

Fraunhofer FOKUS Institute for Open Communication Systems

Shield-Proposal Kick-off CERN, Sept 2024

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The Fraunhofer-Gesellschaft

Annual research budget of roughly 3.4 billion euros,
3.0 billion euros of which is designated as contract research

- Around two thirds of the Fraunhofer-Gesellschaft's contract research revenue is derived from contracts with industry and from publicly financed research projects
- Around one third is contributed by the German federal and state governments in form of base funding



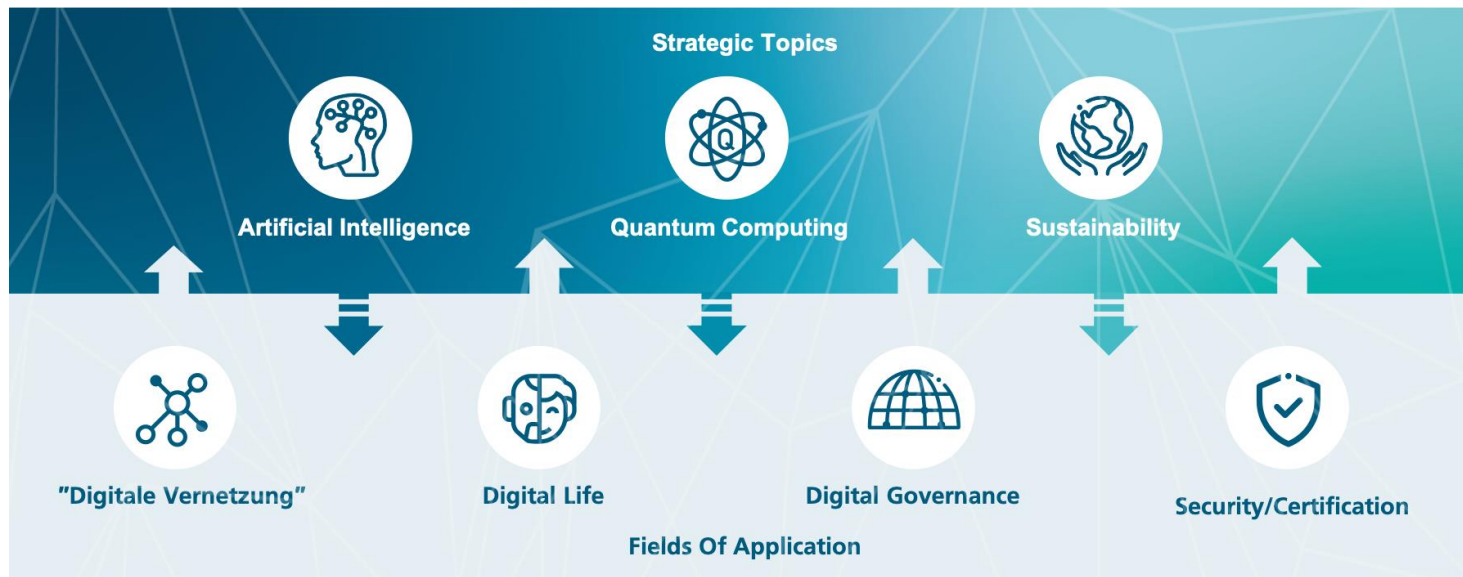
32.000
Employees



76
Institutes and research units



Institute for Open Communication Systems



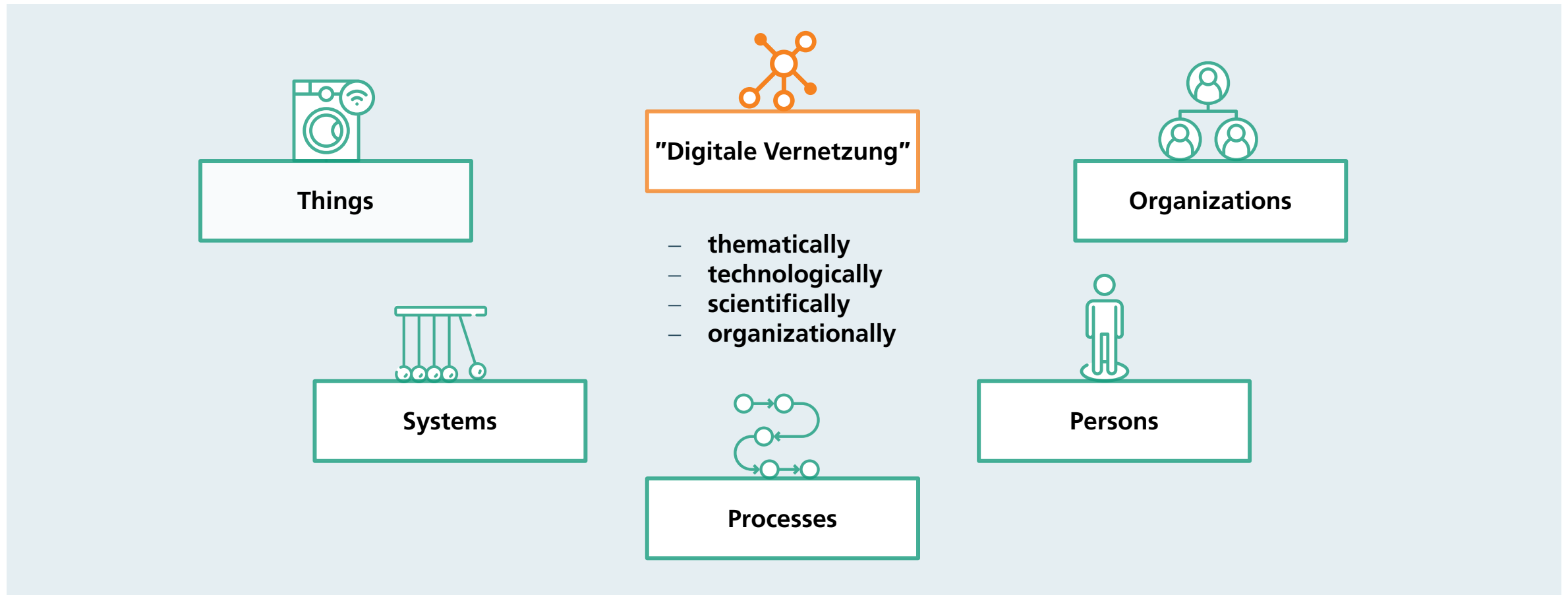
Actively shaping the networked world:
secure, reliable and sustainable

Provider- and technology-independent
mediator between industry,
research and the public sector

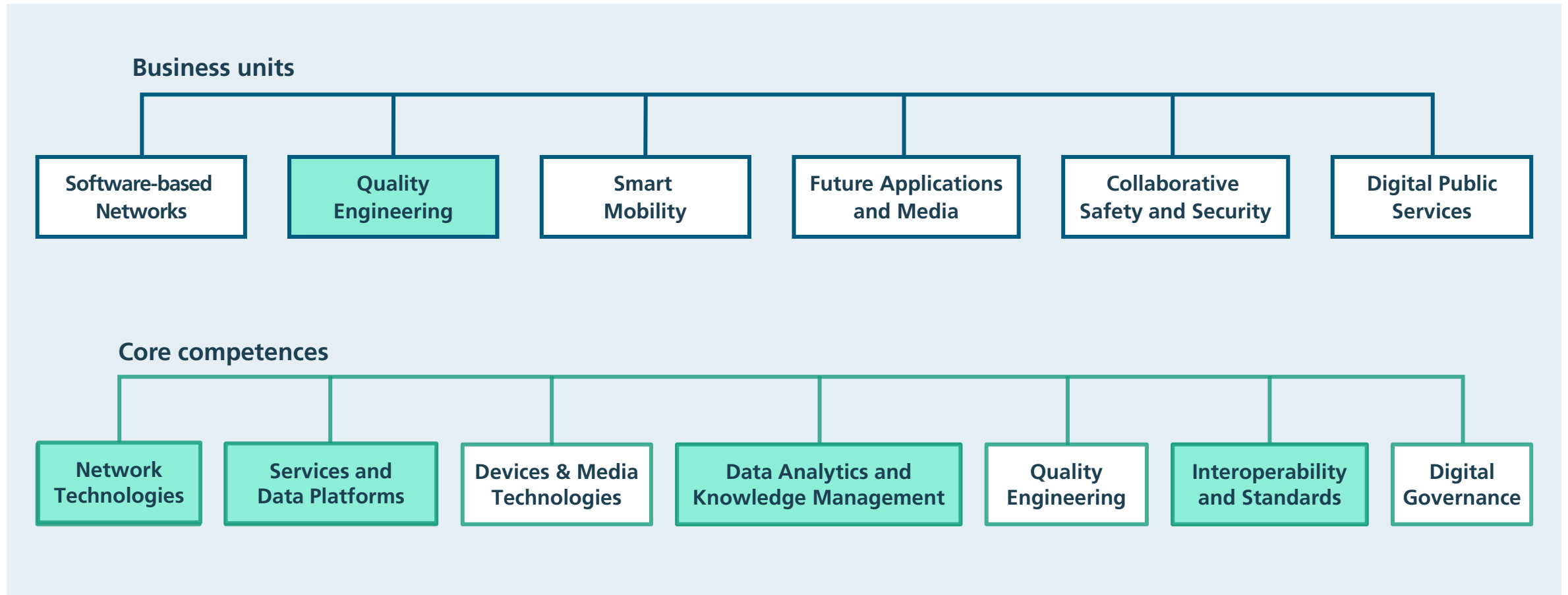
Berlin 

494
Employees 

FOKUS connects everything – secure, reliable, sustainable



Our business units and core competences



Connections to the Call

Relevance to the Call:

- Research activities in Smart Cities (SC) and urban infrastructures

Fraunhofer FOKUS' role in the Shield Project:

- Offers broad expertise in the area of Smart Cities and related (critical) urban infrastructures
- Application & integration of the tools and methodologies developed in SHIELD Smart Cities applications and use cases
- Preferred idea would be to provide relevant data for the Smart Cities use case in Shield in collaboration with the Urban Institute (ui!), a German software company developing and deploying operational data platforms for Smart Cities computing cross-domain relevant data. Fraunhofer FOKUS as second option could also approach local utilities for their data.

Past activities or experiences with the Call topic?

- Involved in standardisation activity DIN SPEC 91357 "Reference Architecture Model Open Urban Platform (OUP)"
- Numerous consulting activities for German and international cities regarding design of urban infrastructures and data platforms (e.g. Stuttgart, Lohmar, Belfast, Liverpool, Haßfurt)
- H2020 Triangulum-SC Framework, FP7 STREETLIFE-SC-Mobility, BMEL SLF-AI-supported services & apps in AGRIFOOD, H2020 SPATIAL-Tools f. explainable AI for cybersecurity, KIVEP-AI-based protocol anomaly detection for IoT networks

Specific interest & expertise

Direct interest areas in the SHIELD project:

- FOKUS research group has long experience in relevant research activities in Smart Cities and urban infrastructures

Technical Expertise in the area of Smart Cities and related (critical) urban infrastructures for SHIELD

- Designing and developing infrastructures and platforms for urban environments and applications
- Analysing and integrating cybersecurity aspects in (critical) infrastructures and applications
- Data Analytics and ML applications in the context of IoT and (telecom) network traffic data

SHIELD TEAM

- **Philipp Lämmel:** Deputy Head of QE4uICT&QC group, Cybersecurity expert specialized in designing and developing secure urban infrastructures
- **Michell Boerger:** Research Scientist & Project Manager, Conducting research in context of explainable and robust AI
- **Helene Knof:** Research Scientist, Conducting research in context of explainable and robust AI
- **Prof. Nikolay Tcholtchev:** Head of QE4uICT&QC group, Prof. Computer Science with focus on Smart City, Smart Region and Smart Country at the University of applied science Wiesbaden
- **Prof. Adrian Paschke:** Head of Data Analytics Center (DANA) at Fraunhofer FOKUS, Head of Semantic Data Intelligence at the Institute of Computer Science at FU Berlin
- **Silke Cuno:** Project Manager, Business Developer, Smart Cities and Sustainability, Fraunhofer FOKUS

Envisioned use of SHIELD project results

Characterisation of the available data:

- Cooperation Partner UI provides access to a **floating car dataset**, going back to June 2018.
- With more than 10 billion data points per month, an update rate of up to 5 seconds per vehicle and several terabytes of historical data*.

Examples of potential attack vectors that have a data footprint

- Attackers physically manipulate sensors that are physically deployed in the Smart City and are therefore physically accessible.
- Attackers hack/manipulate deployed sensors or the data infrastructure and platform.
- Not an attack: Anomalies or discrepancies may indicate inefficiencies (e.g. bottlenecks) in the (physical) city infrastructure.
- Anomalies for disaster management: environmental data may indicate early warning of impending disasters (fires, floods, plagues).

SHIELD results integrated in Fraunhofer FOKUS

- The UI product portfolio could be extended by integrating SHIELD methods into Urban pulse. This would make the SHIELD results directly transferable and applicable to other cities with open urban platforms.
- Fraunhofer could developed methods to commercialised to (industrial) partners as part of a licensing model.

*Source: <https://www.umi.city/analytics>

Project outcomes

Envisaged integration path for the project results within the Fraunhofer FOKUS research strategy

- As a non-profit research organisation, the Fraunhofer Gesellschaft does not pursue any direct commercial interests. The commercial exploitation of the results in the form of services or products is carried out by business partners with whom Fraunhofer FOKUS cooperates as a neutral partner by providing scientific advice, know-how transfer and research and development services.

What would be the optimal outcome of the project for your organisation?

- Improve and demonstrate scientific expertise in this area (e.g. through publications)
- Develop expertise in novel data-driven methods for urban resilience and improve market position in this area to remain at the forefront of European research in urban infrastructure, cybersecurity solutions and AI applications for critical infrastructure.

To which network(s)/audiences do you have access to present project outcomes?

- Fraunhofer FOKUS has a large network consisting of SMEs, large enterprises, cities, academia covering Europe

FOKUS has a big network

Industry



Enterprises **SME** **Startups**

Transfer



Universities



Research Partners



Multipliers



Institutional Support



Federal Government/ EU



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How to cooperate with us

