able to share their data?

Many companies first have to do a kind of housekeeping with their data, because they often don't even know what data they have and how they can make it available internally and externally. Data management is not for IT nerds, but must be approached as a corporate function in the same way as product development or human resources management. Only then can data-driven business models be implemented efficiently and successfully.

What contribution does Fraunhofer, and in particular its work on International Data Spaces, make to Gaia-X?

The International Data Spaces, on which the International Data Spaces Association (ID-SA) and Fraunhofer have been working together for five years, regulate the handling of data when it is used (data-in-use), because the IDS architecture is used to exchange the conditions of use along with data when data is

exchanged between companies. This provides the terms and conditions for the data economy.

Until now, however, the question of data storage (data-in-rest) was still open in the case of data sovereignty. This changes with Gaia-X. Data spaces with a decentralized structure like Gaia-X are technically more complex than if there were a large pot for data storage in the middle. But they are necessary to create trust. We are very pleased to have been a member of the first hour and to be able to solve this important task together with Gaia-X's many partners, in order to make the European economy fit for the future in the field of the data economy.



Vlog: The Gaia-X Association and why companies should be involved



Using Gaia-X and International Data Spaces in practice —guidance and testimonials

More information

Both the [Fraunhofer ISST website](#) and our [Youtube channel "Fraunhofer ISST"](#) contain further information, interesting videos, interviews and publications on the institutes's Gaia-X activities.

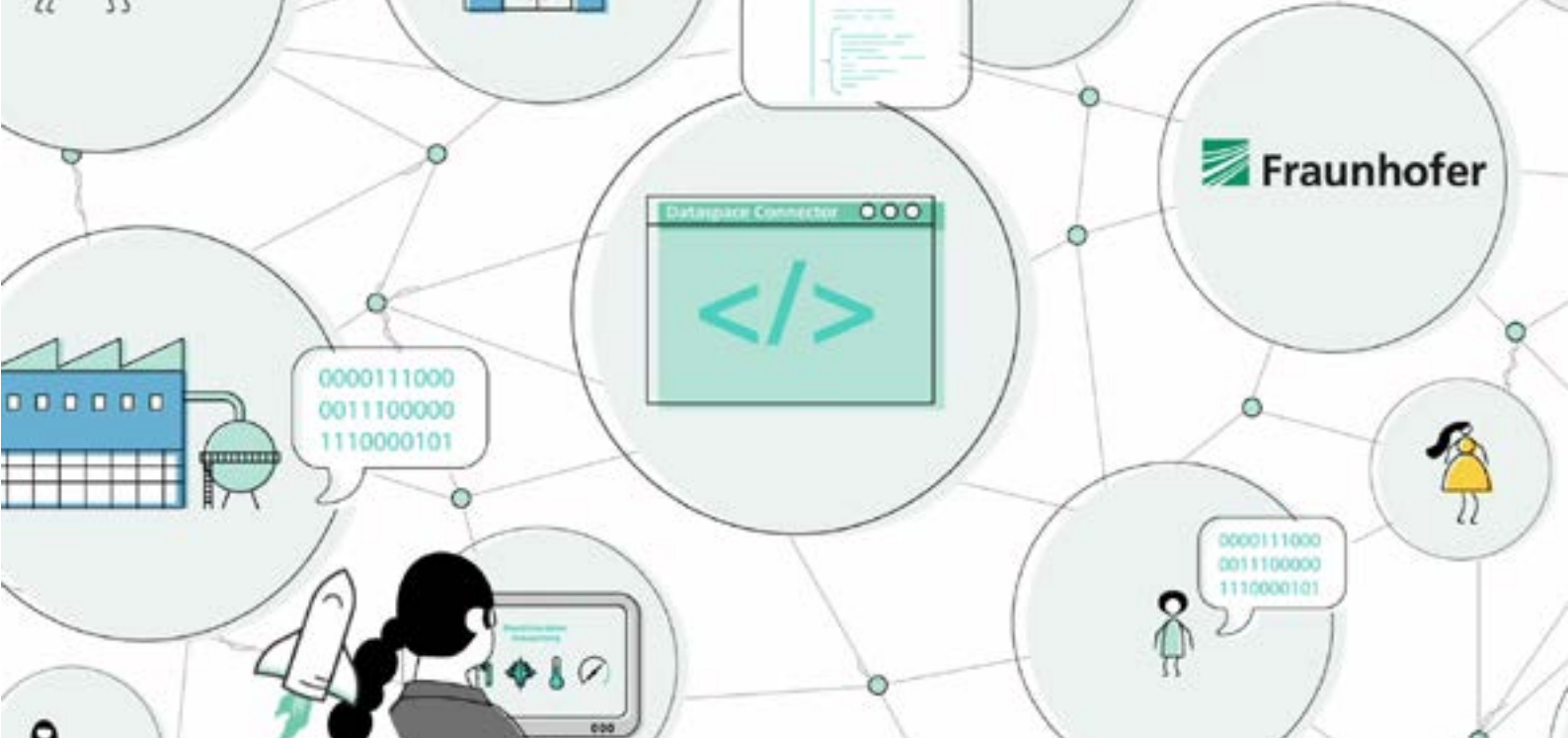
The following sources of additional information are also of particular interest:

- [Gaia-X website of the German Federal Ministry for Economic Affairs and Energy](#)
- [Gaia-X AISBL website](#)
- [Fraunhofer podcast "Gaia-X – Sichere Dateninfrastruktur für Europa" \(Gaia-X – Secure data infrastructure for Europe\) with Prof. Boris Otto](#)



Highlighted projects

Out of the numerous projects which the Fraunhofer ISST team completed successfully in 2020, we present three examples from our data economy, healthcare and logistics business units below: the Dataspace Connector as open-source access to sovereign data exchange, our projects on fighting the Corona pandemic digitally and the Shared Digital Twin as a digital copy of machines, whose data can be accessed by multiple companies.



Dataspace Connector

The custodian of sovereign data exchange

Clean air, networked mobility, user-oriented administrative services, or fast responses to crises – all these attributes of a livable “Smart City” which is fit for the future are only possible with digital solutions. This means: The more digital services, the greater the demand for an open data platform in order to aggregate, harmonize and integrate datasets from different systems. The concept of a Smart City illustrates just how big a role the topic of data exchange plays today. But how does this sort of data exchange work and what does one need to be mindful of in this regard?

Data sovereignty and interoperability in shared data spaces

These days economically successful action increasingly implies that products and services are produced and offered by multiple distributed partners in a value chain. In order to mutually exchange and provide data, the players involved can become active in so-called

data spaces. But since data exchange usually involves sensitive internal company data, data sovereignty should be ensured at all times.

First and foremost, the sovereign exchange of data requires a trustworthy component which has the task of understanding, processing and ensuring the agreed upon conditions for data exchange. In order to implement this task within a data space, interoperability must be ensured in addition to trust. For this purpose the participants must be able to network with one another and enable data exchange within their own infrastructure: their identity ensures exchange of the agreed upon message types and compliance with the conditions of use.

The Dataspace Connector – an open-source software

In order to enable the secure exchange of data, Fraunhofer ISST has developed the Dataspace Connector (DSC) as open-source software. It provides companies with an easy entry point to trustworthy data exchange



Dataspace Connector - The custodian of sovereign data exchange



How to use the Dataspace Connector in practice

using the International Data Spaces (IDS) and Gaia-X. According to the IDS philosophy it is important to have an IDS connector. It enables access to the data space and one's own data is conditioned so that it can be exchanged in the data space. The DSC can also be used to receive data from other participants in the data space.

Thus the Dataspace Connector fulfills two important aspects: Data sovereignty and interoperability of data. These are the value propositions of the IDS architecture and are described in greater detail below.

Data sovereignty

Data sovereignty is given by the ability to attach conditions of use to one's own data before it is shared. The Dataspace Connector has the ability to articulate, interpret and monitor these conditions of use. The DSC also supports eight of the so-called usage control policy patterns. An example of this is the function that data may only be used for a specified period and subsequently has to be deleted again.

Interoperability of data

On the one hand it is important to define conditions of use for data, on the other hand these data spaces should also be understood equally by all involved players. Interoperability demands this same understanding of both the conditions of use of data and the format in which the data must be described. The information model of the IDS Association is supported by the Dataspace Connector.

The Dataspace Connector provides a very good means of building a data space or participating in one. It is available free of charge via GitHub. Hence anyone can access it and also contribute to further development of the Dataspace Connector. The implementation concept of the open source software was verified successfully in December 2020 according to the "IDS-ready" certification criteria of the International Data Spaces Association (IDSA). Fraunhofer ISST offers a range of services to companies. Interested parties can view these via the linked websites.



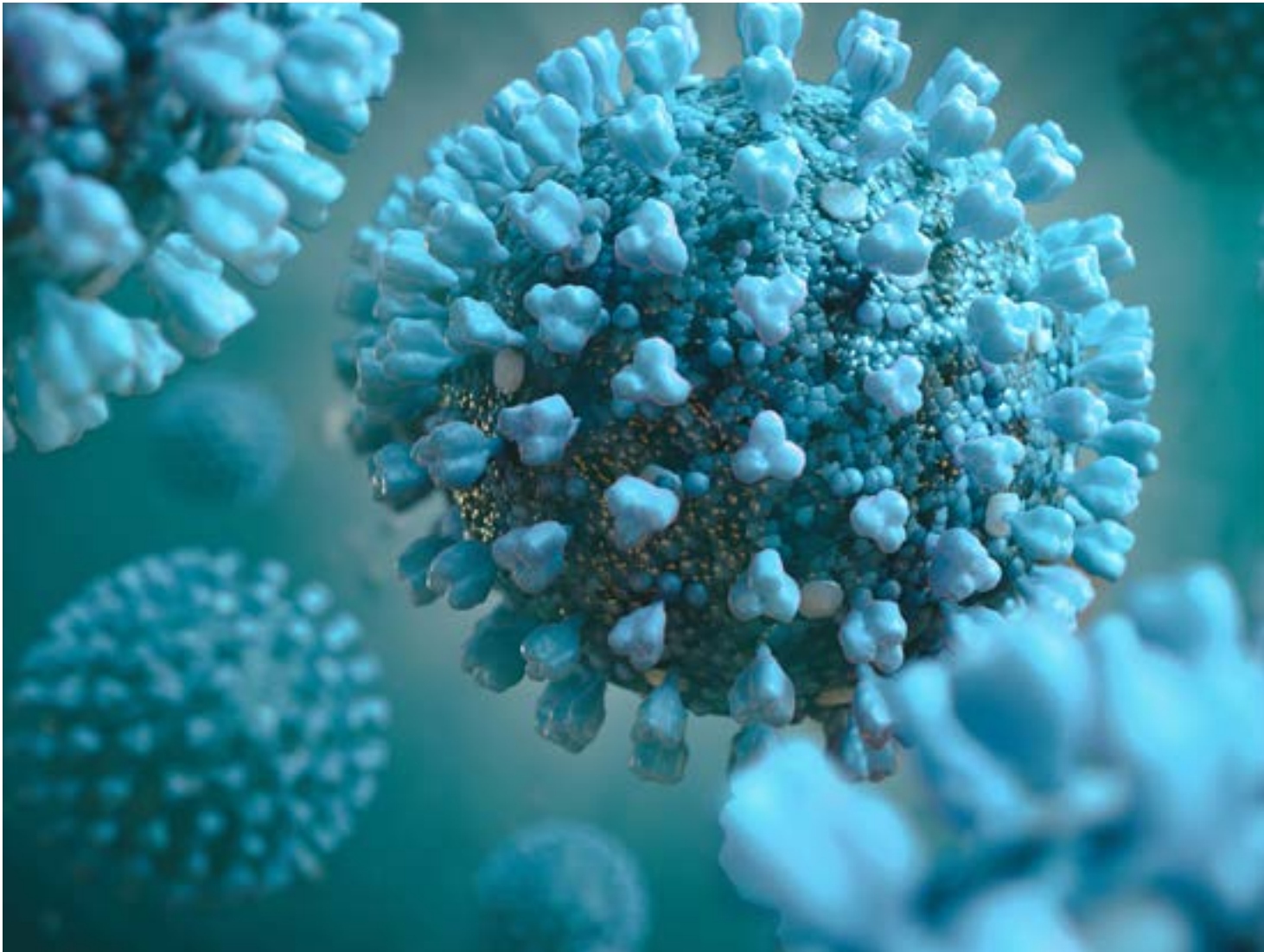
Markus Spiekermann

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markus.spiekermann@isst.fraunhofer.de

More information

Further information on the Dataspace Connector is available at dataspace-connector.io and on the [Fraunhofer ISST website](https://www.fraunhofer-isst.de).





Against the pandemic with digitalization #DigitalvsCorona

Digital solutions make a very important contribution to the fight against the corona pandemic. We at Fraunhofer ISST are working hard on this: with solutions for data donation, faster knowledge exchange among scientists and new features for the so called Electronic Case File (Elektronische FallAkte, EFA). In addition, the "Virtual Hospital NRW", where the

electronic case file is being used productively to exchange treatment data of COVID-19 patients between physicians of different hospitals, was already launched in March 2020. The project descriptions below illustrate exactly what Fraunhofer ISST is contributing to the fight against the corona pandemic through digital solutions.

PanDa@IDS

Pandemic-related data donation based on data sovereignty principles of the Medical Data Space

Pandemic-related research requires the availability of medical care data. A longitudinal view of disease progression requires complex legal constructs (e.g. ethics applications, purpose), the consent of patients, and access points to data-gathering endpoints in both care and research. However, the data sovereignty of citizens in the context of data donation is currently not ensured. The use of data cannot be controlled by the individual. This is also problematic from the research perspective – e.g. with regard to the subsequent use of the data. Thus the objective of the PanDa@IDS project is to build up the overall concept for a trustworthy, self-determined and traceable use of data on the basis of existing solution modules. The existing approaches are:

Digital Life Journey (Technology Readiness Level (TRL) 4): Die Digital Life Journey (DLJ) is a framework that describes the digital sovereignty of citizens in their interaction with information systems on a technical and organizational level (e.g. governance) and is extended to include the use case of data donation.

Trusted Connector (TRL 7): Connector with the currently highest security level, which ensures a trustworthy and manipulation-protected handling of data. This will be extended for the project and transferred to a higher TRL.

MYDATA Control Technologies (TRL 8): Leading framework for Data Usage Control, which implements the concepts of International Data Spaces (IDS) technically. The policies for data use are extended by the specific requirements for handling health data.

Medical Informatics Initiative (MII): The MII develops concepts and solutions for the administration and provisioning of primary care patient data for medical research. A framework of processes for application and data provisioning procedures is defined. Ensuring data sovereignty from the data provider perspective is currently considered primarily at the organizational level.

PanDa@IDS aims to support data donation under consideration of information self-determination and transparency concepts for both citizens and data suppliers. In the process, the type and scope of data use in particular is contractually agreed upon before the data is released and the use and processing of the data in accordance with the contract is subsequently ensured and traced through technical means. To this end, the project partners rely on concepts of data sovereignty from the International Data Spaces and the Medical Informatics Initiative in order to guarantee data use in compliance with the legal framework, to improve data availability and to guarantee transparency and traceability for data donors. The project partners are Fraunhofer AISEC, Fraunhofer IESE and the International Data Space Association (IDSA). The Healthcare Department is currently working on further development of pandemic management solution concepts, with the integration of Gaia-X based data ecosystem concepts in particular playing a central role. By providing technical solution approaches, the scientists aim to contribute to generating an indispensable foundation of pandemic related information as well as enabling the efficient exchange and collaborative use of this information at the public health facility level.



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Virtual hospital

Electronic case file

The state of North Rhine-Westphalia wants to ensure the best possible, comprehensive care of seriously ill COVID-19 patients by using tele-intensive care. To this end NRW Minister President Armin Laschet launched the “Virtual Hospital North Rhine-Westphalia” on March 30, 2020.



The virtual hospital is a digital platform with which North Rhine-Westphalia aims to bundle and provide better access to the medical specialist expertise across the state. Hospitals throughout the state can now draw on the expertise of the University Hospital Aachen and the University Hospital Münster in the fields of intensive care medicine and infectiology. The two hospitals are providing their knowledge on the treatment of COVID-19 patients as well as their experience using intensive care and infectiology tele-consultations – telemedical second diagnoses. Fraunhofer ISST delivered a key module with development of the “electronic case file”. The open specification for the electronic case file was initiated here over ten years ago. It is supported by numerous industry enterprises, which is also illustrated by the association “Elektronische FallAkte e.V.”. In addition, the interaction with the telematics infrastructure, the electronic patient file, and existing networks such as KV-Connect is ensured with the self-administration players. The electronic case file offers quick access to the required

documents such as doctor’s letters, findings, OR reports, and prescriptions. It provides the attending doctors with an up to date and complete overview of the course of treatment.

The electronic case file is designed to network doctors across sector and facility boundaries and to enable them to exchange medical information on jointly treated patients in compliance with data protection requirements. A case file represents one medical case of one patient. The file is controlled by doctors. The virtual hospital NRW uses the electronic case file, provided by Rechenzentrum Volmarstein GmbH (RZV), in combination with a Fraunhofer ISST web portal as the user front end. This portal supports electronic teleconsultations in intensive care through the exchange of data relevant for treatment in compliance with data protection requirements, and by providing documents tailored especially to the needs of intensive care teleconsultations with COVID-19 patients. The Ministry of Labour, Health and Social Affairs of North Rhine-Westphalia helps cover the costs of using the electronic case file. The virtual hospital was originally intended to undergo a pilot phase with a few selected indications in the summer of 2020. In light of the corona pandemic and the high case numbers in the state, the NRW government decided to move the launch date up and to use telemedical applications to ensure the best possible care of seriously ill COVID-19 patients throughout the state.

Further information on the virtual hospital is available here:

- virtuelles-krankenhaus.nrw
- www.kgnw.de



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ViDa

Video-supported teleconsultation and data donation based on the Electronic Case File

Pandemics require digital solutions to maintain health care structures and at the same time improve health research. With the Electronic Case File (EFA), Fraunhofer ISST has already provided a central building block for ensuring and improving the care of COVID-19 patients. The German Federal Ministry of Health aims to make digital health care for patients in Germany possible with the help of the telematics infrastructure (TI) and an electronic patient file (EPA), but this isn't feasible as of yet. But migration concepts already exist which transfer the available electronic case file to the telematics infrastructure as a value added service. Fraunhofer ISST will compile the existing and new requirements into a structured requirements specification. The institute will be supported in this by established partners. Fraunhofer ISST is part of the Medical Informatics Initiative in the SMITH project funded by the Federal Ministry of Research. This existing cooperation is to be used to export data from the electronic case file directly and in a structured way after the consent of the patients.

For dissemination and evaluation, Fraunhofer ISST works closely with the University Hospital Aachen and the Krankenhausgesellschaft NRW (KGNW) as representative of the 344 hospitals in NRW. Fraunhofer ISST aims to expand the electronic case file with two core functions:

1. Conducting a video-consultation directly from the secure environment of the EFA: The teleconsultation currently requires external, possibly insecure systems from third-party manufacturers. Furthermore, this forces physicians to use several software tools simultaneously. The video consultation is to become part of the existing EFA portal in order to have video and medical documentation in one place.
2. Making the data available in the sense of data donation to the Medical Informatics Initiative: A mechanism for a structured export of data (HL7 FHIR) is to be implemented in order to release the data for pandemic research purposes - provided the consent of the patients.



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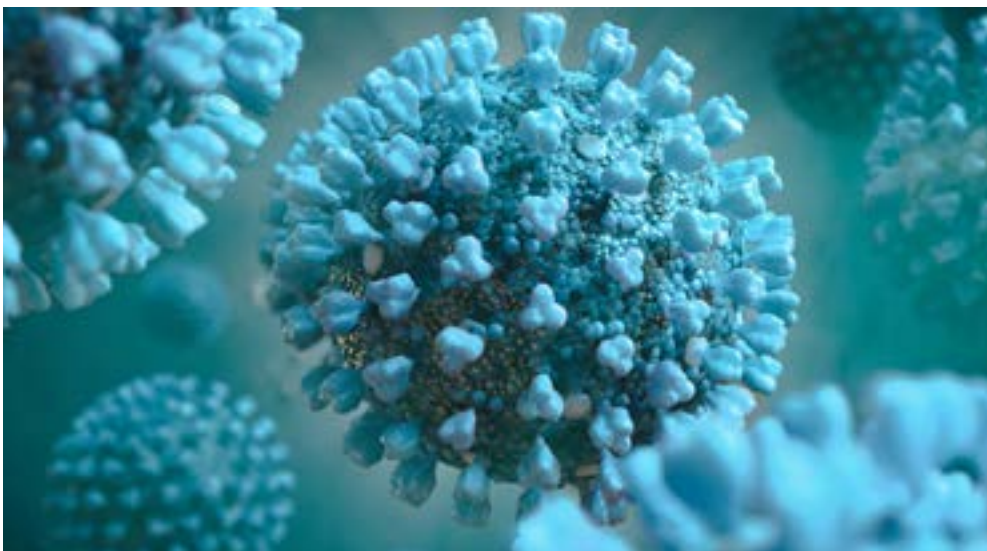
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TMvsCovid19

Use of topic modeling to improve transparency in COVID-19 research

Due to its status as a pandemic, the current corona situation creates a high time pressure for scientific publications. A large number of new publications is produced daily. But the “peer-review” process, the most common method for checking the quality before articles are published in scientific journals, can often not be followed and publications are published on preprint servers without being checked. In order to create transparency and to make efficient use of the publications, intelligent, preferably automated data management is required. This can be supported by an automated content classification, the so-called topic modeling. Topic modeling is a machine learning process.

in which a knowledge graph was developed that links different levels of knowledge with each other (scientific publications, ontologies, text mining results and biomedical databases) and thus provides the basis for heuristics and methods of AI. Fraunhofer ISST supplemented this graph with the service of a trend analysis and by connecting further data sources. The extension of the existing knowledge graph by a trend analysis enables the recognition and visualization of trends in different research disciplines. The resulting transparency supports the research community in their respective research projects and offers the possibility to respond to trends. By integrating additional data sources, the content density of the



It helps researchers identify relevant trends, topics and publications. This was the aim of the “COVID-19 Knowledge Space” project under the direction of the Fraunhofer Institute for Algorithms and Scientific Computing SCAI,

knowledge graph is further enriched and can be used to support decision-making. The project was completed successfully in October 2020 and the service was handed over to colleagues at Fraunhofer SCAI.



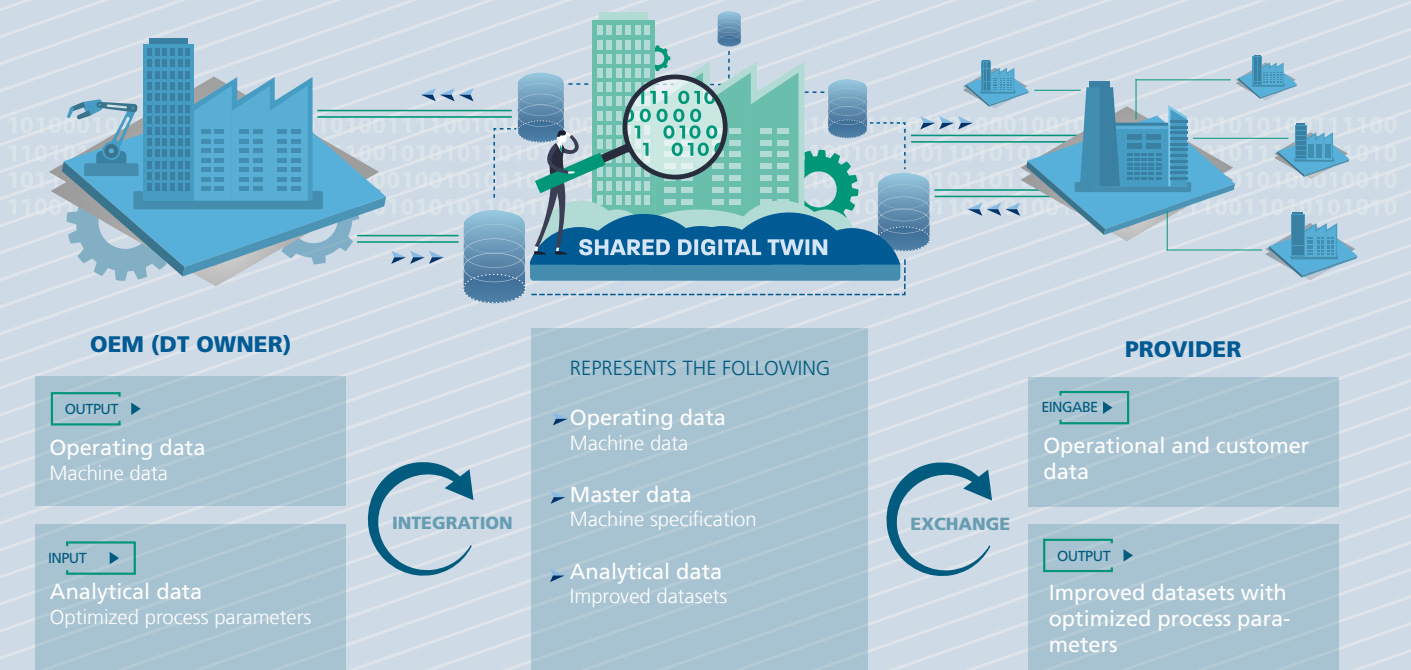
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Shared Digital Twin

Using data as a strategic resource: The “Shared Digital Twin” offers data integration and data exchange

Operators of industrial plants want to avoid downtime. Accordingly maintenance intervals should be closely aligned with the actual need for inspecting the plant. For this purpose, data must be exchanged between the plant operator and the plant manufacturer. This process is only one example of many that require the exchange of data across company boundaries. Fraunhofer ISST has developed an IoT architecture for this purpose which integrates the data of such a company process into a shared digital twin. This data can be shared with other companies on the basis of connectors, whereby the company providing the data always retains control over the use of the data. Thus the shared digital twin enables data exchange between companies without a loss of control. But exactly what does this shared digital twin actually look like?

From Digital Twin to Shared Digital Twin

The digital twin is the preferably highly accurate digital representation of a physical object. This object can be a product or process, for example, which is represented by a digital twin over its entire life cycle. The core of this digital twin is data integration. The data can come from different sources and also have different formats. It is made available in a central repository. Various analyses can then be carried out with the data in this repository. These can come from the fields of artificial intelligence, machine learning or predictive maintenance, among others. The focus during development of the digital twin was initially on internal processes. But since data should not just remain within the company itself, but is exchanged with other companies, the digital twin became a shared digital twin. It was developed within the framework of the Fraunhofer Cluster of Excellence Cognitive Internet Technologies CCIT, a group of over 20 Fraunhofer institutes, on the basis of the



Shared Digital Twin – using data as a strategic resource



Vlog: The digital twin as a key prerequisite for the success of industry 4.0

IoT architecture "RIOTANA" (Real-time IOT Analytics) developed by Fraunhofer ISST. With RIOTANA, informative performance figures can be generated from the raw data of ongoing processes (such as vibrations, temperature, or friction) in real time.

Thus companies can use a shared digital twin on the one hand to make their data available as a strategic resource by describing it in a structured manner and on the other hand by augmenting it with other additional company data. There is no one typical application for the shared digital twin, because this is always use case dependent. A shared digital twin in logistics, for example, is designed differently than in production. As a result, the shared digital twin is an intersectoral approach.

Requirements and solutions

The shared digital twin has to meet two key requirements: For one thing, shared digital twins must have interoperability, because in order for companies to exchange and understand one another's data they have to speak the same language. The administration shell standardized by the industry 4.0 platform is used as the digital twin, so the framework and interfaces of the twin are defined clearly and uniformly.

The other major aspect is the topic of data security. When operating data is shared with other companies, the digital twin must be designed so that it has the ability to both restrict the data and allow for conditions of use to be attached, so that the data provider can ensure that the data is only used as intended. There are other requirements in addition to these two essential demands. One important point is the topic of ownership. It should be clear who the owner of the digital twin is, who the data belongs to and which roles arise in such an ecosystem which exchanges data via digital twins. Another point is the topic of cyber security. As user of such a system, a company must be able to ensure that the system is protected from attack by third parties. This applies in particular to shared digital twins, since these are more vulnerable through their use across different companies.

In order to share data with other companies, it is exchanged in network structures. In order for all of the aforementioned important requirements to be met, Fraunhofer ISST uses the IDS connectors for the shared digital twin. The initiative "International Data Spaces (IDS)" is promoted by the Fraunhofer-Gesellschaft and numerous business and research partners with the objective of enabling the sovereign exchange of data between different companies in a standardized manner. The International Data Spaces Association is driving further development. By using international data spaces, control of the data is always retained by the company that provides the data by attaching usage policies to the data that are shared with cooperation partners. Both companies that share the digital twin can enrich the data with information.

The shared digital twin with the administration shell and IDS connectors is based on two standards that are already being used by industry. The choice of database used in the twin can be decided according to the respective use case. If a company wants to implement a shared digital twin, Fraunhofer ISST can accompany the conceptual design, precisely define the use case and support implementation of the system - especially through expertise in the international data spaces.



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Further information about the shared digital twin is available [here](#) and [here](#).



Interview with Hendrik HaBe about the shared digital twin



Competitive advantage through technology know-how

Our expertise at Fraunhofer ISST

Only someone who has an in-depth understanding of a technology can implement it effectively and to the greatest benefit of their customers. Fraunhofer ISST currently focuses on nine areas of expertise, in which the scientists, through in-depth technological expertise and comprehensive market knowledge, are able to provide optimal support to their customers and partners in the process of developing emerging markets.

International Data Spaces

Data sovereignty is a key capability in the age of digitization, and the international data spaces are the necessary technology.

Contact person



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Expertise

In the provisioning of data, both the producers and owners of data often find themselves exposed to the risk of losing control, thereby eliminating the strategic value of their data resources. This conflict of aims, which exists across industries, is addressed through international data spaces by enabling data providers to share data while maintaining data sovereignty.

Services

The services offered by Fraunhofer ISST include application and concept development for use of the international data spaces, technical proof-of-concepts, implementation support for production deployment and joint open source development.

Digital twins

A complete digital representation helps to overcome information silos.

Contact person



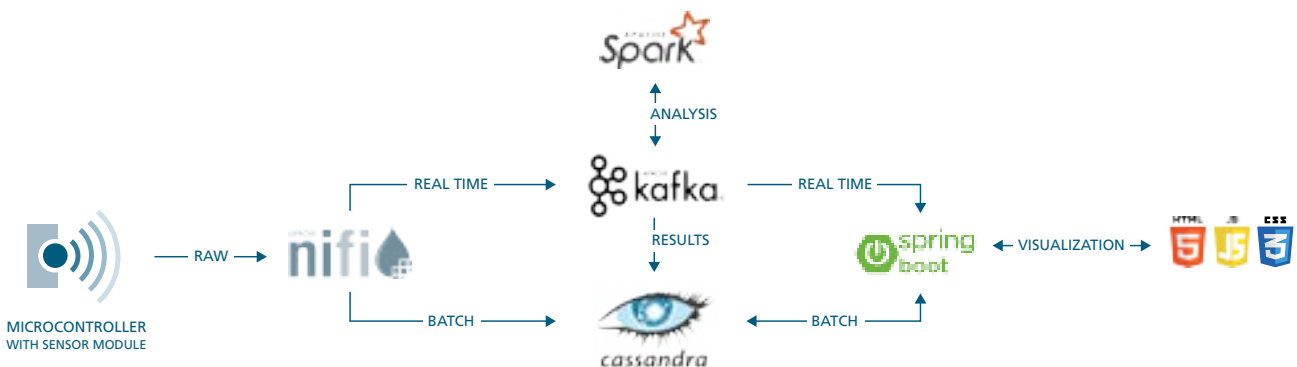
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Expertise

Digital twins as a digital representation of physical goods can be used in numerous applications in many different domains, including manufacturing, logistics or smart cities. Therefore the “digital twins” area of expertise deals with the conceptual design of digital twins and in particular with their use as shared digital twins in networks shared between companies.

Services

The services offered by Fraunhofer ISST include supporting implementation projects, conceptual design of digital twins and conducting pilot programs in the context of digital twins. We also offer provisioning of individual system components with which comprehensive data processing can be performed.



Human-technology interaction

People decide how well technology can support them.

Contact person



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Expertise

Due to the availability of digital technologies in everyday life, many user groups have a large need for innovative human-technology interfaces – at home, at work and in public spaces. New operating and learning concepts are integrating real objects with digital information, take into consideration multi-modal personality profiles and extend the Internet of Things and services around the Internet of Emotions, which adjusts to individual users and user groups.

Services

The services offered by Fraunhofer ISST include feasibility studies, experimental studies, development of prototypes and validation of technology concepts.

Business model development

New digital products and services through the efficient use of data and innovative technologies.

Contact person



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Expertise

Digitization leads to a fundamental change of companies, markets and customers. Through the use of digital technologies and the use of data, companies can review existing value structures and unlock new business opportunities in order to maintain their competitive advantage. Fraunhofer ISST helps you to systematically develop new business models on the basis of data.

Services

The services offered by Fraunhofer ISST include analysis of the business model environment, idea generation for finding new digital business models, design with regard to value propositions, creating value, delivering value and capturing value as well as prototypical implementation of the developed business model.

Strategic data management

From a product-centric to a data-centric organization.

Contact person



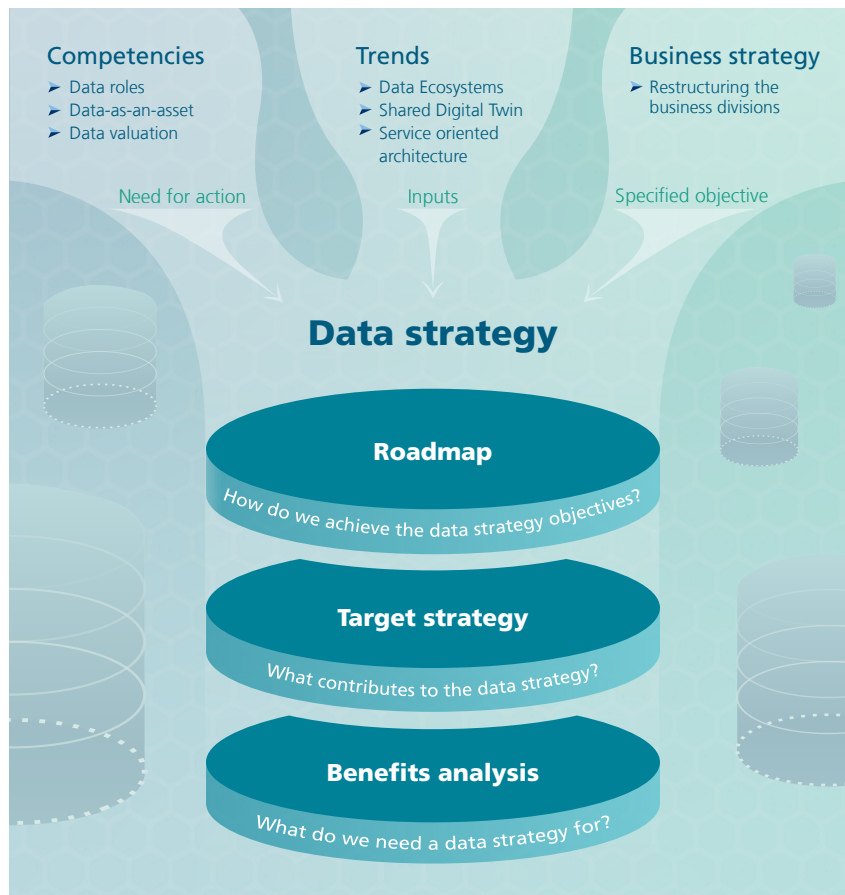
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Expertise

For data utilization across companies, a company first requires strategic data management. This data management should bundle mission critical decisions for data topics and formulate these across companies. New types of organization development (such as uniform data governance or data architecture) or new trends such as data ecosystems will have a lasting effect on a company. The strategic positioning of data management enables the sustainable alignment of data domains, data roles and data applications.

Services

The services offered by Fraunhofer ISST include data strategy positioning, performing data assessments, selecting suitable data governance approaches, developing role and process models and extend to the implementation of data strategy concepts.



Integrated approach to developing strategic data management with the Fraunhofer ISST toolbox

Cloud Transformation

Researching the trends and developments of the cloud transformation, expanding on them and implementing them in practice.

Contact person



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Expertise

Nowadays cloud computing is used in just about every industry and by many different sizes of companies, because the cloud transformation is one of the deciding factors in remaining competitive. In light of the strategic importance of cloud computing, Fraunhofer ISST deals with the construction of sovereign cloud infrastructure and current technological and political developments and trends which have a significant effect on the cloud transformation of companies.

Services

Fraunhofer ISST is the neutral, trustworthy and reliable partner for your cloud transformation. Whether you are just beginning or already well on your way. By means of workshops and feasibility studies, by developing prototypes as part of a proof-of-concept (PoC), and extending to actively developing system components, we assist you with your cloud transformation: from the initial scoping all the way to full implementation.

Artificial intelligence and machine learning

Fitness training for machines

Contact



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Expertise

Artificial intelligence methods, in particular machine learning, allow computer systems to improve themselves automatically on the basis of sample data. Explicit programming is no longer required, not only allowing the performance of already existing functions to be optimized but also enabling access to entirely new activities.

Services

The services offered by Fraunhofer ISST include identification and feasibility assessment of machine learning (ML) deployment scenarios, data pre-processing, selection and hyperparameter optimization of suitable ML models and their evaluation.

Data quality

Using data as a decision maker and strategic resource.

Contact person



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Expertise

Data quality is a core component of modern data processing and a prerequisite for automated decision making. High data quality improves the accuracy of the data as a digital representation of reality and ensures an optimal data foundation for the efficient use of machine learning and artificial intelligence.

Services

The services offered in the area of data quality include both the requirements analysis and gap analysis for identification of potential improvements, and architecture and process development extending to implementation of prototypes for data quality optimization.

Software Engineering

Research based implementation of innovative and pioneering software.

Contact person



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Expertise

Due to the constantly increasing complexity of modern software solutions, efficient and structured acquisition of expertise by the scientists is indispensable. In the "Software Engineering" area of expertise, expertise is developed and expanded in a targeted manner. This allows even complex and innovative software products to be developed in a pioneering manner with a focus on the transfer to the economy and industry.

Services

The services offered by Fraunhofer ISST include technical conception, developing system components, consulting services for the software development process such as reviewing of external software architectures or the conformity assessment of infrastructures in the medical field.



Our expertise in three business units

Digital innovations emerge from concrete challenges that have to be overcome. Our customers include large scale enterprises along with small and mid-size businesses in many different industries. Fraunhofer ISST also collaborates with universities and other research institutes, domestically and abroad.

Knowledge of industry-specific particularities is indispensable for the optimization of complex IT infrastructures. The challenges of current development trends can only be overcome with the expertise of various disciplines. Fraunhofer ISST therefore bundles its expertise in three business units. With this structure, we quickly identify appropriate solutions for companies to improve their competitiveness and develop new business models. We spoke with our business unit managers about future trends, what we offer to companies and personal favorite tools.

Data economy

Markus Spiekermann, head of data economy department, has been with Fraunhofer ISST since 2016 and is currently working on his PhD in the field of economic evaluation of data.



Further information on the data economy business unit:

[*Projects*](#)

[*Technologies*](#)

[*Publications*](#)

Mr. Spiekermann, what do you offer to companies?

Opportunities with regard to the topic of data economy arise from the fact that it is a relatively young domain. If one takes a look at how other domains have developed, then I would say that the data economy is one of the most exciting topics. Because it is about actually viewing data as a product. And this is where we at Fraunhofer ISST and especially in my department see great potential both to reduce costs in the internal processes and to really go out, generate innovations with data and develop new business models.

What makes you in your business unit an exceptional partner for your customers?

Due to our research focus, we recognized the topic of data economy and the consideration of data as a product in its own right very early on and also studied and helped develop these in our department. This allowed us to build up a very extensive repertoire of expertise which we can pass on to our customers.

What distinguishes your team and your teamwork?

Anyone can do young and dynamic. But we have actually succeeded in transferring this spirit of research and science which people have often brought with them from university and research here to the new topic of data economy. We are also adept at tackling the many topics in this business unit for which innovation must be promoted together and at jointly creating new solutions.

What is your favorite tool for digitization?

I don't believe that there are any tools for digitization. In my opinion it is the people who determine digitization, and this is why above all else I need a team which works with me to create the innovations here at Fraunhofer ISST.

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Logistics

Dr. Jürgen Schmelting is the head of the Logistics department at Fraunhofer ISST. His research focus, in which he also completed his PhD, is productions controlling in the transition to digitization.



Further information on the logistics business unit:

[Projects](#)

[Technologies](#)

[Publications](#)

Mr. Schmelting, what does your team offer its customers?

We primarily offer our customers the opportunity to greatly improve the efficiency of their processes. This is because digitized solutions naturally enable the gradual replacement of manual processes. Let me refer to a case study from the mechanical engineering industry, for example. In this instance, in the process from order acceptance to processing, several hundred pages of documentation papers are often printed for a single product simply to overcome the lack of integrated digitization solutions. So in this case no solutions are on hand to ultimately ensure the interoperability of IT systems, and we can contribute to this with our solutions. The solutions we offer are naturally primarily software based solutions. An example is our software platform RIOTANA, which stands for Real Time IoT Analytics. This is a solution we have created, which for example provides us with a real-time condition description of the location of a forklift in production or the states of a production machine.

Who works in your department?

At the moment both industrial engineers and computer scientists work in our department. So we have two different groups which work together on an interdisciplinary basis. This is because we require industry specific knowledge of logistics on the one hand, which is provided by our industrial engineers and logisticians. On the other hand, we also require development know-how from the computer science field for implementation of our software solution. And this is ensured by our computer scientists. We have discovered that the two specialties complement one another perfectly.

What is your favorite tool for digitization?

My smartphone. Because the smartphone allows me to be informed at all times about whatever currently interests me.

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Healthcare

Dr. Sven Meister worked at Fraunhofer ISST for a total of 14 years and was the head of the Healthcare business unit until early 2021. His favorite area of research is the feasibility of implementing digital expertise in healthcare.

Mr. Meister, what do you offer your customers?

Fraunhofer ISST offers support to healthcare companies and institutions through its healthcare department. An example of this is support in the identification of strategic components, meaning digitization strategies. We also support our customers in the implementation of software architectures. This is where names like IHE and HL7 come into play. But ultimately we naturally also support the hot topic of artificial intelligence. This means using data on the basis of growing data volumes essentially as fresh blood, so being able to generate a multitude of support offers from it.

How can companies in the health economy optimize their processes with digitization?

Process optimization in healthcare means having a strategy and thus also a goal. Higher efficiency and effectiveness is ultimately achieved with this goal and the corresponding process optimization. In concrete terms, this means being better able to promote the health of the individual and ultimately naturally also ensuring that the costs arising from the care can be reduced. Of course this also includes the costs which arise at the individual companies in the health economy.

How digital will healthcare be in 20 years?

If we look 20 years into the future, we discover that we as patients don't have to go to doctors nearly as often anymore since many services are already offered digitally. This is very efficient both for us as citizens and for the doctors because it frees up more of their time to deal with the truly difficult cases. We also assume that personalized therapies and/or artificial intelligence in particular will allow for faster treatment of disease processes.

What is your favorite digital gadget?

My world consists of four digital gadgets. My favorite gadget is my robot vacuum because it makes it easier to keep my apartment clean and I find that extremely helpful. In the end a clean apartment is naturally also good for my health.

Further information on the healthcare business unit:

[Projects](#)

[Technologies](#)

[Publications](#)



New head of the healthcare business unit

Effective February 2021, Dr. Sebastian Dries took over as head of the healthcare department. His top priorities are improving processes at the care providers on the one hand and improving communication and interaction with patients along the clinical pathways on the other hand.

What made you as a doctor enter the digital health field?

What particularly interested me as a doctor, against the background of my medical education and my practical experience providing medical care, to discover digital health for myself was primarily the observation that there are still very many gaps at many places in the treatment processes. A lot of the information which people would really need isn't available or there is no way to access this information. That's one topic. The other topic is that I have always had a fascination with structuring topics and using IT means to optimize processes. Then I found that there are ways in which one can use information integration to generate added value from already existing data. That one can combine data from various sources for decisions in case conferences and can then achieve a better overview for the decision makers – and I don't only mean the practitioners but also the patients. And so it happens that I have deployed and used these fundamentals in almost all functions and naturally am now very happy to be in a position at Fraunhofer ISST where I can initiate and promote relevant topics on a large scale with a powerful team and strong partners.

What makes Fraunhofer ISST a strong partner for the health economy?

On the one hand, Fraunhofer ISST is a strong partner for the health economy because it is positioned to perform very good analyses of the clinical needs with its collaborators. We had a very high level of engagement with practice and clinic operators and their

personnel. On the other hand, the institute contributes a comprehensive set of technical capabilities, for example in the field of artificial intelligence, on the topic of interoperability and on the topic of human-technology interaction. These are all relevant topics for coming up with solutions which are fit for the future, for conceptualizing these solutions and to prepare them for development by solution partners.

What is your favorite tool for digitization?

My favorite tool for digitization is the interaction with the actual users. Because the key to digitization is actually to create solutions which are as simple and useful as possible. It's not a matter of introducing just any solutions, according to and with one is then forced to work. Rather, it is about working with the stakeholders to think about how the processes should be configured and to build the solutions in a manner which supports the processes. Then the tool is called requirements development or design thinking, for example. In the end it is always about speaking with the people in the user group who have an idea of what the work should look like in the future.

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Scientific network

As an institute of the Fraunhofer-Gesellschaft, we operate at the intersection of science and industry. Fundamental research by universities provides us with important impulses for the practical transfer to industry applications. The following chairs and professorships form the core of our scientific network:

Prof. Dr.-Ing. Boris Otto

is Managing Director of the Fraunhofer Institute for Software and Systems Engineering ISST and the Chair of Industrial Information Management at the Technical University Dortmund

Prof. Dr. Jakob Rehof

Director of the Fraunhofer Institute for Software and Systems Engineering ISST and holder of the Chair XIV for Software Engineering at TU Dortmund University

Prof. Dr.-Ing. Jan Cirullies

Professor of Business Administration (notably Supply Chain Management and Digital Logistics) at the Dortmund University of Applied Sciences and head of the Data Management In Logistics area of expertise

Prof. Dr. Falk Howar

Professor for Software Engineering at TU Dortmund University

Prof. Dr. Wolfgang Deiters

Professor for User-Oriented Health Technologies at the University of Health Sciences in Bochum (hsg Bochum)

Prof. Dr. Jan Jürjens

Director Research Projects at Fraunhofer ISST and Head of the Institute for Software Technology at the University of Koblenz

Prof. Dr.-Ing. Christian Schwede

Professor for Big Data Analytics at the Bielefeld University of Applied Sciences and Head of the Artificial Intelligence in Logistics area of expertise

Prof. Dr. rer. nat. Sven Meister

Professorship for Health Informatics at the Faculty of Health, Witten/Herdecke University

Memberships

- Alumni der Informatik Dortmund e.V. (AIDO)
- Bundesverband Informationswirtschaft, Telekommunikation und neue Medien e. V. (BITKOM)
- Catena-X, Automotive Network
- Data Competence Center for Cities and Regions (DKSR)
- Gaia-X, European Association for Data and Cloud
- HL7 Deutschland e. V. (HL7 user group in Germany)
- International Data Spaces Association
- Health Economy Network in the Ruhr Region (MedEcon Ruhr e. V.)
- ruhr networker e. V.
- WINDO e. V.
- Wissenschaftsforum Ruhr e. V.

Fraunhofer-Gesellschaft

- Fraunhofer ICT Group (iuk.fraunhofer.de)
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How to reach and contact us



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Freeway A40/highway B1, exit Dortmund-Dorstfeld, Universität.

Heading towards Dortmund: At the first set of lights turn left into the street "Hauerth" (towards Technologie-Zentrum), at the next set of lights turn right into Emil-Figge-Straße (dead end).

Coming from Dortmund: At the first set of lights turn right into the street "Hauerth" (towards Technologie-Zentrum), go under the bridge, at the second set of lights turn right into Emil-Figge-Straße (dead end).

By train

From the Dortmund central station, take the urban railway line 1 towards Düsseldorf to Dortmund-Universität, from there 15 minutes on foot or take the Sky Train to the Technologiepark/Technologiezentrum stop.

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From Dortmund-Wickede airport, take the bus to Dortmund central station, from there: see "By train"; or go by taxi from the airport in about 25 minutes.

From Düsseldorf airport, take the urban railway line 1 towards Dortmund to the Dortmund-Universität stop; or go by taxi from the airport in about 60 minutes.

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Composition / Layout

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