D3.2 - Laboratory Evaluation Report

WP3 - Deliverable 05/2026

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Task 3.1 – Dependability (Functional Safety & IT-Security)

Project Partner	**Project Team / Contact Person**
OTH Regensburg, Software Engineering Laboratory for Safe and Secure Systems (short LaS³)	Meret Kristen Prof. Dr. Jürgen Mottok

Target Customers	**Number of targeted Customers** (as written in the proposal)
SME's and PSE's	40 SME's and 10 PSE's
Actual Number of Customers (KPIs)	
8 Workshops & 10 Consultations → In total 70 SMEs and 19 PSEs were reached 3 additional large-scale events were hosted to introduce the technology	

Equipment used

- LaS³ hardware, including eye-tracking laboratory
- Bulletin board, flipchart, moderation cards

Selectable Learning Arrangements

- Secure Software Process Models (ISO/IEC 270xx, BSI Grundschutz, CISIS 12)
- Audits
- Security Awareness (optional with Eye-Tracking)
- Info Events & Workshops
    - Introduction to IT Security for Executives
    - IT-Security Awareness for Employees
    - Advances in Phishing Recognition
    - Detecting Social Engineering with Eye-Tracking
- Secure Software Development (SAMM)
- Safe and Secure Coding in C/C++
- Product Security (e.g. pen-testing, fuzzing)

Formats used

- Introductory Workshops for interested customers
- In-depth Workshops for employees
- One-on-one consultations with IT-personnel
- On-site Technology evaluations

Example WP Workflow

1. Needs analysis for the SME or PSE using a specific questionnaire (also identifying current problems)
2. Content selection involving choosing specific topics from a set of learning arrangements
3. Hands-on workshop in LaS³ (or on site at the customer's location)
4. Evaluation of hands-on workshop

Customer Outcome
Across multiple IT-security engagements, customers experienced clear and measurable improvements in both their technical security posture and organizational awareness. In projects involving quantum key distribution (QKD), clients benefited from expert guidance on security proofs and protocol design, alongside rigorous stochastic testing of random bitstreams in line with BSI standards, resulting in increased confidence in the robustness and compliance of their cryptographic systems. In critical infrastructure contexts such as water supply, the integration of quantum and post-quantum cryptography into a testbed environment provided customers with a future-proof security perspective and concrete implementation pathways. Equally, strong outcomes were achieved in the human-centric security domain: interactive phishing trainings enhanced with eye-tracking technology enabled employees to better recognize and respond to social engineering attacks. Customers reported high engagement and immediate positive feedback, particularly appreciating the hands-on, practical approach and the visibility into user behavior during phishing detection tasks. Workshops and awareness activities not only improved individual competencies but also revealed previously overlooked vulnerabilities, allowing organizations to address them proactively. In parallel, consulting services—including security audits and support in developing IT emergency plans—provided customers with structured processes and actionable guidance, leading to the successful creation and refinement of incident response strategies. Overall, the services were well received, with several customers expressing interest in continued collaboration and further training offerings.

Strengths and Weaknesses of the formats used
Introductory workshops were particularly effective for reaching a large number of SMEs at once and providing a low-threshold entry point into new topics. They were well suited for raising awareness and delivering basic knowledge. However, their main limitation lay in their lack of depth and limited ability to address individual needs or specific use cases. In-depth workshops built on this by enabling a more detailed understanding of the subject matter. Their interactive nature allowed SMEs to engage with concrete challenges and apply what they learned. At the same time, these formats required greater time commitment, were typically conducted in smaller groups, and still could not fully address highly specific individual requirements. One-on-one consultations offered the highest degree of individualization. They allowed for direct problem-solving and fostered strong relationships between providers and SMEs. The downside was that they were time-intensive and not easily scalable, making them less suitable for reaching a large audience. Technical evaluations provided an objective and structured assessment of technical feasibility and specific needs, offering high value for decision-making processes. However, they required significant resources and were often too complex or advanced for SMEs that were still at an early stage of their development or digitalization journey.

Lessons learned
Over the project timeline customers benefited significantly more from longer consultation formats, typically ranging from two weeks up to three months. These extended engagements allowed for a deeper understanding of individual challenges and more sustainable implementation of solutions, highlighting a general need for more time-intensive support. In addition, there was a noticeable demand for initial consultations based on CISIS12 and the BSI IT-Grundschutz framework. SMEs showed strong interest in structured approaches to information security, particularly as a starting point for improving their overall security posture. At the same time, the increasing number and complexity of cyber threats revealed a high need for comprehensive security awareness campaigns. These initiatives needed to address all employees, as many local SMEs lacked the internal resources and expertise to adequately respond to the growing threat landscape.

Chances and risks for succeeding project DInA
Concept has been shifted to less consultations that cover a longer period and more topics: Chance to work on deeper topics for customers to facilitate long-term effects and changes. Risk that too much budget is focused on less SMEs. Successful workshop formats will also be continued in DInA and cooperations with Transferstelle Cybersicherheit, Gründerzentrum, Local governmental organizations etc. have been established and can serve as a head start for the DInA project

Task 3.2 – Eye-Tracking as a Digital Tool

Project Partner	**Project Team / Contact Person**
OTH Regensburg, Software Engineering Laboratory for Safe and Secure Systems (short LaS³)	Fabian Engl Prof. Dr. Jürgen Mottok

Target Customers	**Number of targeted Customers** (as written in the proposal)
SME's and PSE's	40 SME's
Actual Number of Customers (KPIs)	
8 Workshops & 10 Consultations → In total 43 SMEs and 6 PSEs were reached 4 additional large-scale events were hosted to introduce the technology	

Equipment used
• Various research-grade eye-tracker models: Tobii Pro Fusion, Tobii Pro Spectrum, Tobii Pro Glasses 3 • Specialized eye-tracking software (Tobii Pro Lab & Tobii Eye Tracker Manager) including research licenses • Mobile eye-tracking equipment including laptops, monitors, and macro keyboards • Storage servers and NAS to temporarily store and evaluate eye-tracking data • Various software libraries including sklearn, stats, and pytorch • Conference/Seminar room for in-house workshops (including moderation equipment, movable presentation screen)

Selectable Learning Arrangements
• Online introduction courses/seminars to eye-tracking in human-computer interaction (HCI) • On-site workshops (at an event or customer location) with hands on eye-tracking • Conference booths with eye-tracking demonstrations • Individual eye-tracking studies for customers including study design, conduction and evaluation (duration of around 2 weeks) • Eye-tracking consultations for company websites including a full website scan to identify usability and UX issues (duration of around 2-4 days) • Interactive webinars including eye-tracking demonstration allowing participating companies to engage in a data-driven group evaluation of their website/app/… • Presentation of key findings and outcomes ranging from pitches in smaller venues to large-scale scientific conferences • Reoccurring events like the "IHK-Regensburg Webseiten Sprechtag", where companies can register beforehand and bring new website designs which are then evaluated beforehand by the LaS³ (e.g. A/B-testing)

Formats used

- Empirical eye-tracking studies
- Usability and UX quick checks
- Interactive workshops with a theoretical introduction followed by hands-on training
- A/B-Testing
- Digital product evaluations using eye-tracking metrics (fixation patterns, heat maps, scan paths, …)

Example WP Workflow

1. Initial interview to determine the SME's or PSE's current requirements
2. Identify what processes, screen elements or products need evaluation. This typically follows a problem-centered approach, focusing on interaction aspects, for example processes where SMEs/PSEs receive the most complaints from customers
3. Conduction and evaluation of the study: This process is done at a later point either on-site or in the LaS³
4. Convert findings into suggestions/actions and report these back to the SME/PSE
5. Optional: SME/PSE get back in contact with us after implementing the changes for a small verification study

Customer Outcome

The primary outcome for participating in SMEs and PSEs is a significantly improved understanding of their users' and/or customer's actual interaction behavior. This understanding is grounded not on qualitative assumptions, but in objective quantitative, gaze-based data. Eye-tracking methods reveal precisely where users look, how long they fixate specific interface elements, which areas they overlook entirely, and how their visual attention flows across a screen. All learning arrangements are supposed to help SMEs and PSEs to get a basic understanding of where their company might benefit from eye-tracking and to help them design future studies. Eye-tracking evaluations go far beyond what conventional usability methods such as surveys or think-aloud protocols can provide on their own, as it captures subconscious visual behavior which requires specific training to be understood and interpreted correctly.

For customers with little prior experience in user research, this task serves as a low-barrier entry point into data-driven interface evaluation. Through formats such as quick checks, interactive webinars, or on-site workshops, companies gain hands-on exposure to central eye-tracking metrics and learn how to interpret these in the context of their own products. For customers already familiar with usability evaluation, the focus of the learning arrangements shifts more towards statistical analysis of gaze behavior. Afterwards, these companies know how to conduct basic empirical eye-tracking studies, gaze-based A/B tests, and statistical evaluations of gaze. For them, the focus is more on how these findings can be translated into concrete, actionable recommendations, giving development and design teams a clear basis for prioritizing interface changes.

Across all formats, a key outcome is the shift from qualitative attitudinal to quantitative behavioral product evaluations. Companies leave with documented findings, visual artifacts such as heat maps and scan path recordings, and a structured set of recommendations tailored to their specific product context.

Strengths and Weaknesses of the formats used

Not all formats experienced equal demand. Longer eye-tracking studies (~2 weeks) proved too personnel-intensive for most SMEs and PSEs, as they required regular check-ins throughout the process. In response, the focus shifted toward lower-threshold formats such as the "IHK Regensburg Webseiten Sprechtag", where companies received an initial consultation on a pre-selected product and could optionally progress to a more in-depth study if interest persisted.

Hands-on workshops were consistently well received, with participants valuing the opportunity to interact directly with professional eye-tracking hardware. They were particularly used by companies which were unsure about the potential benefits of integrating eye-tracking into their HCI evaluation processes. Remote formats, by contrast, attracted less engagement, suggesting that eye-tracking is a technology that benefits strongly from in-person experience to convey its full value.

Lessons learned

The main takeaways concern the structure of the learning arrangements offered throughout DInO. Initially designed as intensive consultations spanning multiple days to several weeks, these were restructured into two more focused formats based on practical experience. The first are company-specific consultations lasting on average 2–4 days, in which SMEs and PSEs bring their own digital products for a guided eye-tracking analysis. Findings are communicated in a checklist-based format, ensuring participants both understand how to operate eye-tracking equipment and can derive concrete interface requirements from the data collected. The second is a shorter, workshop-based format typically spanning one day. Participants can either bring their own websites for a group-based analysis or work with example projects provided by the LaS³, drawn from representative issues identified in prior consultations. These are intended to introduce eye-tracking to companies which have little to no prior experience in usability and UX evaluations.

Beyond format, the events that generated the most positive feedback were those conducted in cooperation with external funded initiatives such as Mittelstand Digital or the IHK. These collaborations benefited from a broader thematic scope, where eye-tracking was embedded alongside complementary UX and usability topics such as accessibility and emotional design, creating a richer and more contextually grounded learning experience for participants.

Chances and risks for succeeding project DInA
Several opportunities arise from the format developments established during DInO. Reflecting on participant feedback, the learning arrangements have been more closely aligned with the actual capacity and needs of SMEs and PSEs, including a clearer differentiation of KPIs between company-specific consultations and group workshop formats. Many of the successful DInO events will carry over into DInA. Most notably, the "IHK Regensburg Webseiten Sprechtag", which was introduced in the final year of DInO, has established itself as a recurring event with consistently high demand. Consultation slots are regularly fully booked, and participants can identify concrete usability improvements within a single day. The primary risk for Task 3.2 lies in the time-limited nature of several current cooperation partnerships. Collaborative events with the Mittelstand Digital Zentrum Fokus Mensch from Stuttgart, for example, will come to an end during the DInA runtime. Given the current funding landscape, continuation or replacement of these partnerships cannot be assumed, creating a potential gap in cooperative events that might need to be actively addressed.

Task 3.3 – AI and Machine Learning

Project Partner	**Project Team / Contact Person**
OTH Regensburg, Regensburg Center of Artificial Intelligence (short RCAI)	Prof. Dr. Wolfgang Mauerer

Target Customers	**Number of targeted Customers** (as written in the proposal)
SME's and PSE's	40 SME's and 10 PSE's
Actual Number of Customers (KPIs)	
4 Workshops & 28 Consultations → In total 115 SMEs and 22 PSEs were reached 10 additional large-scale events were hosted to introduce the technology	

Equipment used

- Advanced High-Performance Computing (HPC) setup featuring two Supermicro Nvidia A100 GPU servers along with an IBM Power 9009-22G system
- Comprehensive open-source toolbox equipped with standard Machine Learning tools, including Docker and Jupyter Notebook/Lab to facilitate research and experimentation
- Fully virtualized environment hosted on our local cloud infrastructure, fortified with state-of-the-art security mechanisms to ensure data integrity and confidentiality
- Seminar room equipped with visual aids and collaborative tools, enhancing the quality of presentations and fostering collaborative learning experience

Selectable Learning Arrangements

- Modular online courses and tutorials covering basics about AI and its adoption in SMEs
- On-site training and consultations tailored to the specific needs of individual SMEs
- Interactive webinars and virtual workshops, allowing participants to engage in discussions during the session
- Mentorship programs
- Peer Learning Groups
- Series of guest speakers from successful AI adoption projects
- Expert panels and roundtable discussions
- Simulation and sandbox environments, allowing SMEs experimenting with AI tools and models

Formats used

- Feasibility assessment to determine whether AI technologies align with goals and needs
- Readiness check to adopt AI considering infrastructure, data quality and personnel skills
- Use case identification

- Proof of Concept (PoC) to test the feasibility and potential impact of machine learning solutions on specific problems or processes
- Ethical considerations of effects and impact on people and society
- Making realistic adjustments to over-optimistic expectations in AI capabilities and subproject management tasks
- Development of Minimum Viable Product (MVP)

Example WP Workflow

1. Initial interview to analyze the SME's or PSE's needs
2. Optional: Introductory workshop on AI technologies (at RCAI or on the customer's site)
3. Optional: AI Use Case workshop to identify and prioritize valuable AI applications (at RCAI or on the customer's site)
4. Optional: Iterative engineering consulting on data collection and pre-processing, ML algorithm selection, optimization, evaluation and deployment; Monitoring of the project's progress
5. Optional: Hands-On exploration with case studies using RCAI's HPC infrastructure
6. Feedback and evaluation interview with future perspectives

Customer Outcome

Across the AI and machine learning activities, customers—primarily SMEs and public sector entities—gained a significantly clearer understanding of how AI can be applied in a practical, value-driven way within their organizations. Through structured feasibility and readiness assessments, participants were able to realistically evaluate their own data, infrastructure, and skill levels, which helped align expectations and avoid costly missteps. Many customers progressed from abstract interest in AI to clearly defined use cases and, in several instances, to concrete Proofs of Concept or Minimum Viable Products. The availability of high-performance computing infrastructure and sandbox environments enabled hands-on experimentation, which was consistently highlighted as a key benefit in feedback, as it lowered barriers to entry and built confidence in adopting AI technologies.

Workshops, consultations, and interactive formats fostered strong engagement and collaborative learning, with participants particularly valuing the tailored guidance and "learning-by-doing" approach. Customers reported that the combination of technical expertise, ethical considerations, and iterative support helped them not only identify opportunities but also understand limitations and risks of AI deployment. As a result, organizations were better equipped to make informed strategic decisions regarding AI adoption. Feedback across events and follow-up discussions was overwhelmingly positive, with many participants expressing increased readiness to initiate or expand AI projects and a strong interest in continued support, mentorship, and advanced training offerings.

Strengths and Weaknesses of the formats used
The formats proved particularly strong in their flexibility and practical orientation: a mix of workshops, consultations, and hands-on sessions allowed customers to engage at their own level of maturity and translate theory directly into application. The “learning-by-doing” approach, supported by sandbox environments, was especially effective in building confidence and delivering tangible results. Interactive elements such as peer learning, expert discussions, and iterative consulting further enhanced engagement and knowledge retention. However, some challenges were observed: the modular and optional structure occasionally led to fragmented participation, and varying levels of prior knowledge among participants made it difficult to maintain a consistent depth across sessions. Additionally, resource-intensive formats such as individualized consultations and PoC development limited scalability, particularly for organizations with constrained time or personnel.

Lessons learned
A key lesson learned is that successful AI adoption in SMEs and PSEs requires a strong balance between technical enablement and expectation management: early-stage feasibility and readiness checks are essential to ground ambitions in reality and avoid overcommitment. Hands-on, iterative formats proved far more effective than purely theoretical training, highlighting the importance of accessible infrastructure and “learning-by-doing” approaches. At the same time, tailoring content to different maturity levels is critical, as heterogeneous participant backgrounds can otherwise limit effectiveness. Another important insight is that continuous support—beyond one-off workshops—is highly valued and often necessary to sustain progress, particularly for moving from initial ideas to PoCs or MVPs. Finally, integrating ethical considerations and real-world constraints early in the process helps build more sustainable, trustworthy, and practically deployable AI solutions.

Chances and risks for succeeding project DInA
Opportunities to deepen AI adoption by building established trust, proven formats, and the existing network of engaged SMEs and PSEs. Expanding hands-on offerings, scaling successful mentorship and PoC development approaches, and further leveraging HPC infrastructure can accelerate the transition from experimentation to productive deployment. Specializing in sector-specific AI solutions as proposed for Din Ais rooted in customer feedback and has potential to strengthen long-term partnerships, positioning the initiative as a central hub for applied, trustworthy AI. Risks include resources and the high effort required for individualized support may constrain scalability, while varying levels of digital maturity among customers can slow progress and reduce impact. There is also a risk of declining engagement if expectations are not continuously aligned with realistic outcomes or if quick wins are not visible.

Task 3.4 - IoT & UAV Test Lab

Project Partner	**Project Team / Contact Person**
Deggendorf Institute of Technology Institute for Applied Computer Science	Verena Pilzweger

Target Customers	**Number of targeted Customers** (as written in the proposal)
SME's and PSE's	40 SME's and 10 PSE's
Actual Number of Customers (KPIs)	
1 Workshops & 3 Consultations → In total 25 SMEs and 12 PSEs were reached 3 additional large-scale events were hosted to introduce the technology	

Equipment used

- Advanced equipment, including multicopter carrier systems with up to 25 kg MTOW
- Modular extensions such as 5G modules, IoT sensors, LiDAR systems, and cameras
- SenseBox IoT construction kit for hands-on learning
- Presentation slides to support theoretical instruction

Selectable Learning Arrangements

- Flexible learning arrangements based on participant objectives
- Independent development of technical know-how (self-directed learning)
- Structured knowledge transfer tailored to specific customer needs
- SME-focused learning formats, emphasizing practical skills, scalability, and cost-efficient implementation
- PSE-oriented approaches, focusing on integrating products and services through applied, system-level learning

Formats used

- Presentations and awareness workshops to convey key concepts
- Individualized one-on-one consultations for tailored support
- Laboratory visits at the research site for hands-on insights and technology demonstrators
- Show cases and best practice examples to illustrate real-world applications
- Utilizes digital formats such as webinars and hybrid sessions to broaden access and scalability

Example WP Workflow

1. Initial consultation
2. Needs analysis for the SME or PSE using a specific questionnaire (also identifying current problems)
3. Knowledge transfer through lectures and /or lab visits at the research site

Customer Outcome
As a result of participation, customers gain an enhanced understanding of drone and IoT technologies, including their functions and potential applications. Exposure to real-world use cases provides a solid basis for making informed investment decisions. Practical demonstrations and application-oriented examples help participants understand how these technologies can be applied within their specific contexts. Furthermore, direct interaction with technology, combined with guided demonstrations and clear explanations, reduces both technical and psychological barriers, thereby increasing confidence in engaging with these innovations.

Strengths and Weaknesses of the formats used
The low-threshold approach proved effective because it made participation simple and the technology more approachable for all stakeholders. The laboratory visits proved to be the most popular among participants. On the one hand, online offerings like awareness workshops facilitate higher participation rates among customers compared to on-site offerings. On the other hand, in-person discussions and direct observation of technology have proven to be the most beneficial in retrospect.

Lessons learned
Lowering entry barriers proved essential, as many companies were initially hesitant to adopt new technologies like UAVs due to their perceived complexity or lack of expertise. To address this, practical use cases were incorporated, helping to present the technology in a more accessible and relatable way. By demonstrating concrete applications and real-world benefits, SMEs were able to better understand the relevance and potential of the technology for their own operations. This approach not only increased interest and participation but also supported a more intuitive and confident adoption process.

Chances and risks for succeeding project DInA
This service is no longer part of the DInA service offering

Task 3.5 - High Performance Computing Capacities

Project Partner	Project Team / Contact Person
THD Institute for Future Technologies	Prof. Dr. Helena Liebelt Antje Fischer Maximilian Gell

Target Customers	Number of targeted Customers (as written in the proposal)
SME's and PSE's	40 SME's and 10 PSE's
Actual Number of Customers (KPIs)	
5 Workshops & 13 Consultation → In total 29 SMEs and 21 PSEs were reached 7 additional large-scale events were hosted to introduce the technology	

Equipment used
• Bulletin board, flipchart, moderation cards, online meetings, presentations • HPC and casual IT equipment Institute Future Technology

Selectable Learning Arrangements
• On-site workshops to build a foundation of knowledge • On-site & lab training and consultations tailored to the specific needs of individual customers • Interactive webinars and virtual workshops, allowing participants to engage in discussions during the session • Guest speakers from leading companies and renowned experts

Formats used
• Hosting basic webinars for specific branches • Hosting a yearly symposium for HPC&QC • Individual consulting with test equipment and lab • Hosting on-site workshops

Example WP Workflow
1. Hosting (basic) webinar for specific industries / sectors to generate new leads 2. Conduct one-on-one and personalized consultations with prospective clients

Customer Outcome
Despite challenging framework conditions—most notably the repeated delays in the construction and availability of the training data center—the project successfully achieved its intended outcomes. Limitations in providing physical test infrastructure were effectively mitigated by placing a stronger emphasis on capacity building and the development of foundational knowledge among target groups, rather than focusing primarily on access to test equipment. As a result, the project delivered substantial impact in terms of awareness raising, stakeholder engagement, and capability development in the fields of Quantum Computing and High-Performance Computing (HPC). Firstly, public sector stakeholders were systematically introduced to the fundamental concepts of Quantum Computing and HPC. Through targeted training activities, a solid baseline understanding was established, fostering informed interest and enabling institutions to better assess the strategic relevance of these technologies. Secondly, small and medium-sized enterprises (SMEs) were engaged through a series of webinars and information sessions. These activities combined foundational knowledge transfer with the presentation of concrete, sector-specific use cases, allowing participating companies to identify potential applications and evaluate the relevance for their respective industries and business models. Thirdly, SMEs with already identified use cases received advanced, tailored support. This included dedicated advisory services as well as, where feasible, access to testing environments. These measures enabled participating companies to further develop, refine, and optimize their processes and application scenarios, thereby strengthening their innovation capacity. Overall, the project significantly contributed to building competencies, increasing technology uptake readiness, and fostering a more informed and capable ecosystem around Quantum Computing and HPC across the addressed stakeholder groups.

Strengths and Weaknesses of the formats used
The delivery of introductory webinars tailored to specific industry sectors proved to be an effective tool for initial awareness raising and knowledge transfer. These sessions consistently received positive feedback, particularly regarding their accessibility and relevance for beginners. However, a key challenge remained the acquisition and mobilization of participants, as reaching and engaging a sufficiently broad audience required continuous outreach efforts. The annual symposium on HPC and Quantum Computing emerged as a strong platform for high-level exchange between interested stakeholders and domain experts. It facilitated valuable networking opportunities and has become increasingly established as a forum for expert dialogue in the fields of HPC and Quantum Computing. On the downside, the organization of the symposium required significant

effort, particularly in securing international experts as speakers to ensure high quality and attractiveness of the event.

This format provided the highest level of impact for SMEs with clearly defined use cases. Through tailored consulting and hands-on support, companies were able to address specific challenges and improve or optimize their processes. Nevertheless, the delayed availability of the training data center limited the extent to which testing opportunities could be offered at scale prior to potential investment decisions, thereby reducing the overall reach of this format.

Overall, the combination of formats allowed for a comprehensive approach, ranging from initial awareness building to in-depth technical support, while highlighting the importance of aligning infrastructure availability with service delivery.

Lessons learned

The implementation of the project provided several important insights regarding both operational conditions and stakeholder engagement in the fields of Quantum Computing (QC) and High-Performance Computing (HPC).

A key challenge was the delay in the availability of the training data center due to construction-related issues beyond the project's control. This highlighted the critical dependency of infrastructure-driven activities on external factors and underlined the need for flexible planning and adaptive implementation strategies.

In response to these constraints, a strategic shift towards more intensive foundational training proved to be highly effective. Strengthening basic knowledge among stakeholders not only compensated for limited access to infrastructure but also created a more sustainable basis for future uptake of QC and HPC technologies. At the same time, the project confirmed that identifying and engaging interested stakeholders in both the public sector and among SMEs remains inherently challenging. Awareness of QC and HPC is still limited, and the perceived complexity of these technologies can act as a barrier to entry.

Related to this, the transfer of real-world business problems into potential QC and HPC applications was often too abstract for many participants. This demonstrated a clear need for extensive foundational education and guided translation of domain-specific challenges into computational use cases. However, the project also showed that highly innovative and digitally mature companies were able to benefit significantly. Organizations that had already identified relevant challenges and possessed at least partially structured data were in a strong position to engage with advanced support services and to make tangible progress in applying QC and HPC to their operations.

Overall, the experience underscores the importance of combining awareness raising, capacity building, and targeted support, while ensuring flexibility in response to external constraints and varying levels of stakeholder readiness.

Chances and risks for succeeding project DInA
A key opportunity lies in further reinforcing the strategic shift from a “test before invest” approach towards a stronger focus on skills development and knowledge transfer. Prioritizing structured training and capacity building (“Skills & Training”) is expected to create a more sustainable foundation for the adoption of QC and HPC, particularly among stakeholders with low initial maturity. In this context, a more targeted approach is recommended, focusing on a smaller number of companies but supporting them more intensively. Enabling these organizations in a comprehensive manner—ranging from foundational understanding to practical application—can lead to deeper and more measurable impact. In addition, there is considerable potential in further engaging the public sector. By strengthening competencies within public institutions, DInA can contribute to the optimization of internal processes and data utilization, thereby fostering efficiency gains and innovation within administrative structures. At the same time, a key risk remains in the identification and mobilization of suitable participants, particularly among local SMEs. As observed in the current project, many companies face constraints in terms of time, personnel, and financial resources within their day-to-day operations, limiting their ability to engage with emerging technologies such as QC and HPC. This structural barrier may continue to affect participation rates and should be addressed through low-threshold engagement formats, clear value communication, and alignment with immediate business needs.

Task 3.6 – 5G Testbed

Project Partner	Project Team / Contact Person
Deggendorf Institute of Technologie Institute for Applied Computer Science	Verena Pilzweger

Target Customers	Number of targeted Customers (as written in the proposal)
SME's	50 SME's
Actual Number of Customers (KPIs)	
1 Workshop & 4 Consultation → In total 13 SMEs and 6 PSEs were reached 4 additional large-scale events were hosted to introduce the technology	

Equipment used

- Keysight signal analyzer and Keysight VXG Signal Generator M9384B
- Software-defined radio systems for flexible communication testing
- Mobile measurement backpack for data collection in dynamic environments
- EMV cage for controlled electromagnetic compatibility testing
- 5G Open Radio Station and an indoor 5G campus network for real-world connectivity demonstrations
- Presentation slides to support theoretical instruction

Selectable Learning Arrangements

- Flexible learning arrangements based on individual participant needs
- Self-directed development of technical expertise
- Targeted knowledge transfer tailored to customer-specific requirements
- SME-oriented formats focusing on practical application, quick adoption, and resource-efficient learning
- PSE-focused learning approaches that integrate product and service perspectives in real-world scenarios

Formats used

- Presentations and awareness workshops to communicate key concepts
- Individualized one-on-one consultations for tailored guidance
- Guided laboratory visits for hands-on experience with technologies
- Digital delivery formats such as webinars and hybrid sessions to expand reach
- Demonstration and pilot formats to showcase real-world use and validate solutions

Example WP Workflow

1. Initial consultation
2. Needs analysis for the SME or PSE using a specific questionnaire (also identifying current problems)
3. Knowledge transfer through lectures and /or lab visits at the research site

Customer Outcome
As a result of participation, customers develop a comprehensive understanding of 5G technologies, including their technical foundations, capabilities, functions, and potential applications. By examining real-world use cases, participants are better equipped to make informed investment decisions, while also considering alternative technologies and connectivity options as part of a balanced evaluation process. Practical demonstrations and application-based examples help illustrate how these technologies can be implemented in specific contexts. Furthermore, direct interaction with the systems, combined with guided demonstrations and clear explanations, reduces both technical and psychological barriers, thereby increasing confidence in adopting and working with these innovations.

Strengths and Weaknesses of the formats used
The low-threshold approach proved effective, as it made participation simple and the technology more approachable for all stakeholders. By reducing complexity and lowering initial barriers, a broader range of participants could be reached and actively involved. In this context, online offerings facilitated higher participation rates compared to on-site formats, as they allowed for more flexible and accessible engagement. At the same time, in-person discussions and the direct observation of technology ultimately proved to be more beneficial in retrospect, as they enabled deeper understanding, more intensive exchange, and a more tangible experience of the solutions.

Lessons learned
Adopting a low-threshold approach helped to reduce entry barriers and made it easier for stakeholders to engage with the technology. To support this, numerous use cases were applied to present the technology in a more accessible and practical way, enabling participants to better understand its relevance and potential in real-world contexts.

Chances and risks for succeeding project DInA
This service is no longer part of the DInA service offering