TBI - supported digital product and service innovations

D2.1



EDIH ADRIA

EDIH Adria – EUROPEAN DIGITAL INNOVATION HUB ADRIA – Digital Transformation of Adriatic Croatia
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EUROPEAN DIGITAL INNOVATION HUB ADRIA

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INTRODUCTION

This report provides an overview of the companies that have participated in the Test Before Invest (TBI) innovation services, specifically focusing on the innovation TBI engagements known as Innovation Labs. The overview highlights the broad diversity of industries represented, as well as the wide range of technological innovations these organizations have embraced through the TBI framework. Companies are categorized based on the specific services they received, offering valuable insights into the scope and impact of the program.

It is important to note that detailed internal reports on the delivered TBI services are securely stored on the University of Rijeka's protected SharePoint platform (UNIRI) and are accessible upon request. Each TBI service user was provided with a comprehensive report about the support received, which can be utilized to inform and facilitate procurement of the necessary solutions.

While this report focuses exclusively on the innovation aspect of TBI services (Innovation Labs), a separate document *D2.2 TBI-supported digital transformation projects* covers the services supporting digital transformation projects more broadly.

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Innovation Lab

The Innovation Lab's mission is to facilitate the development, testing, and application of innovative digital solutions. As a strategic initiative within the EDIH Adria ecosystem, the Innovation Lab fosters innovation, collaboration, and entrepreneurship. It offers a platform for individuals and organizations to develop and validate new digital products and services aligned with EDIH Adria's focus areas: health and quality of life, transport and mobility, energy, and sustainable development.

Experts from EDIH Adria provide guidance and support for early-stage digital products and services throughout prototype or minimum viable product (MVP) creation, functionality testing, and feature evaluation phases. The Innovation Lab adopts a bottom-up approach, allowing users full freedom to propose digital innovation concepts requiring EDIH support. It provides a structured framework to incubate and validate these ideas before significant investment decisions are made.

Although each digital innovation project is unique, the following activities are generally included as part of the services provided in most TBI innovation projects:

- **Concept assessment:** This involves a thorough examination of the proposed digital product or service idea, including market potential, technical feasibility, and alignment with strategic innovation goals. Relevant information is gathered to gain a clear understanding of the concept's strengths and challenges.
- **Technology and solution exploration:** An in-depth evaluation of available digital tools, platforms, and technologies is conducted. Based on the specific objectives and innovation requirements, the most suitable technologies are selected to support prototype or MVP development effectively.
- **Prototype development and testing:** The chosen technologies are applied to build and customize prototypes or minimum viable products. This phase includes hands-on demonstrations and testing to verify that the solution fulfills the intended functions and meets user expectations in practical scenarios.
- **Functionality and performance evaluation:** The digital innovation is rigorously assessed to evaluate its operational capabilities and reliability. This ensures that the solution can consistently perform its required tasks and withstand real-world usage demands.
- **Preparation of documentation and technical reports:** Comprehensive reports and technical documentation are developed, summarizing findings, technology evaluations, and recommendations for further development or commercialization. These materials support decision-making and provide necessary information for procurement or scaling efforts.

These activities collectively facilitate the validation and maturation of innovative digital products and services, ensuring they are robust, viable, and aligned with market and user needs.

Outcomes of testing:

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- **Identification of viable innovative solutions:** Through comprehensive evaluation and incubation, the most promising digital products and services are identified as aligned with user needs and EDIH priorities.
- **Demonstration and validation**: Ideas undergo rigorous prototype or MVP testing, ensuring technical feasibility, functional reliability, and user value in realistic conditions.
- **Preparation of detailed reports and documentation**: Comprehensive reports and technical specifications are developed to support further development, decision-making, and procurement processes related to these innovations.

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Reports on the TBI services performed

The following table (Table 1) presents an overview of 19 projects implemented by SMEs across various sectors in Croatia. The table outlines key information for each project, including the organization, industry, project focus, duration, technology category, and estimated investment value. Together, these entries illustrate the current landscape of digital innovation initiatives - ranging from AI-driven assistants, big data analytics, IoT solutions, communication networks, to advanced internet services - and highlight the strategic adoption of modern technologies to improve customer services, optimize operations, and support economic development.

Table 1. Reports on the TBI services performed

No.	User	PI/SME	Industry/sector	Category of the tested technology	Short/general topic description	Project duration	Estimated investment value (EUR)
1	3T. CABLE d.o.o.	SME	Electrical Equipment / Cable Manufacturing	Internet of Things	Solar power plant monitoring platform.	5 months	50.000,00 €
2	MELKIOR TECH d.o.o.	SME	Technology / IT Solutions	Artificial Intelligence & Decision support	Hybrid chatbot on the WhatsApp channel for event information.	5 months	15.000,00 €
3	KRISTALNA IDEJA	SME	Environmental Technology / Air Quality Solutions	Internet of Things	Digital solution for automated indoor air quality management.	8 months	- €
4	CENOSCO d.o.o.	SME	Engineering Consulting / Energy Sector	Artificial Intelligence & Decision support	Development of an AI model based on GENAI to identify corrosion areas on pipelines and industrial installations from photographs.	4 months	- €

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5	INFO NETWORK d.o.o.	SME	IT Services / Software Development	Internet Services & Applications	Web technologies for 3D model visualization and customization in browsers, including AI-generated backgrounds.	3 months	10.000,00 €
6	RIS d.o.o.	SME	IT Consulting / Consumer products	Artificial Intelligence & Decision support	AI-based automation of repetitive inquiries in the support process to increase efficiency and reduce operational load on staff.	2 months	30.000,00 €
7	EUPOLIS GRUPA d.o.o.	SME	Construction / Infrastructure Development	Artificial Intelligence & Decision support	AI chatbot for information, recommendations, and gamification.	10 months	20.000,00 €
8	LLoyds digital d.o.o.	SME	Digital Marketing / IT Services	Artificial Intelligence & Decision support	Rule-based chatbot for communication between business clients and end users with the purpose of restaurant table reservations.	10 months	5.600,00 €
9	Infra Plan Konzalting d.o.o.	SME	Infrastructure Planning / Engineering Consulting	Internet of Things	Digital solution for data management and its capabilities from the perspective of enriching BIM/EPD models with additional information from sensors and/or other information systems (e.g., meteorological data, energy consumption, etc.).	6 months	- €
10	I Digital d.o.o.	SME	Digital Solutions / Software Development	Artificial Intelligence & Decision support	AI chatbot for communication with entrepreneurs generating marketing strategies and plans.	4 months	15.000,00€
11	Poliklinika Salus d.o.o.	SME	Healthcare / Medical Services	Artificial Intelligence & Decision support	AI chatbot for customer communication.	3 months	15.000,00€

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12	Smart Aqua d.o.o.	SME	Environmental Technology / Water Management	Artificial Intelligence & Decision support	Digitalization of water management in order to reach higher efficiency of public water supply systems.	4 months	869.000,00 €
13	Poliklinika Primari	SME	Healthcare / Medical Services	Artificial Intelligence & Decision support	Automating patient communication and administrative processes with AI.	4 months	150.000,00 €
14	Engasco d.o.o.	SME	Manufacturing / Technical Equipment	Internet Services & Applications	Evaluating AI-enhanced digital monitoring and maintenance systems using photo validation and IoT data.	3 months	122.000,00 €
15	Drugi otok	SME	Real Estate / Property Management	Artificial Intelligence & Decision support	Prototype system based on a detection model tasked with identifying dry stone walls.	4 months	- €
16	AL Sistemi d.o.o.	SME	IT Infrastructure / Systems Integration	Cloud Services, Data	Evaluating an AI-based predictive maintenance system for industrial machinery, including its integration with existing IoT infrastructure and its impact on reducing downtime and improving operational efficiency.	1 month	- €
17	Digitcom	SME	Telecommunications / ICT Services	Artificial Intelligence & Decision support	AI applications to improve digital services in charter business, focusing on automated rental price estimation and interactive user AI assistant development.	5 months	- €
18	T & S d.o.o.	SME	Trade / Services	Artificial Intelligence & Decision support	Integration of generative AI and large language models into T&S's digital platform to enhance user experience, improve search,	3 months	- €

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					better connect users with experts, and reduce customer support workload.		
19	Green Spark	SME	Renewable Energy / Environmental Solutions	Artificial Intelligence & Decision support	Testing the feasibility of integrating AI into the SustainMe platform to automate expert assessments and match users with ESG service providers.	3 months	12.000,00 €

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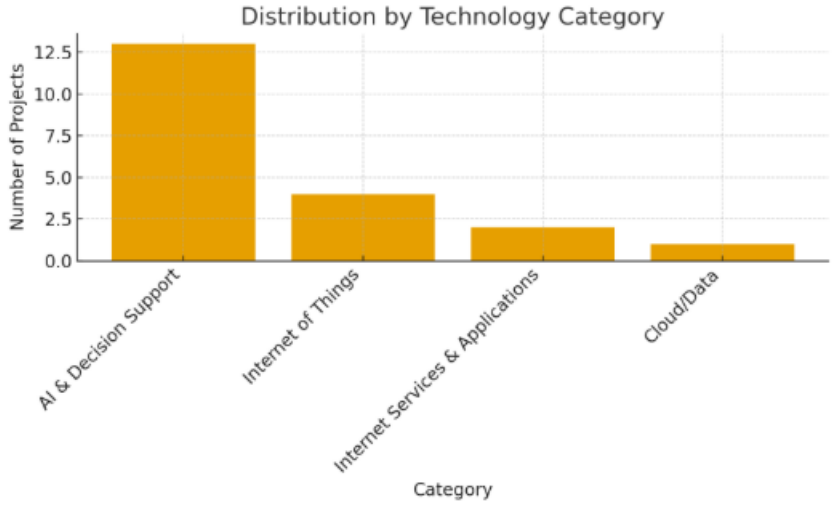
Statistical analysis – summary

Distribution by technology category

Based on the analysed innovation projects, the majority of tested solutions fall within the category **Artificial Intelligence & Decision Support**, confirming the continued strong trend of AI-driven digital transformation among SMEs. More than two-thirds of all projects explored AI models, chatbots, automated communication systems and intelligent decision-support mechanisms. These solutions were primarily aimed at improving customer interaction, automating operational processes, and supporting strategic business decisions. Investment values in this group show significant variation, ranging from **5,600 EUR to over 869,000 EUR**, reflecting both small prototype tests and larger-scale optimization initiatives.

The second most represented category is the **Internet of Things**, including projects related to energy monitoring, smart environmental management, enhanced BIM/EPD models, and industrial data collection. These IoT projects typically combine sensor data with analytical engines, enabling real-time insights into consumption, infrastructure performance and environmental status. Investments in this category range from smaller prototypes up to large solutions exceeding **50,000 EUR**.

Figure 1. Distribution by technology category



A smaller but important group of projects belongs to **Internet Services & Applications** and **Cloud/Data** solutions. These include web-based visualization tools, 3D configurators, AI-augmented maintenance systems, and cloud-driven predictive analytics. Such projects

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illustrate the growing importance of digital platforms and data integration as enablers of operational efficiency and service innovation.

Overall, the data indicates that **AI technologies dominate SME innovation efforts**, while **IoT and Cloud/Data solutions play a key supporting role in operational optimization and industrial digitalization**.

Distribution by type of organization

All analysed projects were implemented by SMEs. This full concentration within the SME sector highlights the entrepreneurial role of small businesses as early adopters and testers of innovative digital technologies.

The SME-driven portfolio spans a diverse set of industries, including IT services, healthcare, environmental technologies, engineering, manufacturing, telecommunications, renewable energy, and consumer services. Despite the absence of public institutions in this dataset, the variety of sectors demonstrates that digital transformation priorities are shared broadly across the private sector, from highly technical industries such as energy and infrastructure, to service-oriented fields like tourism, healthcare, and digital marketing.

SMEs in this sample tend to focus on **practical, implementation-ready prototypes** with measurable business impact—such as automation, predictive maintenance, advanced monitoring and enhanced customer interaction. This behaviour is consistent with market-driven innovation cycles, where smaller organizations adopt agile approaches and experiment with scalable technological solutions.

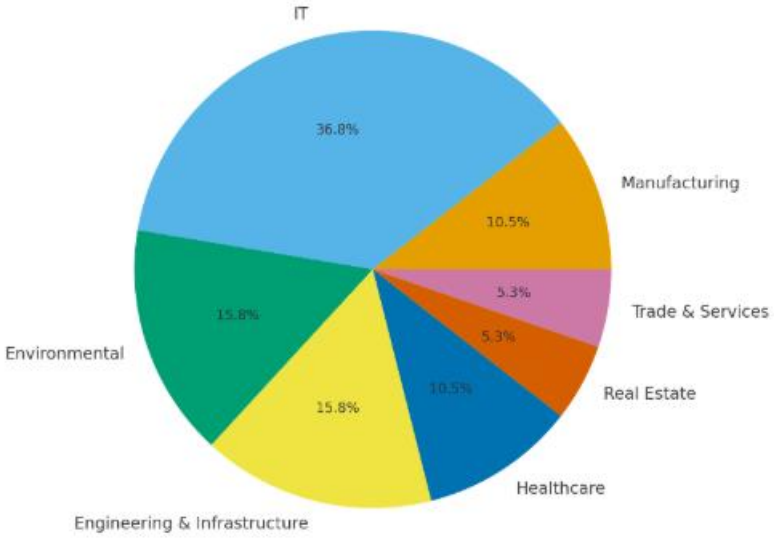
Classification of participants by industry/sector

The participants were grouped into several industry categories, reflecting the wide applicability of digital innovation across the economy. The largest representation comes from:

- **IT and software development companies**, focusing heavily on AI assistants, automated support systems, and digital platform enhancements;
- **Environmental and industrial technology sectors**, testing IoT and AI models for monitoring, optimization, and predictive maintenance;
- **Healthcare providers**, implementing AI-based solutions for patient communication and administrative automation;
- **Energy and infrastructure engineering**, exploring digital and sensor-driven tools to improve efficiency and operational performance;
- **Manufacturing, telecommunications, real estate and services**, adopting AI and data solutions to enhance business models and internal processes.

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Figure 2. Distribution by industry sector



This distribution confirms that **digital innovation is no longer limited to technology-oriented industries**, but is widely integrated across the SME landscape as a key driver of competitiveness, efficiency and sustainability.

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Case studies of successful microservices prototypes

This chapter presents practical examples of microservices introduced and tested through the EDIH TBI framework. Across diverse organizations, microservices proved highly effective in modernizing systems, improving reliability, and enabling faster, more flexible service delivery. By replacing monolithic architectures with smaller, independent components, these initiatives achieved smoother integrations, easier scaling, and more efficient maintenance. Together, the case studies showcase how a structured test-before-invest approach helps organizations reduce risks, validate solutions early, and build digital infrastructure that is truly ready for long-term growth.

AI tools for business optimization

By using artificial intelligence, these technologies provide companies with the opportunity to improve efficiency, personalize services, and make strategic decisions based on data analysis.

Chatbot assistants for sale and services

AI-powered chatbots enable seamless interaction with users, automating responses and helping with sales and services, thereby improving user experience and operational efficiency.

Melkior Tech Ltd., in partnership with the WOOM.zone event platform, tested an AI-powered WhatsApp chatbot to improve how conference and webinar participants get information about schedules, locations, changes, and overlapping sessions. Through the EDIH Adria TBI program, a prototype based on large language models was built and tested on a set of typical event-related questions. The solution provides real-time, 24/7 answers, is easily updatable and highly scalable, and can handle many users simultaneously. Expected benefits include better availability of support on a popular channel (WhatsApp), reduced workload for contact center and admin staff, faster response times, higher participant satisfaction, and a clear estimate of implementation costs to guide further investment decisions.

Polyclinic Primari used EDIH Adria's TBI service to prototype an AI agent that streamlines communication with patients and external partners, addressing growing administrative workload from repetitive tasks like email handling, appointment scheduling, and coordination of systematic checkups. The tested solution combined an AI avatar for general information, an intelligent email classifier (9 categories), automated symptom-based triage with specialist and time-slot suggestions, Google Calendar integration for automatic booking, coordination with external providers, and a centralized, verified knowledge base powered by LLM + RAG. In a test environment, it reduced response times from 4–24 hours to under 5 minutes, cut administrative workload by 85%, improved triage accuracy to 95%, shortened checkup organization from 1–2 days to 30 minutes, increased patient satisfaction, and indicated annual savings of €35k–50k with ROI in 8–9 months, clearly

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demonstrating the operational and financial potential of AI-driven digital transformation in healthcare.

RIS Ltd., a business software company facing a growing volume of repetitive support requests via email and phone, used EDIH Adria's TBI program to prototype an AI-powered digital assistant based on LLM + RAG. In a controlled test environment, the assistant was connected to a small internal knowledge base (FAQs, manuals, sample tickets) and demonstrated automatic email classification and prioritization, retrieval of relevant internal content, draft answer generation for human review, and an interface for viewing conversations and past interactions, with strong emphasis on data security. Testing showed that such a solution could cut low-complexity workload by 50–60%, reduce response times for routine queries by over 70%, lower escalations to higher-level support by up to 40%, enable 24/7 availability without new hires, and improve consistency and accuracy of answers, clearly indicating the potential for a more scalable, efficient, and user-friendly customer support operation.

Optimization of business processes

AI solutions analyse and improve business flows, identifying inefficiencies and offering insights to optimize operations, increase productivity and reduce costs.

Cenosco Ltd., a leading provider of Asset Integrity Management software for high-risk industries, explored with EDIH Adria through the TBI program how AI could improve corrosion detection on pipelines and industrial equipment. Using a large, annotated image dataset, the EDIH Adria team developed and tested a computer vision prototype based on the YOLOv11 "small" model, combined with an innovative tiling strategy for high-resolution images to preserve fine details. The model achieved promising results (mAP50 = 0.756, precision 0.857, recall 0.662), reliably identifying and classifying different corrosion types while demonstrating the ability to rapidly process large volumes of inspection photos. The project confirmed the technical feasibility (TRL 3–4) and strong potential of AI to automate and objectivize visual integrity assessments, reduce manual review time, and improve consistency, providing Cenosco with a solid foundation and concrete recommendations for future integration of advanced AI capabilities into its Integrity Management Suite.

SmartAqua Ltd., a technology company focused on digitalization in water utilities, used EDIH Adria's TBI program to prototype the next generation of its SmartAqua WISDOM (Water Intelligent System for Digital Operations Management) platform. The goal was to tackle fragmented fault reporting, poor analytics, and high technical water losses by combining existing data sources (GIS, IoT, customer databases) with multiple GPT-4–based AI agents and a RAG architecture. In a demo environment, WISDOM analysed customer fault reports in natural language, classified and prioritized interventions, generated reports and customer communication, and provided interactive maps, real-time dashboards, and a repair module with work and equipment recommendations. Testing showed up to 90% faster responses on complex issues, automated handling of 100+ faults per week, over 300% more user interactions thanks to an intuitive AI interface, and time savings of 4–6 hours per operator weekly, clearly demonstrating the system's potential to transform operational efficiency, decision-making, and transparency in the water utility sector.

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“Drugi otok”, a crafts business dedicated to vernacular heritage, explored with EDIH Adria through the TBI program whether AI can automatically detect dry stone walls on complex, noisy LiDAR data and thus speed up mapping and documentation. Together with the EDIH Adria team, they created a bespoke dataset with 3,000+ annotated wall examples on 700+ LiDAR images and trained a YOLOv11 medium model with oriented bounding boxes (OBB) tailored to the elongated shape of walls, optimized as a single-class detector on high-resolution images. The prototype achieved around 48% precision and recall, proving technical feasibility and showing clear value as an “AI assistant” for a first pass over large area, automatically flagging nearly half of potential wall locations and significantly accelerating manual work. The project highlighted the importance of specialized, high-quality data and indicated next steps such as using denser LiDAR (≥300 points/m^2), working directly on point clouds, and developing a GIS plugin, laying a solid foundation for future AI tools in cultural landscape conservation.

AI tools for energy transition

Artificial intelligence technologies enable advanced monitoring, analysis and optimisation of energy consumption, supporting the transition to renewable energy sources and more sustainable management of energy systems. AI solutions help predict failures, reduce maintenance costs and increase energy efficiency at household and industry level. Tests within EDIH Adria explored how these solutions can contribute to the digitalisation of energy networks, energy trade and the sustainable development of communities.

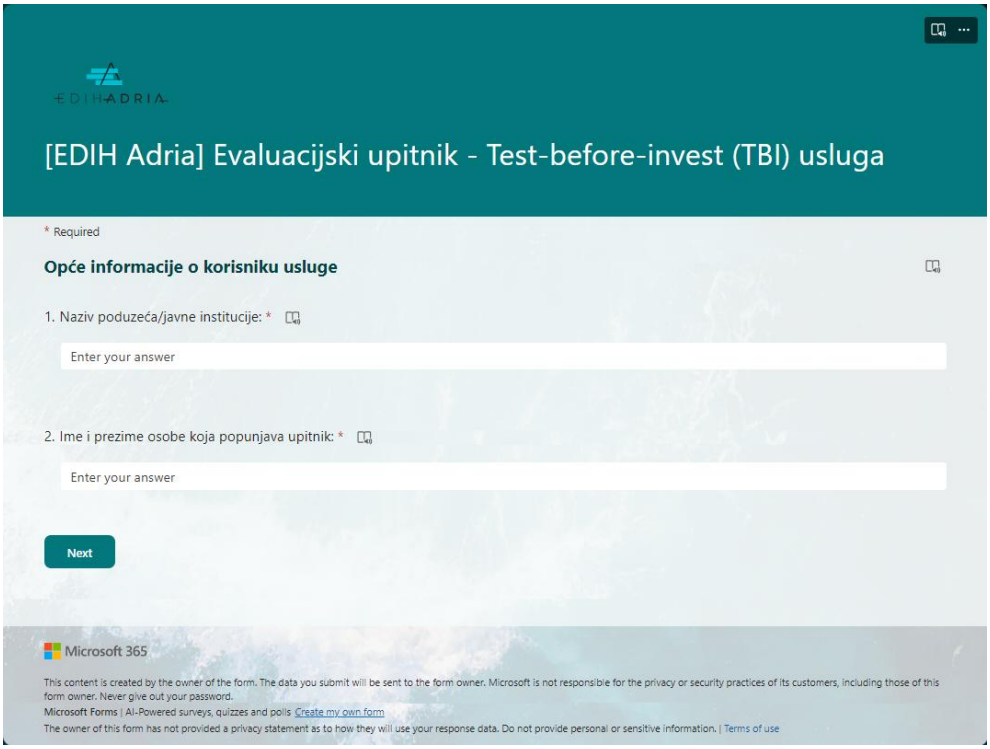
The success story about **3t.Cable**, a company specialized in designing and building PV systems, explored how IoT-based digital monitoring could optimize the performance and maintenance of its growing portfolio of solar plants. The project compared a commercial energy management platform (Insulae) with an open-source, flow-based tool (Node-RED) to design a scalable remote monitoring solution that collects and analyses real-time production and performance data, supports anomaly detection and predictive maintenance, and integrates with existing PV systems. Once fully implemented, the solution is expected to reduce downtime by 20–30%, improve energy efficiency by 5–10%, cut maintenance costs by 15–20%, and increase customer satisfaction and retention, while strengthening 3t.Cable’s technological leadership and sustainability impact in the renewables sector.

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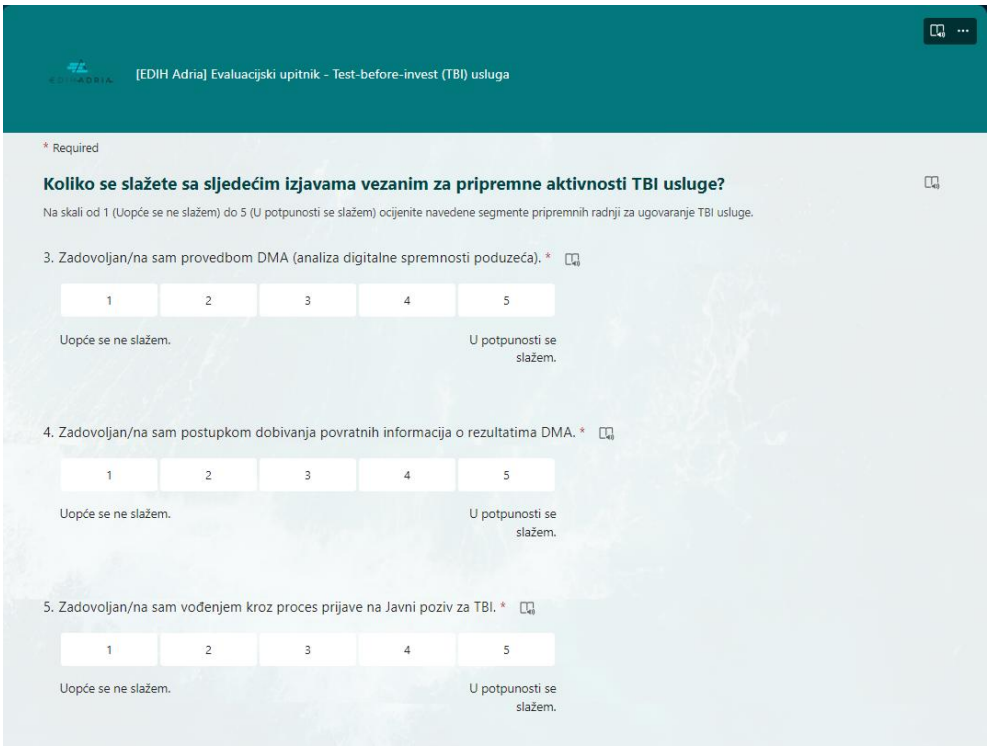
Users' feedback on the TBI service – short overview

At the conclusion of each TBI project, feedback is gathered through a standardized Microsoft Forms survey. An online form is used because of its practicality and efficiency. The link to this form is distributed to the service user along with the corresponding report on the TBI service provided.

Figure 3: Feedback form for the Test-before-invest service



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[EDIH Adria] Evaluacijski upitnik - Test-before-invest (TBI) usluga

* Required

Koliko se slažete sa sljedećim izjavama vezanim za pripremne aktivnosti TBI usluge?

Na skali od 1 (Uopće se ne slažem) do 5 (U potpunosti se slažem) ocijenite navedene segmente pripremnih radnji za ugovaranje TBI usluge.

3. Zadovoljan/na sam provedbom DMA (analiza digitalne spremnosti poduzeća). *

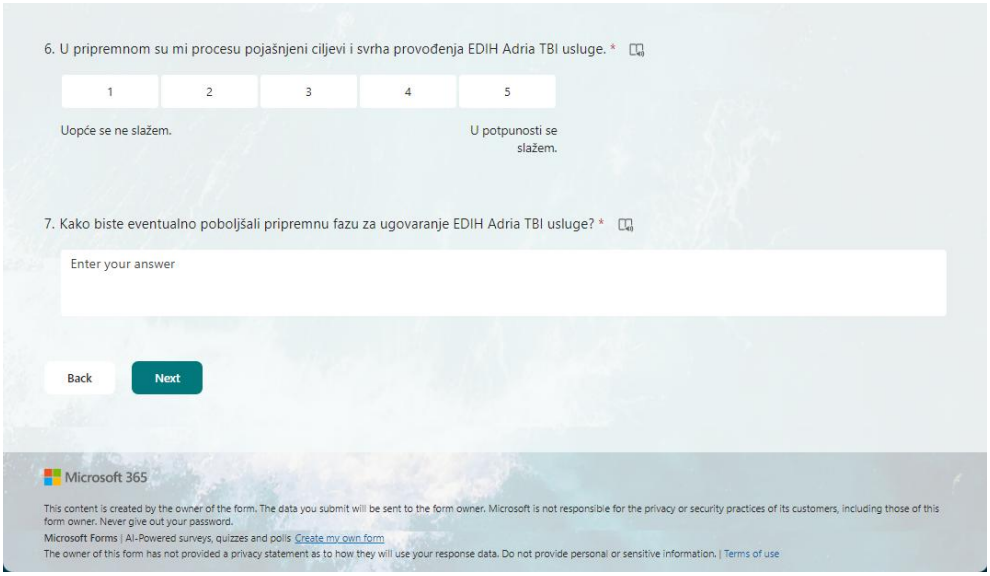
1	2	3	4	5
Uopće se ne slažem.				U potpunosti se slažem.

4. Zadovoljan/na sam postupkom dobivanja povratnih informacija o rezultatima DMA. *

1	2	3	4	5
Uopće se ne slažem.				U potpunosti se slažem.

5. Zadovoljan/na sam vođenjem kroz proces prijave na Javni poziv za TBI. *

1	2	3	4	5
Uopće se ne slažem.				U potpunosti se slažem.



6. U pripremnom su mi procesu pojašnjeni ciljevi i svrha provođenja EDIH Adria TBI usluge. *

1	2	3	4	5
Uopće se ne slažem.				U potpunosti se slažem.

7. Kako biste eventualno poboljšali pripremnu fazu za ugovaranje EDIH Adria TBI usluge? *

Enter your answer

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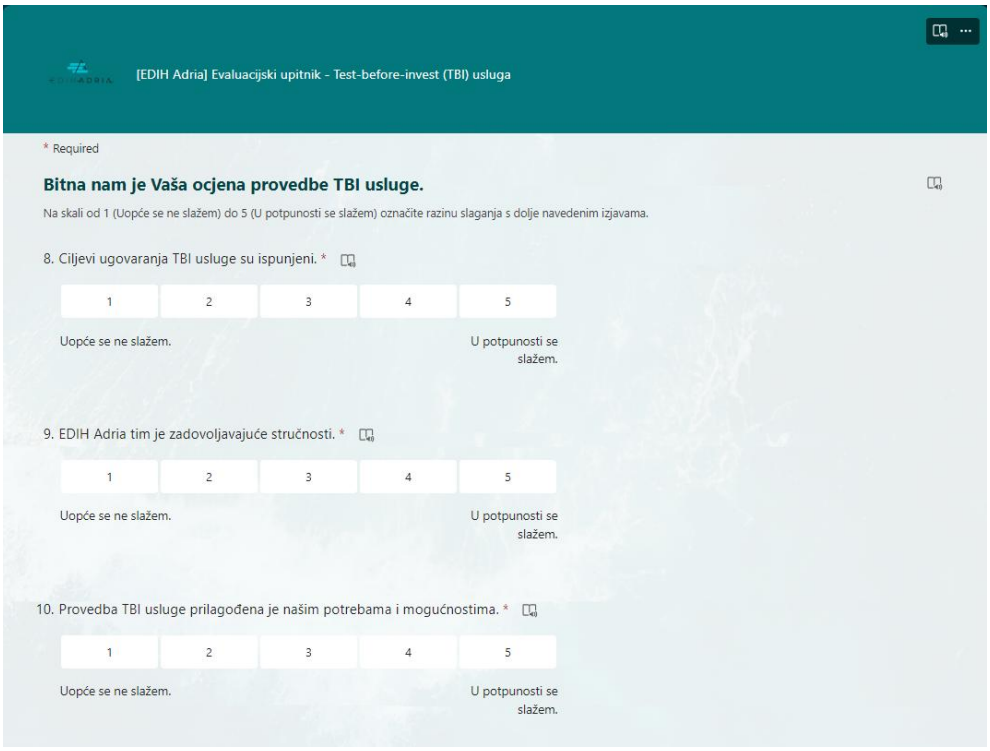
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Projekt je temeljem Ugovora o dodjeli bespovratnih sredstava br. 101083838, sufinanciran od strane Europske unije iz programa Digitalna Europa (DIGITAL) te iz Državnog proračuna Republike Hrvatske



[EDIH Adria] Evaluacijski upitnik - Test-before-invest (TBI) usluga

* Required

Bitna nam je Vaša ocjena provedbe TBI usluge.

Na skali od 1 (Uopće se ne slažem) do 5 (U potpunosti se slažem) označite razinu slaganja s dolje navedenim izjavama.

8. Ciljevi ugovaranja TBI usluge su ispunjeni. *

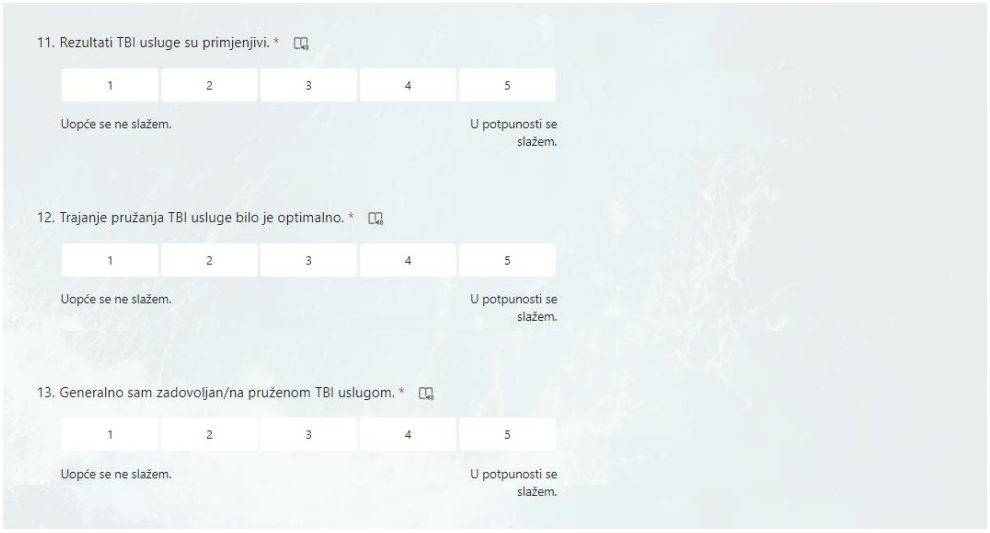
1	2	3	4	5
Uopće se ne slažem.				U potpunosti se slažem.

9. EDIH Adria tim je zadovoljavajuće stručnosti. *

1	2	3	4	5
Uopće se ne slažem.				U potpunosti se slažem.

10. Provedba TBI usluge prilagođena je našim potrebama i mogućnostima. *

1	2	3	4	5
Uopće se ne slažem.				U potpunosti se slažem.



11. Rezultati TBI usluge su primjenjivi. *

1	2	3	4	5
Uopće se ne slažem.				U potpunosti se slažem.

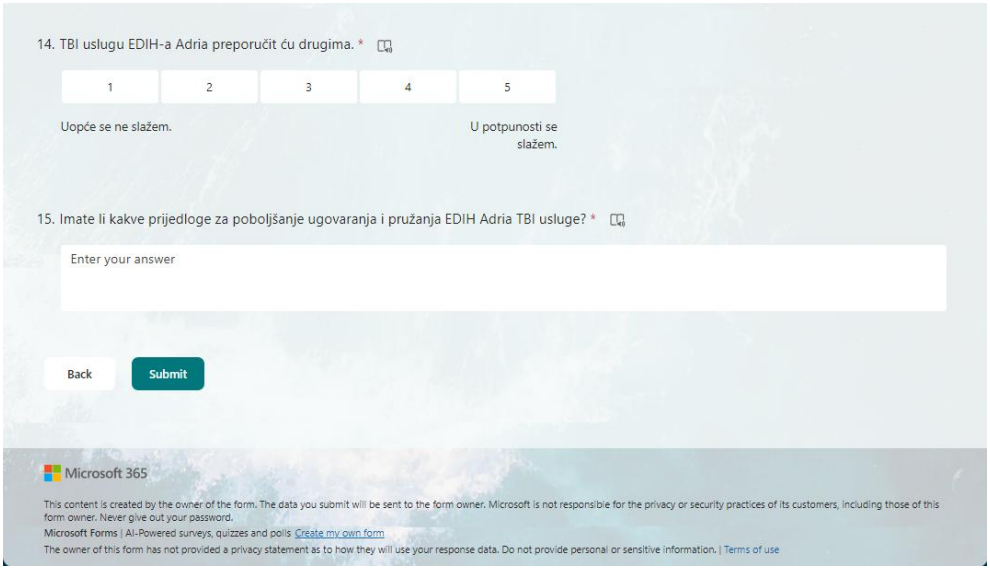
12. Trajanje pružanja TBI usluge bilo je optimalno. *

1	2	3	4	5
Uopće se ne slažem.				U potpunosti se slažem.

13. Generalno sam zadovoljan/na pruženom TBI uslugom. *

1	2	3	4	5
Uopće se ne slažem.				U potpunosti se slažem.

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The feedback form comprises three main sections:

1. Preparatory phase clarity
2. General satisfaction with the service
3. Likelihood of recommending the TBI service to others

These sections were selected as the most relevant ones, providing us with a comprehensive overview of the TBI service. Providing feedback was not mandatory; therefore, not all TBI service users completed the survey.

Below are the average scores for each of the sections:

User	**Preparatory phase**	**General satisfaction**	**Likelihood to recommend**
3t.cable d.o.o.	5	5	5
RIS d.o.o.	3	5	5
AL Sistemi doo	5	5	5
Engasco d.o.o	5	5	5
Kristalna Ideja d.o.o.	5	5	5
Smart Aqua d.o.o.	5	5	5
Poliklinika Primari	5	5	5
Melkior Tech d.o.o.	5	5	5
Lloyds digital d.o.o.	5	5	5
I-digital d.o.o.	5	5	5
Green Spark d.o.o	5	5	5
Total	**4.82**	**5**	**5**

The open-ended questions feedback collected from users was largely positive.

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Feedback on the preparation phase of the EDIH Adria TBI service indicates generally positive experiences. Most respondents reported that the process was clear, well-organized, and met their expectations, with several notes there were no particular issues or areas requiring change. A smaller number suggested potential improvements, such as offering clearer explanations of the service's purpose, additional consulting during the early stages, or making certain materials available in Croatian. A few respondents also mentioned the value of further digitalization, including digital signatures and more streamlined documentation processes.
Responses related to the service delivery phase also reflect overall satisfaction. Participants described the collaboration as professional and supportive, with timely communication and relevant information provided throughout. Suggestions for improvement were mostly focused on simplifying communication and documentation for users with less technical backgrounds and improving the structure and accessibility of the project website. Some noted minor coordination challenges that were resolved during implementation. Overall, the feedback suggests that the service was well received, with participants identifying only limited areas for refinement.

Printable versions of the completed Microsoft Form surveys are available upon request.

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Conclusion

The TBI-supported activities within EDIH Adria show that even small, low-risk experiments with advanced digital tools are a very effective way to drive and de-risk digital transformation across many sectors, from clinics, software and utility companies to industry, cultural heritage and solar energy.

By trying out AI (chatbots, assistants, image recognition), IoT-based monitoring and modular/microservices architectures in a controlled “test before invest” setting, organisations could quickly see if these technologies really work for them and what they stand to gain. The pilots consistently delivered faster responses to users, less routine manual work, better visibility and control over operations, fewer errors and clear potential for cost savings. At the same time, they highlighted two key prerequisites for trustworthy, scalable solutions: good, domain-specific data combined with human oversight, and flexible, modular system designs that can be easily connected.

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