Deliverable 3.1.

Deliverable title

D3.1 Catalogue of courses created

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EXECUTIVE SUMMARY

Deliverable D3.1 presents the final structured overview of training programmes developed within the S4AI_HUB project as part of Work Package 3 – Skills and Training. The deliverable summarizes the process through which the catalogue of courses was designed and validated and provides a consolidated description of the resulting training framework.

The catalogue of courses was developed through a multi-phase methodological process implemented during the project tasks related to the development of the training programme methodology. The process began with a comprehensive needs assessment aimed at identifying knowledge and skills gaps among the project's key target groups – small and medium-sized enterprises (SMEs), startups and public sector organisations. This phase included the analysis of strategic documents and policies, survey research, focus groups and semi-structured interviews with representatives of the target groups.

Based on the findings of the needs analysis, a standardized methodological framework for the design of training programmes was developed. This framework defined the structure of each training programme, including elements such as learning objectives, target groups, entry requirements, learning outcomes, training content, delivery methods and evaluation procedures. The methodology ensured comparability and quality of training programmes and provided the basis for the development of a coherent catalogue of courses.

Through cooperation with consortium partners, a set of training programmes that can be delivered within the S4AI_HUB ecosystem was collected and systematized. These programmes were subsequently classified into thematic areas reflecting technological priorities and the needs of the target groups.

The final result of this process is a catalogue of 24 training courses, structured within the framework of the EDIH Academy model and covering key domains such as artificial intelligence, cybersecurity, cloud services, digital business analytics and Green ICT. Detailed course descriptions, including training objectives, learning outcomes and programme content, are provided in the annexes accompanying this deliverable and in previously submitted reports.

We would like to specially thank the institutions of the Science and Technology Park Niš, Research and Development Institute for Artificial Intelligence, and the Center for Digital Transformation of the Serbian Chamber of Commerce for their exceptional cooperation, as well as the management of these institutions for their professional attitude and commitment to establishing a sustainable model of the EDIH Academy.

1. ABBREVIATIONS AND ACRONYMS

Abbreviation / Acronym	Description
S4AI_HUB	Serbian European Digital Innovation Hub for Artificial Intelligence
EDIH	European Digital Innovation Hub
AI	Artificial Intelligence
SMEs	Small and Medium-sized Enterprises
ICT	Information and Communication Technologies
DEP	Digital Europe Programme
STP Niš	Science Technology Park Nis Ltd.
STP Čačak	Science Technology Park Čačak Ltd.
ICEF	Innovation Centre of the Faculty of Electrical Engineering in Belgrade Ltd. – ICEF
IVI	Institute for Artificial Intelligence Research and Development of Serbia
CDT	Centre for Digital Transformation
Ni-CAT	Cluster Ni-CAT
ICT Hub	ICT Hub

2. BACKGROUND

The Digital Europe Programme (DEP) represents one of the key instruments of the European Union for strengthening digital capacities across Europe. The programme focuses on areas such as high-performance computing, artificial intelligence, cybersecurity, advanced digital skills and the deployment of digital technologies across the economy and public sector.

Within this framework, the European Digital Innovation Hub (EDIH) network has been established to support digital transformation at the regional and national level. EDIHs act as one-stop-shop platforms providing services such as digital maturity assessment, testing of technologies before investment, access to finance and the development of digital skills.

The S4AI_HUB project represents the Serbian node within the EDIH network. Led by the Science and Technology Park Niš, the consortium brings together research institutions, innovation organisations and industry partners with the aim of accelerating digital transformation in Serbia.

One of the key components of the S4AI_HUB activities is the development of advanced digital skills through targeted training programmes, and creation of "EDIH Academy". Within Work Package 3 (Skills and Training), the project aims to provide structured training programmes supporting the adoption of artificial intelligence and other advanced digital technologies in SMEs, startups and public sector organisations.

3. OBJECTIVE/AIM

The objective of Deliverable D3.1 is to present the catalogue of training courses developed within the S4AI_HUB project and to provide a structured overview of the training programmes that will be delivered through the S4AI_HUB training framework.

The preparation of this deliverable is the result of a series of project activities implemented within Work Package 3 (Skills and Training). These activities included the analysis of digital skills needs among the

target groups, the development of a methodological framework for training design, the collection and systematization of training proposals from consortium partners, as well as the validation of the proposed training framework through consultations and workshops with training providers.

Specifically, the deliverable aims to:

- Present the catalogue of courses developed as part of the methodological process implemented within the project;
- Provide a structured overview of the training programmes organised within the edih academy framework;
- Document the methodological approach used to design and standardise the training programmes;
- Describe the key activities undertaken during the development of the training catalogue, including needs analysis, partner consultations and trainer capacity development;
- Ensure transparency and replicability of the developed training framework for future implementation.

The catalogue represents the operational outcome of these activities and provides the basis for delivering training services to the target groups within the S4AI_HUB ecosystem.

4. IMPACT

The development of the catalogue of courses represents an important step toward strengthening digital skills and supporting digital transformation across different sectors in Serbia. The training programmes developed within the S4AI_HUB project aim to address identified knowledge and skills gaps among SMEs, startups and public sector organisations. By providing access to structured training programmes, the project contributes to improving the ability of organisations to adopt and implement advanced digital technologies.

Particular emphasis is placed on strengthening competencies related to artificial intelligence, cybersecurity and cloud technologies, which were identified during the needs analysis as priority areas for capacity development. These competencies are increasingly important for improving productivity, competitiveness and innovation capacity within the economy.

The catalogue of courses also contributes to the broader mission of the S4AI_HUB as a national European Digital Innovation Hub. By establishing a structured training framework, the project provides a foundation for the long-term development of digital skills programmes and supports the wider digital transformation agenda in Serbia.

5. REPORTING OF SERVICES DELIVERY

The development of the catalogue of courses was carried out through a structured process consisting of several interconnected phases.

The first phase, involved a needs assessment aimed at identifying digital skills gaps among the project's target groups. The analysis combined desk research with primary research methods, including comparative analyses, surveys, interviews and focus groups with representatives of SMEs, startups and the public sector. This phase enabled the identification of priority thematic areas for training programmes.

As part of the desk research, an analysis of international practices was also conducted, including a review of training programmes and skills development models implemented in previously established European Digital

Innovation Hubs (EDIHs), namely EDIH Adria in Croatia and EDIH Marche in Italy. This comparative review helped ensure that the structure of the catalogue and the training methodology are aligned with good practices within the European EDIH network and that the proposed courses correspond to the types and forms of training services commonly delivered by other EDIH centres across Europe.

The second phase, focused on the review of training capacities among project partners. Consortium partners were invited to submit information on training programmes that they are able to deliver within the S4AI_HUB framework. Information was collected through a standardized questionnaire to ensure consistency of training descriptions. Based on these inputs, a methodological framework for training design was developed. The methodology defined a standardized structure for each training programme, including elements such as training objectives, target groups, entry requirements, learning outcomes, training content, delivery methods and evaluation procedures.

Following this process, the proposed training programmes were collected, reviewed and standardized according to the defined methodological template. This allowed the creation of a coherent training catalogue ensuring comparability and quality across programmes. The final catalogue includes 24 training courses, which are organized into thematic domains reflecting technological priorities and the needs of the target groups. These domains include artificial intelligence applications in business and industry, cybersecurity, cloud services, digital business analytics, Green ICT and specialized training programmes.

A dedicated training workshop for trainers (Train-the-Trainer) was organized with the aim of strengthening the pedagogical competencies of lecturers involved in delivering the courses and aligning teaching methods with adult education principles. During this process, the design of the training programmes was aligned with internationally recognized standards for adult education and learning services in non-formal education.

6. CONCLUSIONS

The development of the catalogue of courses represents the final outcome of the methodological process undertaken within the S4AI_HUB project to establish a structured and sustainable training framework. The activities carried out within this engagement combined analytical, methodological and capacity-building components in order to ensure that the training offer is both relevant to the needs of the target groups and aligned with European practices in the field of digital skills development.

Through the combination of needs analysis, methodological development and cooperation with consortium partners, a coherent catalogue of 24 training programmes has been created. The catalogue reflects the identified needs of SMEs, startups and public sector organisations and aligns with the broader objectives of the Digital Europe Programme, particularly in the areas of artificial intelligence, cybersecurity, cloud technologies and digital transformation.

In addition to defining the training content, the project activities also contributed to the establishment of quality assurance mechanisms for the delivery of training programmes. The development of a standardized training template, the analysis of international practices within the EDIH network and the organization of a Train-the-Trainer workshop enabled the harmonization of teaching approaches and strengthened the pedagogical competencies of lecturers involved in delivering the programmes.

The establishment of this catalogue therefore represents not only the creation of a list of training courses, but also the foundation for the EDIH Academy model within S4AI_HUB. This model provides a structured framework for delivering digital skills training, ensuring consistency in programme design, transparency of learning outcomes and a comparable level of quality across different training providers.

The developed training programmes provide the basis for the implementation of training services in the upcoming phases of the project. Through their future delivery, the S4AI_HUB consortium will contribute

to strengthening digital competencies among companies, startups and public institutions, thereby supporting the broader objective of accelerating digital transformation and innovation capacity in Serbia.

7. ANEXES

7.1. Analysis of the needs of target groups for strengthening capacity and knowledge in digital transformation and the possibility of creating a comprehensive training program

Regulatory and strategic framework

International framework

The introductory part of the report presents the Digital Europe Framework Programme, as well as the building blocks of the programme in the form of European Digital Innovation Hubs. In addition, the Republic of Serbia is a member of the **Horizon Europe programme** , from which domestic scientific institutions and technology companies annually withdraw more than 40 million euros for research and innovation projects. This mechanism is complementary to the activities of the Hub and should be further promoted to companies and institutes in Serbia through this instrument.

On the World Economic Forum's Networked Readiness Index, the Republic of Serbia ranks 55th out of 131 economies, with technology lagging behind other categories (human resources, governance, impact), and according to the AI Readiness in Government Index, the Republic of Serbia ranks 57th out of 193 countries. Regionally, our economy is ahead of most countries: North Macedonia (83rd), Croatia (70th), Montenegro (78th), Romania (64th), Albania (89th) and Bosnia and Herzegovina (117th) [1].

The European Union has placed digitalisation as a central pillar of its development, economic and social framework , with a clear ambition to build a digitally sovereign, resilient and inclusive Europe by 2030. Through **the Digital Compass 2030 initiative** [2], the EU defines digital transformation not only as a technological process, but as a comprehensive societal project based on European values – the protection of human rights, privacy and data, social cohesion and sustainable development. The Union's digital policy clearly emphasises a human-centric approach, in which digital technologies serve to empower citizens, institutions and the economy, rather than replacing or excluding them.

The European Union's digital policy framework is structured around **four strategic pillars**: *developing digital skills and human capital, building a secure and sustainable digital infrastructure, transforming the economy digitally* and *ensuring the full digitisation of public services*. These pillars are accompanied by clearly defined and measurable targets, such as at least 80% of the adult population having basic digital skills, **75% of businesses using cloud technologies**, big data and artificial intelligence, and making key public services fully available online. In this way, the EU is introducing a managed and coordinated model of digital transformation, based on systematic monitoring of progress and alignment of Member States' policies.

Of particular importance in the European approach is the linking of digitalization with the strategic autonomy, economic resilience and geopolitical positioning of the Union . The EU's digital policy relies on a strong regulatory framework, but also on significant public investments through European financial instruments and multi-country projects. The aim of this approach is to reduce dependence on non-European technology platforms, strengthen domestic capacities in key areas such as artificial

[1]Strategy for the Development of Artificial Intelligence in the Republic of Serbia for the Period 2025–2030 https://pravno-informacioni-sistem.rs/eli/rep/sgrs/vlada/strategija/2025/5/1/reg

[2]2030 Digital compass – The European way for the digital decade, https://data.europa.eu/doi/10.2759/425691

intelligence, semiconductors and cloud infrastructure, and position the European model of digital transformation as a globally relevant, value-based alternative development path.

National framework

Taking into account national priorities and the findings of the Smart Specialization Strategy, Serbia has the greatest potential for development in the fields of ICT, creative industries, food production and processing, mechanical engineering and automotive industries. Supporting projects and initiatives of the Government of Serbia point to potential in biotechnology, which will be developed in the "BIO4 Campus" on 100,000 m ^{2}, as well as in the field of healthcare, where citizens' health data is centralized, but also works on the application of virtual reality for the purpose of medical diagnostics and education at the Faculty of Medicine in Belgrade.

The regulatory framework in the form of the Law on Science and Research provides a good basis for directing the activities of scientific and research organizations and research and development institutes for the development and implementation of solutions based on artificial intelligence, and **the professional staff** working in these institutions represents **a valuable resource** that should be relied on in the dissemination of knowledge to the private and public sectors.

Serbia is the first country in Southeast Europe to **adopt an artificial intelligence development strategy**, develop ethical guidelines for its use, and establish a specialized research and development institute for artificial intelligence. We are the first country in the region to establish a National Artificial Intelligence Platform, or supercomputer infrastructure, which is now being further expanded with new superchips. The State Data Center has the highest certification and provides reliable and secure data storage for both the state and the economy. This means that domestic companies can use local resources to store their data, as well as to develop their products on the platform.

The current Artificial Intelligence Development Strategy 2019-2025, like the previous one, recognizes **the importance of training and education for artificial intelligence in the building blocks of the Strategy** and links them to economic development. The Strategy indicates that "It is necessary to enable professional development of employees who can include the application of artificial intelligence in their daily activities in a way that helps and improves their work. In addition to introducing artificial intelligence into formal education, it is important to encourage models of informal education that will enable lifelong learning and that will prepare the entire population for the expected massive impact of artificial intelligence in everyday life."

Additionally, Objective 3 of the aforementioned Strategy prescribes the Development of Human Resources and Knowledge in the Domain of Artificial Intelligence, while Measure 3.4 prescribes Non-Formal Education for the Use of Solutions Based on Artificial Intelligence:

> *To use and properly understand solutions based on artificial intelligence, preparation and training are necessary, primarily for employees, and then for the wider population. It is necessary to create educational modules and courses that follow changes in the labor market, in order to enable rapid adaptation to new trends and needs through the acquisition of the necessary knowledge and skills in this area. This will increase productivity and the use of special solutions in work, as well as the competitiveness of economic entities. It is necessary that modules, courses and workshops are not only informative, so it is necessary to organize exams that will evaluate the acquired knowledge.*

The measure includes the creation of training and workshops, both remotely and in person, aimed at beginners in all professional fields, regarding the application of artificial intelligence with an emphasis on the method of application, identification of application possibilities in work, as well as familiarization with existing tools.

The measure includes financial and organizational assistance in the creation, development and organization of these courses and trainings, organizing specialized workshops for retraining and further training of employees who need such knowledge to perform their jobs, monitoring labor market trends and continuously improving courses and policies in accordance with needs and technologies, training on aspects of protection against discrimination, creating partnerships with the business sector for the development of targeted educational programs that facilitate the implementation of solutions that incorporate artificial intelligence into everyday business operations.

Then Measure 3.5: Non-formal education and recognition of prior learning of professionals from the information technology domain for the design and development of solutions based on artificial intelligence:

These modules, courses and trainings should enable specific education of users who already have previous knowledge in this area and who need to not only apply solutions but also develop them. Support includes the creation of educational programs that follow the development of new technologies, how to integrate artificial intelligence into existing solutions, potential risks and how to overcome these risks, training in the field of ethics and the legal framework. Modules, courses and workshops must not be of an informative nature, but the content must be practical, concrete with mandatory evaluation of participants after completing the training.

The measure includes the creation of training courses and workshops, both remotely and in person, intended for IT professionals and other professionals who need such education in order to perform their work more efficiently. The topics they need to cover are related to the development and application of artificial intelligence, including machine learning, automation and data analytics, prevention of discrimination, etc. It is necessary to establish cooperation with chambers of commerce and associations to identify needs and organize training, as well as provide financial and organizational assistance in the creation, development and organization of these courses and trainings, etc.

The implementation of these measures is planned continuously in the period 2025–2030 and is fully aligned with the objectives of EDIH S4AI_HUB in the training domain.

Specialized institutions for financing innovation and science, such as **the Science Fund and the Innovation Fund** , provide a good basis for directing and implementing scientific and innovation priorities. In the PRIZMA program of the Science Fund, one of the six sub-programs relates to research in the field of artificial intelligence, and with a specialized program for basic and applied AI research, the Fund's investments in this area amount to 4.4 million euros. On the other hand, the Innovation Fund implements the GovTech program, which represents a link between innovation and the public sector, by advertising the problems faced by the public sector, for which startups and innovative companies come forward with solutions. Then "Katalitic" as a co-investing grant program of the Innovation Fund worth 7.4 million euros, which provides 200,000 euros in grants per project for micro and small enterprises developing products and services based on artificial intelligence. In addition, a special call Serbia Ventures AI was

implemented to attract investment funds to invest in Serbian AI startups, in which the Republic of Serbia is investing 5 million euros.

The Strategy for the Development of the Startup Ecosystem of the Republic of Serbia 2021-2025 [3]recognizes human resources, knowledge and competences as a key prerequisite for the sustainable development of innovation and technological entrepreneurship. The analysis of the situation (chapter 4.1.2) particularly highlights the lack of adequate knowledge and skills, both among startup founders and in public administration institutions that have a role in creating and implementing policies to support the startup ecosystem. In this context, the strategy emphasizes the importance of systematic and continuous training, as well as the development of informal educational programs focused on modern digital and innovative technologies.

Special emphasis is placed on Measure 4.3, which aims to increase the competences of public administration employees to create and implement measures in the field of startup ecosystems. This measure recognizes the need for the public sector to develop an understanding of new technologies, innovative business models and the dynamics of the startup community, in order to effectively design, implement and evaluate public policies and support programs. Training and development programs are a key instrument for strengthening these capacities and directly contribute to the modernization of public administration. In addition, Measure 4.5 foresees the establishment and implementation of the GovTech program, within which the state takes on the role of the first user of innovative solutions. This approach encourages the application of digital and advanced technologies, including solutions based on artificial intelligence, in the real environment of the public sector. The above measures are in direct line with the goals and activities of the EDIH initiative, which, through training, strengthening digital competencies, and supporting the implementation of new technologies, contributes to connecting the startup ecosystem, public administration, and the economy.

When it comes to the public sector, the body responsible for developing the competencies of civil servants is the National Academy of Public Administration, which has so far trained 600 people in the field of artificial intelligence. The NAAPA is a logical partner for EDIH in recruiting civil servants and bringing new technologies closer to the public sector.

The Strategy for the Development of Digital Skills in the Republic of Serbia 2020-2024 is [4]a key national document that systematically regulates the development of digital knowledge, skills and competences of the population in accordance with the needs of the modern information and communication society. This Strategy emphasizes that digital skills, from basic digital literacy to advanced ICT competences, are becoming a prerequisite for successful individual and organizational adaptation to the pace of technological transformation, including the field of artificial intelligence, data analysis and digital business. The document recognizes that the growing application of new technologies in all sectors requires the continuous development of digital skills through formal and informal forms of learning, which includes training, certification and advanced training programs that enable citizens and professionals to follow and adopt innovative technologies. This includes, in addition to basic ICT literacy, the development of competencies required for the effective use of software tools, learning about digital security, as well as understanding and applying solutions based on artificial intelligence and other advanced technological

[3] Strategy for the Development of the Startup Ecosystem of the Republic of Serbia 2021-2025 https://prosveta.gov.rs/wp-content/uploads/2021/12/Strategija-razvoja-stertup-ekosistema-RS-od-2021-do-2025.pdf

[4]Strategy for the Development of Digital Skills in the Republic of Serbia 2020-2024 . https://pravno-informacioni-sistem.rs/eli/rep/sgrs/vlada/strategija/2020/21/2/reg

concepts. The strategy also emphasizes that the development of digital skills is one of the basic prerequisites for accelerating the digital transformation of the economy and the public sector and that it contributes to better access to digital services, competition in the labor market and creating conditions for the application of advanced technologies in practice. This comprehensive framework is in line with the objectives of the EDIH initiatives, which aim to strengthen digital competencies, support the adoption of AI and other technologies, and connect academia, the public sector and the economy in the transformation process.

Digital maturity of the enterprise

For a proper and accurate understanding of the needs of the economy for digital knowledge and skills, it is important to understand the current level of ICT use in the economy. In order to better understand Serbia's position in the global context, we will compare data for Serbia with the average data of EU countries for several important indicators. The first and most comprehensive is **the Digital Intensity Index** , which measures the degree of use of digital technologies in enterprises. In practice, the Digital Intensity Index shows how much digital transformation is integrated into everyday business and how many enterprises use digital tools not only for basic, but also for advanced business processes. The index is based on the amount of adopted digital technologies and digital practices (e.g. high-speed internet, e-commerce, CRM systems, cloud services, big data analytics, social networks, electronic invoices, artificial intelligence, etc.). The digital intensity index is calculated by adding up the practices, or the number of technologies used in business, and the result can be from 0 to 12. Based on the total number of points, companies are classified into four categories of digital intensity, companies with **very low and with low digital intensity** (0-3 and 4-6 adopted technologies) and those with **high and very high digital intensity** (7-9 and 10-12 adopted technologies). The indicator most used in European and national strategies is the number of enterprises with **at least a basic level of digital intensity** , which includes all companies with a score of 4-12, i.e. all companies except those with very low intensity. The index is used to:

- monitored progress in digitalization at the sector and country level,
- identified barriers and needs for further development of digital skills and infrastructure,
- shape policies to support small and medium-sized enterprises in the transition to more advanced digital tools,
- compared the digital maturity of companies against the European average and the goals from the Digital Compass 2030.

Each year, some of the same and some of the different digital technology practices are measured in accordance with the evolution of the DII calculation methodology. Thus, in the period **2024 and 2025,** the following practices were measured in both years:

1) Internet access for more than 50% of employees for business purposes, the existence of a fixed internet connection with a speed of at least 30 Mb/s,
2) Carrying out e-commerce in the amount of at least 1% of total turnover,
3) Significant web sales (with a corresponding B2C share),
4) Using cloud computing services,
5) Hiring ICT experts,
6) The application of artificial intelligence, as well as
7) Using ERP and CRM systems in business management.

Specifically in 2024 (DII version 4), special **emphasis** was placed **on cybersecurity and organizational maturity** , so the following were measured as separate digital practices:

1) The existence of formalized documents on measures,
2) ICT security practices and procedures,
3) Implementation of at least three cybersecurity measures,
4) Raising awareness among employees about their obligations in the field of ICT security, as well as
5) Enabling remote access to business email, documents, and applications.

Specifically in 2025 (DII version 3), the focus was more on **the use of cloud technologies and digital tools** , so the following were measured as individual practices:

1) Using one or more social networks for business purposes,
2) More intensive use of cloud computing services (including intermediate and sophisticated cloud),
3) Organizing online meetings via the internet, as well as
4) Data analysis conducted internally or with the support of external vendors
5) **The existence of a company website as a basic form of digital presence .**

The Digital Intensity Index measurement is based on data obtained through the survey **"Use of ICT in Enterprises** ". Every year, national statistical offices conduct surveys on the use of information and communication technologies in enterprises, which are methodologically aligned with Eurostat, which allows for a comparative analysis of the situation in different European Union member states, as well as candidate countries for membership. Indicators of ICT use in enterprises cover the following areas: access to and use of the Internet, employment of ICT professionals, ICT training for professionals and other employees, ICT security, digital commerce (e-commerce), as well as digital business, including artificial intelligence, data analysis, cloud computing, IoT, big data analytics, 3D printing, robotics, etc. The research is conducted in Serbia on a representative sample of approximately 2,000 companies, and at the EU level on over 100,000 companies with 10 or more employees.

According to data for 2023, from the territory EU 58% of small and medium-sized enterprises (SMEs) have reached at least a basic level of digital intensity, while 91% of large enterprises have achieved this level [5]. Given that one of the goals of the **Digital Decade is** that more than 90% of SMEs in the EU should reach at least a basic level of digital intensity by 2030, this means that there is a gap of 32%. Only 4.4% of SMEs in the EU have reached a very high level of digital intensity, while 19.6% have reached a high level. The majority have recorded basic, low (33.8%) and very low (42.3%) levels of digital intensity. The largest share of companies with a *very high* index The highest digital intensity was recorded in Finland (13.0%), Malta (11.4%) and the Netherlands (11.0%), while the countries with the highest percentage of enterprises with *a very low* digital intensity index were Romania (72.1%), Bulgaria (70.6%) and Greece (56.2%). For the Western Balkans region (WB6), including Serbia, it is estimated that **43% of SMEs have reached the basic level of digital intensity** , which is noticeably lower than the EU average [6].

The tables below analyze companies and compare the results of Serbia and the European Union (EU27_2020) for 2022 and 2024, measured using version 4 of the Digital Intensity Index (DII), as well as data for 2023 and 2025, obtained using version 3 of the DII. The values in the table represent the percentage of companies in a given category.

[5]https://www.eureporter.co/business/digital-economy/2024/09/05/how-digitalized-have-the-eus-enterprises-become-2

[6]Western Balkans Digital Economy And Society Index 2024 Report . https://www.rcc.int/download/docs/DESI-2024-a_31.pdf/d3c0b55d1647a529f54d3f3ee10ecbdf.pdf

Table 1Digital intensity (DII Version 4) [7]

Category	EU27 ('22)	**EU27 ('24)**	Serbia ('22)	**Serbia ('24)**
Very low digital intensity	30.18%	26.35%	21.76%	13.85%
Low digital intensity	37.74%	39.40%	40.52%	45.14%
High digital intensity	27.90%	27.08%	32.78%	31.89%
Very high digital intensity	4.19%	7.17%	4.94%	9.13%
At least basic digital intensity	69.82%	**73.65%**	78.24%	**86.15%**

Table 2Digital intensity (DII Version 3)[8]

Category	EU27 ('23)	**EU27 ('25)**	Serbia ('23)	**Serbia ('25)**
At least basic digital intensity	58.87%	**72.10%**	50.30%	**51.40%**

Based on the Digital Intensity Index (DII) version 4, Serbia shows significant progress in the digitalization of enterprises with 10 or more employees and exceeds the European Union average in many indicators. However, the dominance of the "low digital intensity" category indicates that a large number of enterprises have not yet switched to the use of advanced digital technologies. Policies aimed at accelerating the adoption of higher levels of digitalization (for example, incentive measures for cloud, CRM, AI and big data) are still necessary in order to achieve greater economic and competitive effects. However, the analysis of data obtained in the years measured using the version 3 set of indicators indicates significantly different results, which do not confirm the same level of progress in Serbia. These findings collectively confirm the need for systematic measures to support the digital transformation of the economy, especially small and medium-sized enterprises, in order to reduce the gap with the European Union and accelerate the application of advanced digital technologies in practice.

Looking at individual **sectors of economic activity** in enterprises with 10 or more employees, data for 2024 show that enterprises in Serbia in most sectors record a higher share of digital intensity compared to the EU27 average. The areas of transport and storage (99.1%), administrative and support services (99.4%) and information and communication activities (100%) stand out in particular, where digital saturation is practically complete. In contrast, individual sectors such as manufacturing (75.4%) and water supply and waste management (69.9%) show further room for improvement. Overall, Serbia has a significantly more favorable picture in terms of the adoption of digital technologies in enterprises than the EU average, but there is a clear need for digital transformation to be implemented more evenly across all branches of the economy.

[7]Eurostat, Digital intensity by size class of enterprise (ISOC_E_DII dataset), ≥ 10 empolyees.
[8]Same

Table 3Digital intensity by sector (2024, companies with ≥10 employees) [9]

Sector of activity (NACE Rev. 2)	EU27 (%)	Serbia (%)
Water, wastewater and waste management	78.62	69.92
Construction	61.50	75.41
Processing industry	72.39	75.43
Energy, gas, steam and air conditioning supply	93.33	84.18
Wholesale and retail trade; vehicle repair	79.41	86.77
Administrative and support services	70.84	93.39
Real estate	88.65	94.71
Hospitality and accommodation	55.83	94.88
Professional, scientific and technical services	95.62	98.29
Transportation and storage	67.03	99.69
Information and communications	98.16	100.00

In Serbia , practically all companies use the Internet in their business and have access to broadband internet. **Around 85% of companies have a website** , but there is an uneven territorial distribution: in the Belgrade region, the presence is over 90%, while in the Šumadija and Western Serbia region it is around 75%, which indicates the need for further investments in the even development of digital capacities. **Cloud services are used by 41% of companies in Serbia** . The percentage of companies that sell and buy online (e-commerce) is continuously growing and currently stands at 27.7%. The percentage of companies in Serbia that use **business software (ERP, CRM or BI systems) is 33%** and it is necessary to accelerate progress in this area, given that Serbia has adequate infrastructure and human capacities, but also **lags behind the EU-27 average** , which is around 53%. A special strategic priority is the introduction of artificial intelligence as a basic tool in the operations of all companies. Currently, **only 10% of companies in Serbia declare that they use tools based on artificial intelligence** . Therefore, in addition to the already built State Data Center and the national artificial intelligence platform that provides supercomputer services, a significant expansion of capacity is planned in the next two years through an investment of 50 million euros.

In our research on educational needs in the field of technology, we have deepened the questions asked in the European Survey on the Use of ICT in Enterprises, as well as introduced additional questions related to preferred learning and training practices.

Digital Europe Program - European Digital Innovation Hubs

The EDIH network website provides search and access to all European digital innovation hubs [10]. For the purposes of our analysis of training and development programs, we selected one center in Italy, as a developed economy of the European Union, and a center in Croatia, as a regionally close and economically comparable country.

The example of Italy - EDIH4Marche

EDIH4Marche[11] is one of the 13 Italian EDIH centers supported by the Digital Europe program and co-financed by the National Recovery and Resilience Plan of the Ministry responsible for Economic

[9] E *rostat, ISOC_E_DIIN2. https://ec.europa.eu/eurostat/databrowser/view/ISOC_E_DIIN2__custom_19323566/default/table*

[10] EDIH Catalogue. https://european-digital-innovation-hubs.ec.europa.eu/edih-catalogue

[11] www.edih4marche.eu

Development, Enterprise and the “Made in Italy” brand. The technologies they focus on are **artificial intelligence** and **cybersecurity,** in the sectors of manufacturing, tourism, services for companies, citizens and communities, trade, agriculture and food products. The consortium coordinates Confindustria's Digital Innovation Hub Marche, which is the digital hub of the Italian Chamber of Commerce, with a total of 12 partners coming from different domains of economy, science and education from regional business associations, universities to competence and training centers.

Similar to other EDIH centers, EDIH4Marche offers the expertise of its consortium members in a range of services to support companies embarking on a digital transformation journey, from digital maturity assessment, pre-investment testing, training and finally support for accessing financing. The initial step is the analysis of the company's **production processes from a digital perspective**, which is done through coaching services. A total of 5 previously established digital hubs within the respective trade associations are responsible for this segment. The analysis tools vary depending on the specific situation and sector of the company and can be:

A. Based on the methodology developed within the Digital Europe program in the form of DMA (digital maturity assessment)
B. "Zoom 4.0" - guided evaluation of production processes based on a model developed by the Chamber of Commerce, and
C. Industry 4.0 Test - Measures the digital maturity of 8 main business processes based on a model developed by the Polytechnic University of Milan.

At the end of the process, the company receives two reports, one with an assessment of the current state (“as-is”) and the planned (“to-be”), with reference to the next steps and services that they can take and use within EDIH4marche. In the domain of **pre-investment testing** It offers a first-hand introduction to various technologies grouped into eight sections over 15-20 days: collaborative robotics and automation, human-centered manufacturing, technologies for cyber-physical systems, artificial intelligence, big data, cybersecurity, additive manufacturing (3D printing), technologies in marketing, energy audit and carbon footprint. In the domain of digital and advanced business skills ***training***, various consortium partners are implementing training on the following topics:

- AI for SMEs: Understand, Use, Innovate
- Digital Innovation and Data Management for Operational Efficiency
- Digital tools for project management
- Smart Connected Products
- Robotics health and safety
- Collaborative Robotics
- Design 4.0
- Smart Maintenance
- Manufacturing 4.0
- Manual handling of loads in new employment contexts
- Introduction to Artificial Intelligence for Industry 4.0
- Becoming sustainable in the 4.0 era
- Product Digital Twin
- Cybersecurity for industry 4.0
- Cybersecurity awareness
- Big Data & Analytics
- Additive Manufacturing
- Artificial Intelligence and Gpt Chat
- Digital Marketing Fundamentals
- E-Commerce Creation and Management
- Digital Awareness and Digital Strategy
- Introduction to Artificial Intelligence
- Artificial Intelligence for Manufacturing
- Ecodesign for Fashion: From Regulatory Evolution to Digital Product Passports
- Using Artificial Intelligence to Promote Your Business
- Introduction to Generative AI in Business

- Artificial Intelligence Applications for MSMEs
- Cybersecurity awareness
- Artificial Intelligence Applications for MSMEs (Second Edition)
- The culture of data
- Cybersecurity: a strategic asset for competitiveness
- Cybersecurity: A Strategic Asset for Competitiveness (Second Edition)
- New Technologies for Production
- Cybersecurity: A Strategic Asset for Competitiveness (Third Edition)
- Cyber and Industrial Security
- Digital Innovation Management
- Business intelligence and business analytics for strategic development
- Digital Awareness and Digital Strategy (Second Module)
- Warehouse Planning and Management 4.0
- Introduction to Generative AI in Business
- Digital Revolution and Artificial Intelligence in Tourism, Hospitality, Catering and Complementary Businesses
- Business Intelligence and Business Analytics for Strategic Development
- How to Engage Your Potential Customers with AI
- Compliance with the Nis2 Directive for C-Level
- How to Gather Requirements for a Successful Project
- NIS2 Compliance for C-Level (Second Edition)
- Planning and Management Control - Digital Strategies and Tools
- Introduction to Generative AI in Business (Second Edition)
- Warehouse and Logistics Automation
- Generative AI: Text Generation And Image Generation
- Introduction to Generative AI in Business (Third Edition)
- Generative AI: Text Generation And Image Generation (Second Edition)
- Digital Innovation Management (Second Edition)
- Introduction to Generative AI in Business (Fourth Edition)
- Artificial Intelligence and GPT Chat for Entrepreneurs
- Generative AI: Text Generation And Image Generation (Third Edition)
- Power-Bi Training
- Cybersecurity: A Strategic Asset for Competitiveness (Second Edition)
- Cybersecurity: A Strategic Asset for Competitiveness (Third Edition)
- Power BI Training (Second Edition)
- Understanding Cybersecurity and NIS 2
- Artificial Intelligence and ChatGpt for Entrepreneurs (Second Edition)
- How to Conduct a Vulnerability Assessment
- Trustworthy Artificial Intelligence and Structured Data: Model Collection and Validation
- Artificial Intelligence: How to Extract Reliable Knowledge from Multimedia Data

Depending on the complexity of the subject matter, training courses have different durations. Most often, programs last a minimum of 2 hours and a maximum of 8 hours per day and can last a total of one to four days. The time interval between sessions is at least a week. In terms of the number of participants, they are most often groups of 10 participants, and there can be up to 20 participants for simpler topics. The training courses are intended for managers of organizations, technical personnel, or all employees if they are the basics of a technology (example: "Introducing Artificial Intelligence"). The teaching method is

combined, in the physical space of the partner organization that provides the training, online or hybrid (part online, part in a physical space). Training prices range from 250 euros to 1,500 euros excluding VAT. Also, the goal and content are defined for each training.

Table 4Illustrative examples of EDIH training in Italy

Trainings at EDIH4Marche						
Training name	Hours per day	Total days	Target group and prior knowledge	Number of participants	Method of implementation	Price per person
Introduction to Artificial Intelligence	8	2	Any employee can attend the training without any prior knowledge.	20	In the partner's physical space	€500 + VAT
Artificial Intelligence for Manufacturing	8	2	Entrepreneurs, production managers, research and development managers, quality managers	15	In the partner's physical space	€1,000 + VAT
Cybersecurity awareness	6	1	All interested	15	Online	€500 + VAT
The culture of data	8	3	Entrepreneurs, production managers, ICT specialists (technical personnel)	9	In the partner's physical space	€1,500 + VAT
Business intelligence and business analytics for strategic development	8 + 4 + 4	3	Entrepreneurs, managers and human resource managers (non-technical individuals)	15	Hybrid	€1,100 + VAT
Digital tools for project management	2	3	Entrepreneurs, C-level managers in small and medium-sized enterprises interested in improving business processes by applying Agile practices	10	Online	€300 + VAT

The example of Croatia – EDIHAdria

EDIH Adria is made up of partners coming from the private sector: Ericsson, Nikola Tesla - a regional technology leader for automation and optimization and AI solutions, and Infobip d.o.o. - the first Croatian unicorn and a global cloud platform; from the academic sector: Research Center with a supercomputer and 3D printers, as well as the Center for Artificial Intelligence of the University of Rijeka; J. Dobrila University in Pula - an academic partner with a strong STEM education; STEP RI - Science and Technology Park of the University of Rijeka; PORIN - a local development agency of the city of Rijeka that works with SMEs on digitalization, education and networking. EDIH Adria is based on two key technologies that are in demand in the Republic of Croatia - **artificial intelligence and high-performance computing**. Within EDIH, these technologies are focused on the sectors of health and

quality of life (including health tourism), transport and mobility (with a special emphasis on the maritime sector), as well as energy and sustainable development, i.e. on strengthening sectors that are key to a faster transition of Adriatic Croatia towards a digital economy. The trainings are intended for three target groups of participants:

1. Training for employees
2. Education for the IT industry
3. Education for experts in the IT industry

The trainings are tailored to different levels of knowledge – beginner, intermediate and advanced. They are aimed at employees in organizations, as well as at the development of local IT experts and the community. The trainings are practical and goal-oriented , they can be independent courses or part of modular packages. Participation requires registration in a public call , along with administrative steps and submission of documentation. The method and conditions for the implementation of several trainings are presented below:

Application of GenAI technology for IT engineers
Features : 5 hours, online, company instructor
This workshop provides participants with a deeper understanding of the application of machine learning and generative artificial intelligence in the development of IT solutions. Through Python, participants explore the key components of GenAI applications, best practices and techniques such as vectorization, prompt engineering, and the use of assistants such as GitHub Copilot. The workshop provides a comprehensive insight into building innovative solutions based on generative AI technology.

The opportunity for business transformation with generative AI
Features : 4 hours, in a physical space, lecturer from the company
Generative artificial intelligence can, based on simple user queries (prompts), create an original text, idea, draft or strategy in a matter of seconds. This technology enables companies, institutions and public authorities to achieve new levels of creativity, efficiency and faster problem-solving.

Computer vision and deep learning: application opportunities and challenges
Features : 4 hours, in a physical space, faculty lecturer
Computer vision is a field of artificial intelligence that allows computers to interpret and understand the visual world. With deep learning algorithms and models, computers can classify images, detect and identify objects, analyze video content, track motion, and recognize activities.
Internet of Things (IoT)
Features : 4 hours, hybrid, company instructor
IoT technologies provide real-time data, increase efficiency, and open up space for new services and applications. Companies can use IoT to improve processes, optimize costs, and develop more profitable business models with the support of real-time data.

Principles of LEAN methodology
Features : 4 hours, in a physical space, faculty lecturer
The LEAN methodology enables organizations to increase efficiency, reduce costs, and improve the quality of services or products. The focus is on eliminating waste, optimizing resources, and directing processes toward greater value for customers.

EDIH Adria also offers other training courses:

- Digital tools for more efficient business
- Business process planning and transformation
- Internal education and training of employees
- Security and privacy
- Digitalization in medicine
- Data analytics and business reports
- Artificial intelligence in everyday business
- Prompt engineering
- From employee engagement to in-company training - what, how and when to do it
- Internal education and training of employees via online platforms
- Internet of Things (IoT)
- Paperless operations and digital signatures
- Application of generative artificial intelligence in education: curriculum design
- Strategic planning
- Autonomous driving models in maritime and road transport
- Central Health Information System of the Republic of Croatia (CEZIH)
- How to conceive, design and execute training
- Application of generative artificial intelligence in education: design of project applications and scientific papers
- Introduction to effective operations management
- User orientation, characteristics of a “good” process flow
- Principles of LEAN methodology
- How to recognize a good process improvement project?
- Digital communication with citizens using artificial intelligence
- Data visualization to support business decision-making
- Basics of digital security and privacy
- Application of generative artificial intelligence in everyday business
- ChatGPT Basics for Entrepreneurs
- Workflow optimization with GenAI
- Advanced ChatGPT for entrepreneurs
- Security and data protection in Cloud services
- How to improve productivity in daily work, planning and project implementation using Notion tools
- GenAI for knowledge testing - generating tests, quizzes and assessments
- Opportunity to transform business with generative artificial intelligence
- Employee engagement - what, how and when to do it
- Skill improvement
- Text analysis technologies
- Application Development with a Master of Laws (LLM) degree
- Predictive analytics and the use of simple machine learning methods to predict market prices
- Applying computer vision and deep learning to increase security and area surveillance
- Computer vision and deep learning: opportunities and challenges of application
- Search Engine Optimization - SEO
- GDPR (isn't) a bogeyman: what, how and when to do when coordinating your business?
- Advanced use of GenAI technology for managers and business teams
- Airtable – an advanced alternative to Excel for organizing data
- Learn your LLM: BERT
- Application of GenAI technology for IT engineers
- How to educate employees about cybersecurity
- PLS-SEM in higher education and the IT industry: how to make better data-driven decisions
- Training of Trainers: Generative Artificial Intelligence in Education

Overview of existing training programs for project partners

Given the diversity of technological expertise possessed by the project partners, it is first necessary to determine the capabilities and competencies of the staff for the transfer of knowledge of individual technologies. In order to obtain this data, a questionnaire on training was created for all consortium participants, which contained questions on the name and purpose of the training, then learning outcomes, duration, delivery methods, target population by industry and job position, teaching material, as well as references of the lecturers (an example of the questionnaire is given in the annex). The questionnaire was accompanied by illustrative examples of training from EDIH Italy and Croatia so that the partners would have a reference model in terms of name, duration, outcomes and learning methods when proposing programs.

The questionnaire also included a matrix of technologies that the partners identified when submitting the project, with the aim of determining which technologies they have competent staff for and the willingness to implement training in various industries. The list of technologies for which they initially indicated that they have technological expertise is as follows:

Technological expertise	STP Niš	IVY	ICEF	CDT	NI-CAT	ICT HUB	STP Cacak
Additive manufacturing		X					X
Artificial Intelligence & Decision support		X	X	X	X		
Big data			X			X	X
BI tools				X		X	
Blockchain and Distributed Ledger Technology (DLT)	X					X	X
Cloud Services	x	X	X	X			X
Communication network		X	X	X			
Date			X				
Digital twins		X					
Gamification	x				X	X	
High-performance computing		X	X				
Human-computer interaction		X					
Internet of Things	x	X	X	X			X
Internet Services & Applications	x	X	X		X	X	
Location-based applications		X	X				
Logistics	x	X		X	X		
Micro- and nanoelectronics, optoelectronics			X				
New technologies for Audio-Visual sector - Media	X					X	
Photonics			X				
Quantum Technologies (computing/communication)			X				X
Robotics	x	X	X				X

Sensors & Vision Processing Systems		X	X				
Software Architectures			X				
Virtual Reality	x		X			X	X

After collecting responses from project partners, we find that training programs were offered by 6 consortium partners. Table 5shows the distribution of a total of 24 implemented trainings according to the partner organizations involved in the work of S4AI_HUB. The largest number of trainings was offered by the Center for Digital Transformation, which indicates its central role in the implementation of capacity building activities. A significant contribution is also made by the Science and Technology Park Niš, as well as innovation centers at universities in Belgrade, which confirms the strong connection of the hub with the academic and innovation ecosystem. The participation of research institutes and specialized organizations, such as the Institute for Artificial Intelligence of Serbia and ICT Hub, further contributes to the thematic diversity and quality of the trainings offered.

Table 5Number of trainings by partner organizations S4AI_HUB

Partner organization	**Number of trainings**
Digital Transformation Center	13
Science and technology park Nis	3
Research and Development Institute for Artificial Intelligence of Serbia	2
Innovation Center of the Faculty of Mechanical Engineering, University of Belgrade	1
Innovation Center of the Faculty of Electrical Engineering in Belgrade d.o.o.	4
ICT Hub	1
Total	**24**

The table below shows the technological domains of training proposed by partners within the S4AI_HUB, obtained by subsequent thematic classification based on the content and focus of individual trainings. Based on the data obtained on the implemented trainings, it was possible to clearly identify and group the topics into several key categories that reflect the dominant directions of development of digital capacities among target groups. These categories include the application of artificial intelligence in business and industrial contexts, cybersecurity, digital business and analytics, cloud services, as well as ICT solutions aimed at environmental protection and sustainable development (Green ICT), with a separate group of specialized trainings. This classification provides a clearer insight into the structure of the training offer and serves as an analytical basis for further consideration of the compliance of the offered programs with the identified needs of target groups.

Technological domains of training
AI in business – refers to systems that use smart technologies such as text mining, chatbots and virtual agents, speech recognition, and natural language processing and generation, for the purpose of more efficient analytics, advanced decision-making, and prediction of possible outcomes in finance, sales, marketing, human resources, and other business processes.

AI in industrial processes and production – involves the application of smart technologies such as computer vision, machine learning and deep learning to optimize production, maintenance and logistics, improve quality control, as well as increase the level of robotization and automation.
Cyber security – refers to measures, controls and procedures applied to an organization's ICT systems to ensure the integrity, authenticity, availability and confidentiality of data and systems (authentication, back-up, VPN, risk assessment, security testing, etc.).
Digital business and analytics – involves the use of technologies, methods and software for data analysis to identify patterns and trends, draw conclusions, make predictions and make better decisions in order to improve performance (ERP, CRM, Big Data, BI tools, data from smart devices, satellite data, Open Data).
Cloud services – mean paid ICT services that are accessed via the internet for the use of software, processing resources, data storage space and other digital services.
ICT and the environment (Green ICT) – implies compliance with the Green Agenda and the implementation of ICT solutions to increase energy efficiency, more efficient use of resources and materials, as well as support for the circular economy (Carbon Footprint, GHG, renewables, Green IT).
Specialized training *(startups, entrepreneurship, innovation, IP protection, finance)*

The distribution of training by technological domain, shown in Table 6shows a clear dominance of the AI-BUSINESS domain, within which a total of 9 out of 24 training courses were offered, making this category the most represented and most significant in the structure of the offer. This is followed by SPECIALISED-TRAINING with 5 training courses and GREEN-ICT with 4 training courses, which indicates a strong focus on specialized support for startups, innovations and finance, as well as on topics of sustainable development and ESG policies. The AI-INDUSTRY and CLOUD-SERVICES domains are represented with 2 training courses each, which reflects a targeted approach to the application of advanced technologies in industrial processes and digital infrastructure. The smallest number of training courses was implemented in the BUSINESS-ANALYTICS and CYBER-SECURITY domains, with 1 training course each, which indicates potential room for expanding the offer in these areas in the coming period. Overall, this distribution reflects S4AI_HUB's focus on the practical application of artificial intelligence in business, with additional support for regulatory, security and sustainability aspects of digital transformation.

Table 6Classification of training by technological domains S4AI_HUB

Training by domain	Number of trainings
AI-BUSINESS	**9**
Advanced implementation of DSA, DMA and NIS2 – challenges and opportunities with AI	1
Natural language processing	1
GDPR basics and an introduction to the application of AI in data protection	1
Fundamentals of artificial intelligence	1
Basics of digital services and EU regulations (DSA, DMA, NIS2) with an introduction to AI	1

Application of artificial intelligence in tourism	1
Development of RAG agents using large language models (LLM)	1
Regulatory framework for the application of artificial intelligence	1
Advanced GDPR implementation and the challenges of AI in data protection	1
AI-INDUSTRY	**2**
Artificial intelligence and machine learning	1
Advisory training in the field of materials and welding with the possibility of further training in a specific area	1
BUSINESS ANALYTICS	**1**
Monitoring disaster risk using satellite imagery	1
CLOUD SERVICES	**2**
E-commerce infrastructure (NoSQL, CLOUD)	1
Modern mobile telecommunications networks, 5G in the case of a Smart City	1
CYBER SECURITY	**1**
Cybersecurity basics	1
GREEN-ICT	**4**
Digital innovations for carbon footprint management	1
Advanced application of AI in ESG strategies and reporting	1
Development of a Green Digital business model	1
Introduction to AI and ESG – new technologies for sustainable development	1
SPECIALIZED TRAINING	**5**
Access to Finance – Strategies and tools for securing investments	1
Launcher	1
Intellectual property protection in technological innovations	1
Innovation School – a specialized bootcamp program for startups	1
Total	**24**

Identification of specific needs of target groups

Needs assessment is carried out with the aim of allowing the target population to assess their own level of knowledge and skills, as well as their interests, attitudes, habits and preferences in the learning process (McCawley, 2009). Systematic collection and analysis of data obtained through needs assessment allows the researcher to identify and describe the "gap" between the existing state and the desired level of competence, as well as to design customized training programs. By understanding what the target group knows, thinks and what their interests are, we create educational programs so that they are more accessible, acceptable and usable for clients.

The method of examining educational needs can be *direct* and *indirect* . **A direct needs assessment** is conducted through a formal survey that collects data directly from users. The advantage of this approach is that it provides data that is more specific to the needs of individuals and can be implemented using quantitative and qualitative methods. On the other hand, the disadvantage is that it requires significantly more resources for design and implementation, and most often institutional approval. **An indirect approach** uses secondary data or hires intermediaries (advisors) to provide their opinions on priority

needs and challenges. An indirect assessment can be conducted faster and more simply and does not require the same level of investment in design, implementation and analysis.

For the purposes of this EDIH task, we used both assessments to survey the two populations. We treat the proposed trainings received from the project partners as an indirect assessment, i.e. expert opinion on the technological needs of organizations. While the direct assessment is made by examining the educational needs of companies using a mixed-method research method and using survey, interview and focus group methods.

Survey - quantitative assessment

As a quantitative method, the survey provides insight into the attitudes, opinions and self-assessment of the competencies of companies and respondents. The survey questionnaire was distributed primarily as an entry questionnaire to companies applying for the public call for use of EDIH services.

The set of questions in the survey questionnaire is designed to enable a systematic review of multiple interrelated aspects of the development of digital capacities in organizations. The questionnaire contains questions on the following thematic units: administrative data on size, age, sector of activity, and then questions from the **Digital maturity assessment** tool developed by the European Commission. This tool assesses a company's digital maturity in 6 domains, one of which specifically relates to the level of knowledge within the organization:

1. Digital business strategy
2. Digital readiness
3. Human-centric **Digitalisation**
4. Data management
5. Automation and artificial intelligence
6. Green digitization

The next set of questions assesses the current and desired state of digital skills, the assessment of the need for the training offered, proposals for additional training, the attitude towards the use of AI, the existing practices of employee development and education and dynamics, and finally, the company's willingness to invest money and time in employee training . This structure of the questionnaire allows, in addition to identifying specific areas where there is a need for training, to also look at the broader context in which organizations make decisions about human resource development – including their capacities, limitations and priorities. The questions used in the questionnaire are presented below, followed by an analysis of the responses received.

Survey questionnaire	
1.	What is your company doing to train and develop its staff for digitalization?
2.	When introducing new digital solutions, how does your company encourage participation and empowerment of its staff?
3.	For each of the following domains of technology use, please indicate your current and desired level (level 1–5):
3.1.	AI in business (ML, LLM, NLP, data science, business analytics, finance, sales, marketing, HR)
3.2.	AI in industrial processes and production (Industry 4.0, robotics, maintenance)
3.3.	Cyber security

3.4.	Digital business and analytics
3.5.	Cloud services
3.6.	ICT and the environment (Green ICT)
4.	From the list of partner trainings listed, assess how much you need this training.
5.	If there are any other training courses in the field of digital and advanced technologies that interest you and are not listed above, please list them.
6.	If your organization is not using artificial intelligence, what are the reasons for not using it?
7.	Based on past practice, how does your organization plan to master and improve employees' digital technologies?
8.	What percentage of employees have attended training in digital and advanced technologies in the past year?
9.	How many days are you willing to have your employees dedicate to developing their knowledge and skills in relevant training?
10.	How much are you willing to pay for training per employee in the field of digital and advanced technologies?

Data cleaning:

For responses in which respondents indicated the absolute number of employees who attended training (e.g. 1, 2, 5), standardization was performed in relation to the size of the company. For this purpose, the reference number of employees by size category was used (micro = 5, small = 30, medium = 150), based on which the percentage of employees covered by training was calculated. This approach ensured the comparability of data between companies of different sizes. In the responses to the question of how many days companies are willing to allocate for employee training, when they answered in ranks (e.g. 5-7), the higher figure was used for the analysis.

Findings from the Survey

The following are key findings from the survey, which was conducted to gain quantitative insight into the sample structure, existing practices and perceived needs of organizations in the field of digital and advanced technologies. The survey data provide a basis for examining the prevalence of certain attitudes, levels of self-assessed skills and interest in different types of training, as well as for understanding the capacity of organizations to invest time and financial resources in employee development. While the survey cannot fully capture the complex contexts in which organizations operate, it allows for the identification of general patterns and trends that are relevant for further shaping support and training programs within the EDIH.

The presentation of the results begins with basic descriptive indicators, such as the regional distribution of the surveyed organizations and their size, as these parameters represent the necessary context for interpreting all subsequent findings. The regional and structural profile of the sample influences the available resources, organizational capacities and access to knowledge, and is of particular importance for understanding how organizations approach digital transformation and the adoption of new technologies. After this introductory contextual framework, the findings related to the current and desired level of digital skills, the application of artificial intelligence, existing employee development models and interest in offered and potential training programs are analyzed. This structured presentation allows the survey results to be read as a starting point for a deeper qualitative analysis, which follows in the following sections and complements the quantitative insights with the specific experiences and perspectives of different target groups.

The report begins with an analysis of **regional and size distribution of the surveyed organizations,** as the basic context for interpreting the following findings.

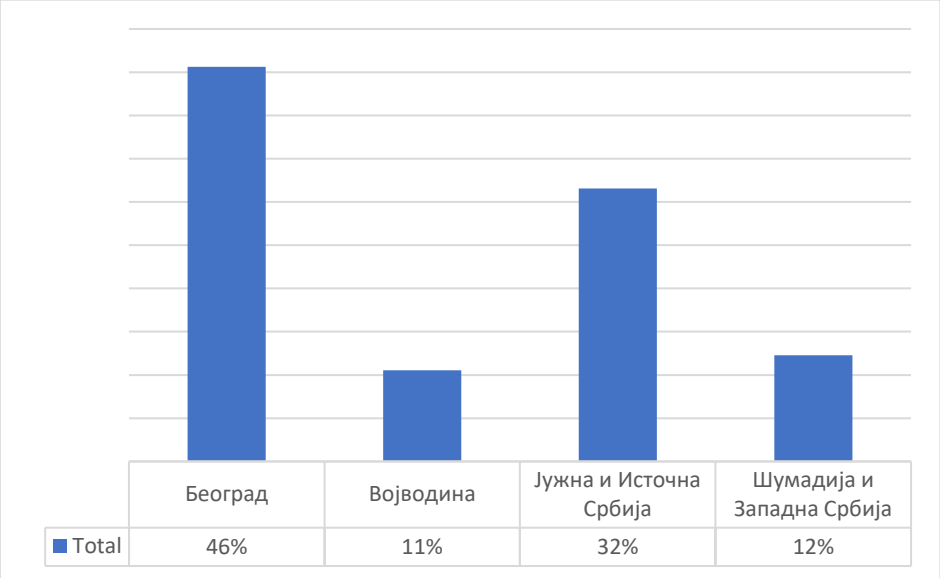

Chart 1Regional distribution of surveyed companies
Legend meaning: Београд – Belgrade, Војводина – Vojvodina, Јужна и Источна Србија – South and East Serbia, Шумадија и Западна Србија – Šumadia and West Serbia.

The largest share of surveyed companies comes from Belgrade (46%), followed by Southern and Eastern Serbia (32%), which reflects the regional concentration of economic activities in the sample.

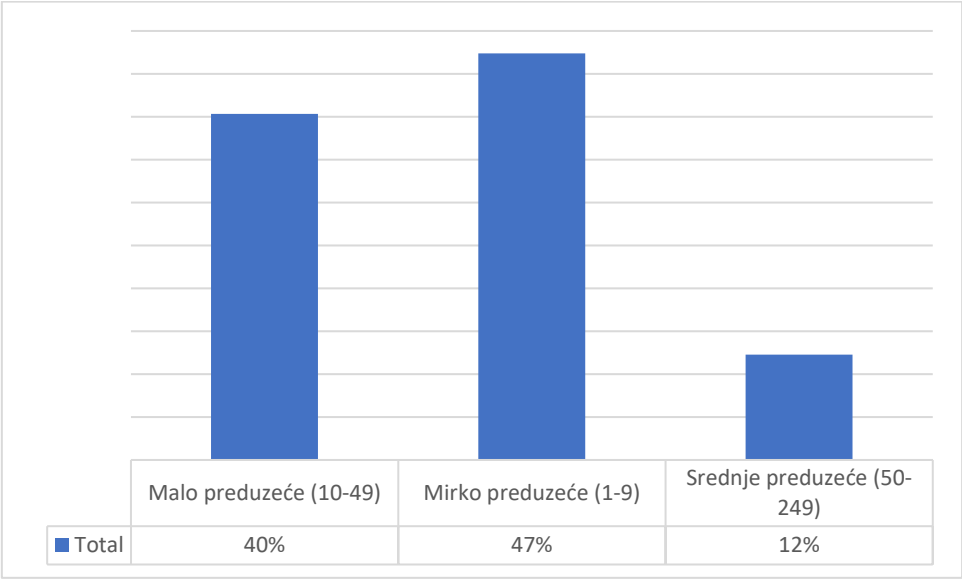

Chart 2Distribution of surveyed companies by size
Legend meaning: Malo preduzeće – Small enterprise, Mikro preduzeće – Micro enterprise, Srednje preduzeće – Medium enterprise

The sample is predominantly composed of micro and small enterprises with up to 50 employees. Micro enterprises have the largest share (47%), followed by small enterprises (40%), while medium-sized enterprises are less represented (12%). This sample structure is in line with the general structure of the

economy in Serbia, in which micro and small enterprises make up the majority of active economic entities. The pronounced dominance of micro and small enterprises indicates that the needs for training and support measures should primarily be adjusted to the capacities of smaller organizations, which often have limited human and financial resources for systematic investment in digitalization and skills development. The lower participation of medium-sized enterprises suggests the need for additional mechanisms for their inclusion in similar programs in future cycles.

The next set of questions comes from the European Digital Maturity Questionnaire, examining **training practices within organizations** , especially when introducing new technologies.

Table 7Representation of different education and training practices for digitalization

Digital technology training organization practices	**(%)**
Assesses staff skills to determine missing skills	20%
Enables learning by doing/mutual learning/opportunities for experimentation	19%
Organizes short trainings, provides instructions/guidelines and other e-learning resources	19%
Develops a staff training and development plan	13%
Use subsidized training and development programs	12%
Sponsors staff participation in training organized by external organizations (training providers, academia, suppliers)	12%
Offers internships and jobs in key capacity areas	5%
Total	**100%**

The results presented in Table 7indicate that organizations most often base their digital skills development on internal mechanisms. The most common practice is to assess employees' existing skills to identify missing competencies (20%), which indicates a growing awareness of the importance of diagnosing needs before investing in training. At the same time, a significant share of organizations rely on learning through work, with peer learning and experimentation (19%), as well as short, flexible forms of training and internal e-learning resources (19%). These findings suggest that companies prefer approaches that minimize costs and organizational disruption, but also enable rapid application of knowledge in everyday business processes.

Table 8Distribution of the total number of practices applied by companies

Total number of practices	**(%)**
1	16%
2	12%
3	19%
4	21%
5	16%
6	9%
7	7%
Total	100%

The data in Table 8further confirm the heterogeneity of training approaches, as most organizations combine several different practices simultaneously. The largest share of respondents applies four

different training practices (21%), while a significant percentage is also present among those who use three (19%) or five practices (16%). At the same time, a relatively small share of organizations relies on one or two forms of support, which indicates that digital training is increasingly seen as an isolated activity. This structure points to the need to design support programs, including EDIH services, as modular and combined packages that can be adapted to different levels of organizational maturity and existing learning practices.

Table 9Practices that the company undertakes when introducing new technologies

How does a company encourage participation and empowerment of its staff when introducing new digital solutions?	**%**
Gives staff greater autonomy and appropriate digital tools for decision-making and execution	12%
Informs staff about digitalization plans in a transparent and inclusive manner	15%
Makes it easier to inform staff about new digital technologies	15%
Provides staff with a digital support team/service (internal/external)	12%
Monitors staff adoption of technology and takes measures to mitigate potential side effects (e.g., fear of change, "always-on" culture versus work-life balance, safeguards for privacy risks, etc.)	11%
Redesigns/adapts jobs and workflows to support the ways staff would actually like to work	9%
Involves staff (including non-ICT staff) in the design and development of digitalization of products/services/processes	12%
Establishes more flexible working conditions enabled by digitalization (e.g. remote working)	14%
Total	**100%**

The results from Table 9show that companies in the process of introducing new digital solutions most often strive to strengthen the capacity of employees through organizational and cultural mechanisms, rather than through formalized training programs. The most common practices relate to transparent and inclusive informing employees about digitalization plans (15%), as well as facilitating access to information about new digital technologies (15%). A significant share also has the establishment of more flexible working conditions enabled by digitalization, such as remote work (14%), which indicates that digital transformation is perceived to a significant extent as a means of improving the working environment and motivating employees. Less frequently, but still relevantly, are practices that involve greater autonomy in the use of digital tools, job redesign, and the involvement of employees in the design of digital solutions.

Table 10Distribution of the total number of practices applied by companies when introducing new technologies

Total number of practices	%
1	11%
2	12%
3	11%
4	23%
5	4%
6	11%
7	11%
8	19%
Total	**100%**

Data on the total number of practices applied further indicate a pronounced combination of different approaches within the same organizations. The largest share of companies applies four different practices when introducing new technologies (23%), while a significant percentage is also present among those using eight different practices (19%), which indicates a high degree of complexity and integration of employee support measures. On the other hand, a relatively small share of organizations relies on a limited number of measures, which suggests that the introduction of digital solutions is increasingly accompanied by a broader set of organizational changes. These findings indicate that support and training programs should be designed to complement existing internal practices, with a special emphasis on change management, internal communication and active involvement of employees in the digital transformation process.

Questions related to assessing the current and desired state of technological competence

Initially, it was necessary to define broader areas of technology use in business for which it was necessary to assess the missing knowledge and desired training. Given that such a standardized nomenclature does not exist and that it depends on the geographical and temporal context being observed, we implemented several following steps. Initially, we classified the training offered by partners, which created a set of thematic areas. Experts from partner organizations were subsequently consulted to confirm that such a classification was appropriate and that their training could be classified in this way.

Considering that the economy does not know these areas sufficiently, which is why the numerical assessment of its knowledge is subject to flat-rate assessments and misunderstanding of the grading scale, we decided to include a description and meaning for each level of knowledge in the questionnaire. Below is a complete table with the 6 defined areas of business technology, as well as descriptions of the knowledge levels.

Level of knowledge	Level 1 — Not applicable	Level 2 — Basic application	Level 3 — Medium application	Level 4 — Advanced Application	Level 5 — Strategic Implementation
AI in business	The company does not use AI tools nor is there awareness of their business application.	The company uses certain AI tools (e.g. ChatGPT, Copilot) for basic administrative or marketing tasks.	AI is used in multiple business functions (marketing, finance, market analysis) and brings tangible benefits.	AI is integrated into business processes (sales automation, customer analytics, revenue forecasts); results are measured.	The company has an AI strategy and is investing in the development of its own solutions or advanced applications (e.g. predictive analytics, personalization).
AI in industrial processes and manufacturing	We do not use digital or smart systems in production or services.	Part of the equipment or process uses automation or sensors, but without integration with AI.	Digital systems in production collect data and enable process optimization.	The company uses smart systems and algorithms to monitor, control, and predict production failures.	AI systems are fully integrated into production and logistics processes (smart factory / smart service).
Cyber security	Data security is not systematically regulated; we rely on the individual responsibility of employees.	We have basic protection measures (antivirus, passwords), but no security policy.	There is an internal procedure for data protection and incident response.	The security system is formalized: there are policies, training, and regular risk monitoring.	Data security is part of strategic management; there is an internal or external security officer.
Digital business and analytics	Business decisions are made without digital data or analysis.	We use simple spreadsheets and digital tools to track sales or customers.	We regularly use digital reports, dashboards, and basic analytics in decision-making.	Decisions are based on integrated data and analytical models; there are digital reports by sector.	The company uses advanced tools and models for digital transformation, risk management, and strategic planning.
Cloud services	We do not use cloud services.	The company uses cloud services for basic business needs (e.g. Gmail, Google	Cloud is used in multiple business functions (e.g. sales, finance, HR);	The company has a cloud strategy (e.g. Microsoft 365, AWS,	Cloud is the foundation of an enterprise's digital infrastructure; data,

		Drive, OneDrive, Dropbox), but without central management or security policies.	data is shared and synchronized between teams;	Azure) and integrated systems for data operation, storage, and processing; cloud tools for AI and analytics are used;	applications, and AI models are fully integrated in the cloud environment; the company uses the cloud for scalability and innovation.
ICT and the environment (Green ICT)	The company has no activities related to the energy efficiency of ICT systems.	The company has a basic awareness of the environmental impact of digitalization (e.g., paper reduction).	The company implements some energy efficiency and responsible e-waste management measures.	The company has a sustainability plan and is striving to reduce the energy consumption of digital technologies.	The company develops or implements "green" digital solutions and actively monitors its environmental digital footprint.

Below is a presentation of the findings obtained by examining the current and desired level of knowledge across all technologies.

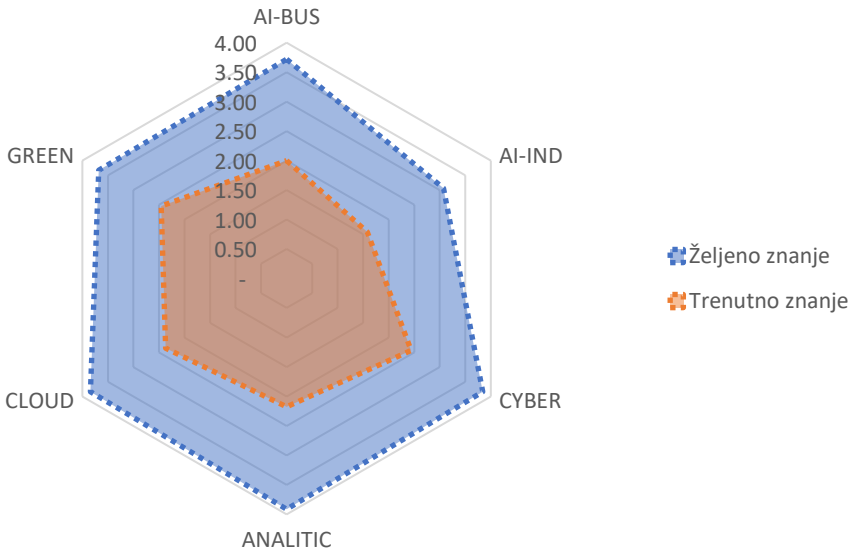

Chart 3Display of desired and current level of knowledge by technology domains

The following are the findings of the research related to the assessment of the current and desired level of knowledge in key technological domains. The radar diagram provides a comparative, synthetic view of the existing capacities and the expected level of competences, clearly highlighting the domains in which the largest gap between the current state and the needs of companies has been identified. In order to

provide a more precise understanding of the intensity of the observed differences, the findings from the graphs are further elaborated through a tabular view showing the absolute values of the current and desired level of knowledge, as well as the calculated gap and the percentage increase in needs by individual domains. This more detailed view allows for a comparison of the domains with each other and represents an analytical basis for identifying priority areas for the design of training programs and support measures within the EDIH services.

Table 11Desired, current state, gap and % of required growth

Area	Currently	Desired	Gap	Increase needed
AI in business	2	3.72	1.72	**+ 86%**
AI in industry	1.58	3.07	1.49	**+ 94%**
Cyber security	2.44	3.84	1.4	**+ 57%**
Digital business	2.18	3.91	1.74	**+ 80%**
Cloud services	2.37	3.84	1.47	**+ 62%**
Green ICT	2.45	3.68	1.22	**+ 50%**

Research findings show that the areas **of highest priority** , i.e. with the most pronounced educational needs, are primarily those in which the largest gap between the current and desired level of knowledge has been identified.

- **AI in business** is the area with the largest perceived gap. The current level of competencies is relatively low, while the desired level is extremely high, indicating a strong and clearly articulated need for systematic training. Special emphasis should be placed on the development of analytical and AI competencies, including business analytics, application of LLM models and automation of HR processes.
- **Digital business and analytics** is the second most critical area. Although organizations recognize the importance of digital transformation, existing knowledge does not keep up with the dynamics and complexity of modern business processes. Targeted upgrading is needed in the areas of digital strategy, process optimization and advanced analytics. These two areas should be the focus of future training programs, as they represent key prerequisites for successful digital transformation and strengthening competitiveness.

Medium priority areas , i.e. with moderately pronounced educational needs, refer to technological domains in which basic capacities exist, but are insufficient for full and sustainable implementation.

- **AI in industrial processes and production (Industry 4.0, robotics, maintenance)** shows that certain competencies already exist, but are not sufficient for the full adoption of advanced industrial concepts. Additional training of technical and operational staff is needed, especially in the areas of automation, robotics and predictive maintenance.
- **Cybersecurity** also stands out as a significant area of need, with the gap indicating the need for more intensive and practically oriented training, with a focus on risk management, security procedures and the development of specific security skills.

- **Cloud services** show a relatively high gap, with insufficient understanding of cloud platforms, tools, and security aspects being one of the factors slowing down the modernization of ICT infrastructure.

in the area of **ICT and the environment (Green ICT)** . However, given the strategic importance of green digitalization, this area still requires continuous improvement of knowledge and skills.

Opinion about trainings

Respondents were asked to express their need for partner training by rating it from 1-unnecessary to 5-necessary. The following results were obtained:

Table 12Average rating of the consortium's training needs

Training names	Needs assessment
Artificial intelligence and machine learning	4.1
Fundamentals of artificial intelligence	4.1
Regulatory framework for the application of artificial intelligence	3.8
Cybersecurity basics	3.6
E-commerce infrastructure (NoSQL, CLOUD)	3.6
GDPR basics and an introduction to the application of AI in data protection	3.4
Advanced GDPR implementation and the challenges of AI in data protection	3.2
Basics of digital services and EU regulations (DSA, DMA, NIS2) with an introduction to AI	3.0
Introduction to AI and ESG – new technologies for sustainable development	3.0
Natural language processing	2.9
Development of RAG agents using large language models (LLM)	2.8
Advanced application of AI in ESG strategies and reporting	2.8
Development of a Green Digital business model	2.8
Advanced implementation of DSA, DMA and NIS2 – challenges and opportunities with AI	2.7
Intellectual property protection in technological innovations	2.7
Modern mobile telecommunications networks, 5G in the case of a Smart City	2.4
Digital innovations for carbon footprint management	2.1
Monitoring disaster risk using satellite imagery	1.8
Application of artificial intelligence in tourism	1.4

Most needed training (score ≥ 3.8). These are the areas where there is the greatest perceived need for competency development. Organizations see them as a high priority. Training in the field of artificial intelligence — both technical and regulatory — is clearly identified as the most urgent. This indicates the need for organizations to better understand AI technologies, their application, impact on business, and obligations arising from legal regulations.

- Artificial intelligence and machine learning — 4.1
- Fundamentals of Artificial Intelligence — 4.1
- Regulatory framework for the application of artificial intelligence — 3.8

High Need (score 3.4–3.7) - These topics are highly relevant and significantly missing from the current competency set. Cybersecurity and cloud/NoSQL infrastructure are the foundation of digital resilience and efficiency. GDPR and AI are becoming critical due to new regulatory obligations and the need for responsible data use.

- Cybersecurity Fundamentals — 3.6

- E-business infrastructure (NoSQL, CLOUD) — 3.6
- GDPR Basics and Introduction to the Application of AI in Data Protection — 3.4

Medium level of need (score 2.7–3.3) . These topics are important, but not among the most urgent priorities. These are areas that require improvement, but organizations see them as a “second priority” compared to topics like AI fundamentals, cybersecurity, and cloud infrastructure.

- Advanced GDPR implementation and AI challenges — 3.2
- Fundamentals of Digital Services and EU Regulations (DSA, DMA, NIS2) + AI — 3.0
- Introduction to AI and ESG — 3.0
- Advanced implementation of DSA, DMA and NIS2 — 2.7
- Intellectual property protection in technological innovations — 2.7
- Natural Language Processing (NLP) — 2.9
- Development of RAG agents using the LLM model — 2.8
- Development of Green Digital business model — 2.8
- Advanced application of AI in ESG strategies and reporting — 2.8
- Modern mobile telecommunications networks (5G) — 2, **4**

Low need (score ≤ 2.5). These are topics that are not currently in focus or are only relevant to specific sectors. These areas are considered a lower priority for most organizations. They are most often relevant in narrow industries (e.g. tourism, ESG management, geospatial analysis) and do not represent a general priority, indicating a clear differentiation between universal and context-specific educational requirements.

- Digital innovations for carbon footprint management — 2.1
- Disaster risk monitoring using satellite imagery — 1.8
- Application of AI in tourism — 1.4

Table 13Company proposals for additional training

Category	Frequency	Keywords / most common motifs
AI and automation	30%	AI tools, automation, generative AI, AI in accounting, AI in marketing, AI in architecture, CAD + AI, AI model development, AI chatbot, Google AI tools, RAG, machine learning
CRM + marketing + client systems	16%	CRM (HubSpot, Zoho, Pipedrive), digital marketing, customer support, customer tracking, e-commerce, UX/UI, customer segmentation, sales-marketing connection
Process digitalization / workflow	11%	process digitization, archiving, digital tools, document automation, digital communication flows, legal-tech, general digital transformation
ERP / HRIS / business systems	7%	ERP, HRIS (human resource system), software development cycle / maintenance
Web / 3D / CAD / Technical Skills	7%	website management, 3D model integration, technical drawings, CAD modeling
No need / no answer	30%	"there is none", "no", "they do not exist", "we have no answer", "I have no idea"

While topics such as carbon footprint management, satellite analytics and the application of AI in tourism are relevant to a narrower number of organizations or individual sectors, the open-ended responses of the respondents show that some companies have a need for very practical, business-oriented training that directly supports operational efficiency and growth. When asked about additional training, **30% of companies indicated additional needs**, indicating that the training provided covers the needs of one third of companies.

Table 14Reasons why companies do not implement AI

Reasons not to use AI	**%**
There are not enough experts in this field in the organization.	30%
Uncertainties regarding the legal aspects and consequences of AI	16%
Incompatibility with existing equipment, software or systems	15%
Difficulties with access or quality of data for analysis	15%
The costs are too high.	13%
Fear of data protection and privacy breaches	10%
Ethical dilemmas	2%
Total	**100%**

The findings presented in Table 14show that the reasons why companies do not implement artificial intelligence are not primarily technological in nature, but are primarily related to human capacity, regulatory uncertainty and organizational readiness. The most frequently cited reason relates to the lack of experts within organizations (30%), indicating a clear gap in the knowledge and skills needed to launch AI initiatives. A significant share of respondents also highlight ambiguities regarding the legal aspects and consequences of implementing AI (16%), as well as technical and qualitative barriers, including incompatibility with existing systems and limited access to quality data (15% each). Implementation costs are also recognized as a relevant barrier (13%), while fears related to data protection and ethical issues are less common, but still present. These findings indicate that wider adoption of AI requires an integrated approach that combines human capacity development, legal and regulatory support, and technical preparation of organizations.

Table 15Technology learning practices within the company

Existing practice of the organization	**%**
The organization plans to some extent the mastery and improvement of digital technologies by employees.	70%
The organization lets the employee manage the mastery and improvement of competencies related to digital technologies.	19%
Has a clear plan for each employee regarding mastering and monitoring digital technologies	11%
Total	**100%**

The findings presented in Table 15indicate that in most companies there is a certain level of awareness of the importance of continuous improvement of digital skills, but that this practice is most often partially formalized. The largest share of organizations (70%) states that there is a framework planning for mastering and improving digital technologies at the company level, which indicates the existence of a strategic intention, but not necessarily clearly defined implementation mechanisms. At the same time, a

significant part of companies (19%) leaves the management of the development of digital competencies to the employees themselves, which may indicate a flexible approach, but also the absence of systemic support and clear guidelines.

On the other hand, a relatively small share of organizations (11%) have a clearly defined and individualized digital skills development plan for each employee. This finding indicates that systematic management of competence development is still underdeveloped and that there is room for improvement through the introduction of structured tools for knowledge assessment, training planning and progress monitoring. In this context, EDIH programs can play a significant role in supporting companies in the transition from a generic or individual approach to a more comprehensive and sustainable model of digital skills management.

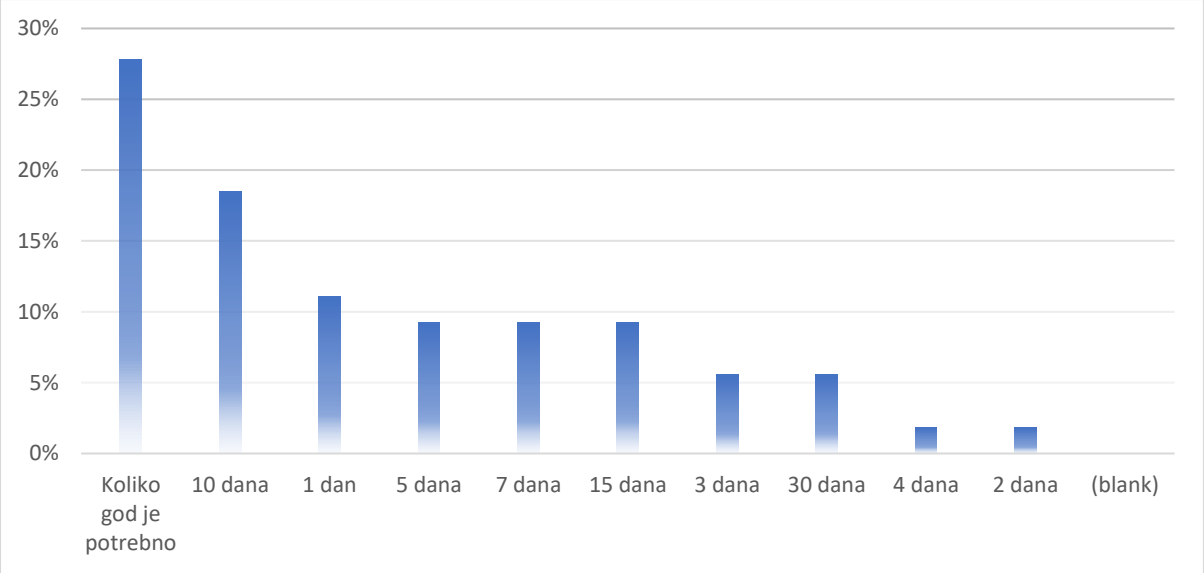

Chart 4Number of days that companies are willing to allocate for training their employees
Legend meaning: Koliko god je potrebno - As long as necessary, Dana - days

The graph shows that companies are most often willing to allocate a relatively limited time frame for training, with short forms of training dominating. The largest share of respondents indicates up to 10 days of training per year, while a significant number of companies prefer even shorter formats (1–7 days), which indicates the need for flexible, modular and practically oriented programs. A smaller share of organizations is willing to allocate longer periods (15 or more days), which suggests that more intensive programs require clearly demonstrated value and a direct connection to business results. This indicates that the proposed EDIH short trainings are fully adequate, and that there is room and need for organizing more intensive trainings.

Table 16Companies' willingness to finance employee training

	Average euros	M a x euros	Min euros
Small Enterprise (10-49)	352	1000	200
Micro Enterprise (1-9)	348	1000	200
Medium Enterprise (50-249)	343	1000	200
Total	**349**	**1000**	**200**

The data in the table indicate a relatively uniform willingness of companies of different sizes to finance employee training. The average value of the allocation is around 340–350 euros per employee, while the maximum amount in all categories is 1,000 euros, and the minimum is 200 euros. These findings suggest that, regardless of the size of the company, there is a similar framework of financial expectations.

Companies were also asked about the percentage of employees who had attended training in the previous year, and the data shows a negative trend. Namely, **almost half of the companies** responded that their **employees did not participate in organized learning** and development programs.

Interviews and focus groups

A survey is a quantitative research method, which allows data to be collected from a larger sample and thus general conclusions to be drawn. A survey questionnaire has pre-set questions and does not provide flexibility in the expression of the respondent. On the other hand, methods such as interviews and focus groups are qualitative and complementary research methods, allowing for freer conversations and understanding the reasons why members of the target groups take certain positions. The following are the key findings of individual focus groups and interviews, organized by target group type, divided into the public sector, the startup community, and small and medium-sized enterprises (SMEs).

Focus Group Report – Public Sector

The focus group was held on December 18, 2025, in an online format (via video-conferencing platform). The activity was conducted with the aim of identifying key barriers, needs and potential for digital transformation and the application of artificial intelligence in the public sector. The focus group was attended by representatives of **public administration** (Local Government Units) and **public utility companies from several cities in Serbia**. The discussion was semi-structured, with moderation, and the analysis was conducted using a combination of thematic coding of the transcript and moderator notes. The public administration consists of the cities of Niš, Čačak, Vranje and Novi Pazar, and the public utility companies LER Čačak, PUC "Komunalac" and PUC "Gradsko zelenilo" are from Čačak, as well as PUC "Mediana" from Niš.

Key finding 1: Digital transformation as *a top-down* process

The introduction of digital systems in the public sector is predominantly carried out through *a top-down* approach, most often as a legal or institutional obligation. End users of the system are not involved in the planning phase, while needs analysis and process adaptation occur only after implementation. This approach produces resistance from employees, slows down work and creates the feeling that digitalization is an additional administrative burden, rather than a tool for improving efficiency.

"Solutions are imposed, and only then is it analyzed whether it is necessary and how it is necessary." Public Enterprise - Čačak

"The system comes from above and it is assumed that everyone knows how to use it." Public Administration - Vranje

"Just when people are getting used to one system, a new one comes and everything starts from scratch." Public Administration - Niš

Key Finding 2: Lack of people, knowledge and systemic training

One of the central obstacles to digital transformation is the combined deficit of human resources and competencies. Systems are often introduced without organized training, while knowledge is transferred informally, through the personal initiative of individuals and reliance on the collegiality of more digitally competent employees. These employees become an informal "first line of support", without formal recognition of this role, which leads to their additional burden and increased risk of burnout.

"Those who are a little more skilled help others, but it is not systematically recognized."
Public administration – Niš
"Younger colleagues go through applications and train older ones, even though it is not their job."
Public enterprise – Čačak
"1100 employees, and 5 people in IT – that is unsustainable."
Public enterprise – Niš

Key Finding 3: Lack of digital foundations and system fragmentation

The analysis shows that a large part of the public sector does not have a stable level of basic digital literacy, while advanced digital systems and AI solutions are being introduced at the same time. In parallel, the digital ecosystem is fragmented - different ministries and institutions are developing unrelated systems, which leads to double data entry, parallel work and reduced productivity. For employees, digitalization often does not mean simplifying work, but duplicating it.

"We have to start with basic training – Office, internet, e-mail."
Public administration / PUC
"We are introducing the same into ePisarnica and eTurist – we are working twice." Public administration – Vranje
"Digitalization is being introduced, but paper is not being abolished." Public administration-Niš

4. Perception and potential of AI application

Artificial intelligence is perceived as a useful tool for improving administrative and repetitive processes, but not for strategic decision-making. The most commonly identified areas of application include speech-to-text tools, note-taking, administrative assistants, and information aggregation.

"AI can speed up work, but it can't plan the budget."
Public Administration - Vranje

5. Preferred training models

Participants agree that block training sessions lasting one to two days, with physical removal from the workplace, are the most effective. Short online training sessions were rated as the least effective.

"If you stay at your job, the phone will keep ringing."
Public Administration - Čačak

Key findings – summary

- The analysis shows that **public enterprises function more efficiently and are far more similar to the business sector**, while public administration is more strongly constrained by procedures, hierarchy and regulatory framework, with a more pronounced lack of adequate staff.
- Digital systems in the public sector are predominantly introduced **top-down**, without prior needs analysis and without involving end users. They are often perceived as imposed solutions to which organizations subsequently and reactively adapt.
- **Systematic training is generally absent**; knowledge transfer takes place informally and spontaneously, according to the principle *of peer learning* or reverse mentoring, relying on a small number of digitally literate employees.
- There is a pronounced **staffing deficit** - both in terms of the number of employees and in terms of digital competencies, with a continuous outflow of professional staff.
- **Outdated systematizations** and an unfavorable age structure further complicate adaptation to technological changes.
- **Basic digital literacy** (working in an Office environment, using the internet and email) is a necessary prerequisite for any further digital transformation and application of artificial intelligence.
- The state's digital ecosystem is fragmented: parallel and incompatible systems (eSick Leave, eTourist, eTaxes, etc.) produce duplicate work and reduce efficiency.
- Switching to advanced digital systems using outdated hardware and slow internet infrastructure, instead of speeding up work and increasing efficiency, often produces the opposite effect.
- Public enterprises, compared to public administration, show greater operational flexibility and readiness to implement advanced digital solutions, with management support playing a key role.

Implications for EDIH

The findings indicate the following needs that have direct implications for the success of the EDIH training program:

- Introduce systematic needs analysis and planning with the active participation of employees who are future users of digital and information systems, so that planning and implementation processes move in *a bottom-up* direction.
- **Systematically organize education and learning within public sector organizations**, whereby it is necessary to formally recognize and valorize existing practices of *peer learning* and mentoring within working hours and work tasks.
- Amend and **supplement job classifications** by identifying positions and activities related to "introduction of innovations", "digital transformation", "technology transfer" and "knowledge transfer".
- Organize training in basic digital literacy (working with text, working with spreadsheets, searching the internet).
- The introduction of new digital solutions must be accompanied by the procurement of modern network equipment and other digital infrastructure in order to truly accelerate and simplify work.

Interview - public sector local self-government

A representative of the city administration from the South Serbia region shared his experiences and views on the introduction of information systems, the application of artificial intelligence, cybersecurity, as well as the capacities and needs of his organization in this process. The following is a summary of that in-depth conversation, structured by key topics, with direct quotes and analysis. The goal is for decision-

makers to gain insights into the context and challenges from the field, as a qualitative complement to the quantitative findings of the research.

Introduction of digital systems and employee awareness

A city government source describes digitalization as a process that most often comes "from above," through centrally imposed solutions and legal obligations, without sufficient prior involvement of end users. "The system comes from above and it is assumed that everyone knows how to use it," he says, pointing out that new software is introduced without an analysis of local needs and without adequate information and training for employees. This top-down implementation, he explains, often causes resistance among employees and slows down daily work. When a system is perceived as imposed, employees perceive it more as an additional administrative burden than as a tool for improving efficiency.

He also emphasizes that digital solutions are being introduced in rapid succession, without enough time for people in the organization to adapt. "Just when people are getting used to one system, a new one comes along and it all starts over," conveying the impressions of colleagues. This continuous pressure of frequent changes, combined with a lack of prior notice and training, creates frustration: employees have the impression that they are constantly "chasing" new programs and procedures, while their core work suffers. The interviewee emphasizes that involving end users – those who will actually work in these systems – in the early stages of planning would significantly contribute to better adaptation. At the local level, there is a willingness to give suggestions and feedback, if only there were mechanisms for the voice of practitioners to be heard in the design and procurement of digital solutions.

Capacities and staffing challenges

In addition to the structural problems of introducing technologies, our interlocutor particularly emphasizes the limited capacities of local governments – both in terms of the number of people and their digital competencies. "One of the central obstacles to digital transformation is the combination of a lack of human resources and competencies," he explains, adding that new systems are often introduced without organized training. Therefore, knowledge about the use of information technologies is transferred informally and spontaneously – relying on the personal initiative of individuals and the collegial help of a few "digitally literate" employees. In practice, these technically skilled individuals become de facto support in the organization, although this is not in their job description.

He adds that the problem of staffing is not only about skills, but also about the sheer number of people: in many city administrations, IT departments are small and overburdened. Although local governments do digital work on a smaller scale, a similar imbalance between needs and available IT experts is evident. Our interlocutor also points to the continuous outflow of the most qualified to the economy or other authorities, as well as to the unfavorable age structure of the staff. "There is a pronounced staffing deficit – both in terms of the number of employees and in terms of digital competencies, with a continuous outflow of professional staff. Outdated systematizations and an unfavorable age structure further complicate adaptation to technological changes. In other words, it is difficult to retain and motivate young experts in public administration, while at the same time a significant share of employees find it difficult to accept new technologies before retirement." These limited capacities initially slow down any digital transformation initiative.

Also, **the fragmentation of the state IT ecosystem** imposes an additional burden on limited teams. Different ministries introduce their own applications that are not interconnected, so local governments have to work in multiple systems in parallel. "We introduce the same in ePisarnica and eTurist – we do

double work," he explains, illustrating how parallel systems produce duplication of work instead of savings. Such a fragmented approach to digitalization, combined with outdated computer equipment and slow internet at the premises, leads to the fact that the introduction of advanced solutions sometimes slows down work instead of speeding it up. The interviewee emphasizes that it is therefore important to build a single, interoperable system and modernize the infrastructure in order to achieve the effects of digital transformation.

Application of artificial intelligence (AI)

When asked about artificial intelligence, he expresses moderate optimism – he sees AI as a useful tool for improving certain routines, but not as a solution for everything. In his opinion, the greatest value of AI tools is that they can take over repetitive administrative tasks – for example, transcribing speech into text, automatically compiling meeting minutes, aggregating information from multiple sources or providing simple administrative assistance. It is precisely such areas that were also recognized by the focus group participants as the most promising for the application of AI technologies. On the other hand, our interlocutor emphasizes that decisions that require complex reasoning, contextual knowledge or political responsibility must remain in the domain of humans. Artificial intelligence tools can be very helpful in supporting civil servants – speeding up procedures, reducing administrative burdens and allowing human resources to focus on more demanding tasks – but they cannot replace the expertise and judgment that comes with experience in public administration. This view is in line with the wider perception in the public sector: AI is currently accepted primarily as a means of increasing efficiency, while its role in strategic decision-making is viewed with skepticism.

Cybersecurity and data protection

Although the topic of cybersecurity is not at the forefront of everyday conversations, our interlocutor is aware that digitalization also brings increased risks to data security. As public administration becomes increasingly dependent on information systems, exposure to potential cyber incidents also increases. In practice, there is often a lack of specialized information security personnel, so this role naturally falls to IT departments that are already small in number. Maintaining high security standards with limited resources is a big challenge, especially in smaller cities.

The interviewee points out that raising awareness among employees about security protocols is crucial. His administration, like others, is faced with the fact that the human factor is a weak link if employees are not sufficiently trained to recognize threats (such as phishing emails, malicious attachments). At the national level, local governments are increasingly being targeted by hacker attacks, which is why it is important that every employee understands and complies with the prescribed protection measures - otherwise, the entire organization can become a victim of an attack. According to our interviewee, they have not had a serious security incident so far, but prevention should not be neglected: "The damage from one cyber attack could be very large for the city administration. That is why we must proactively work on data protection." He believes that additional training for staff on the basics of cyber knowledge, as well as expert support in risk assessment and infrastructure improvement, would be very useful.

Training and development of digital skills

Speaking about improving employee skills, our interviewee emphasizes the need for systematic and continuous training of personnel. Until now, according to him, there has been a lack of organized education when introducing new systems – the assumption was that people would manage on their own, with minimal instructions. Such an approach has proven inadequate. Instead, we should start from the

ground up: “We need to start with basic training – Office, internet, email,” he says, emphasizing that basic digital literacy is a prerequisite for any further transformation.

In particular, training formats and methods that are most suitable for employees in the public sector were considered. According to our interviewee, short online training sessions that are completed in an hour or two have not proven effective. Employees often follow them from their workplace with other current obligations, which drastically reduces concentration. Interactive workshops and so-called block trainings lasting one to two days, outside the regular work environment, have proven to be much better. This is also in line with the views of employees in the city administration in Čačak that “If you stay at your workplace, the phone will ring all the time”, which makes learning impossible. Therefore, our interviewee recommends that employees be allowed to be physically displaced at least occasionally during training – either in the form of seminars in training centers, or through experience exchange programs with other cities. Such intensive training, accompanied by practical examples, in his experience bring the most benefits because employees can fully dedicate themselves to learning new skills. Of course, after the training, it is important to provide supporting documentation, manuals or online materials, so that knowledge can be refreshed as needed.

Focus Group Report – Startup Community

This report summarizes key insights from a focus group discussion of the startup community, organized to identify educational needs, i.e. knowledge gaps, and how to most effectively address them. The focus group was held on December 18, 2025, in an online format, with audio recording of the conversation. A semi-structured conversation was conducted, with thematic units that included training, regulatory and financial challenges, financing and support models. The moderator's notes were treated as the primary source of findings, while the transcript was used as additional illustrative material for quotes and context. The participants are startups from the fields of health and medicine, energy, creative and digital services, as well as teams developing hardware. The companies come from several parts of Serbia: Belgrade (Palilula, Voždovac), Čačak and Niš.

Key finding 1: Technical knowledge is assumed; “startup business” knowledge is lacking

Participants clearly point out that technical knowledge is not the primary problem. The key gap relates to the business side of startups: legal framework, finance, market strategy, and risk management in the growth phase.

"We need business startup knowledge. We don't need technical knowledge."
Čačak

"We are all technically educated and digitally literate;
our only needs are around startups."
Čačak

"We need to better understand how
to engage in and operate in the digital economy."
Belgrade - Palilula

Key Finding 2: Regulatory Compliance and Contracts are a Critical Risk Point

Legal documents and regulatory requirements appear very early, often before startups have the resources to adequately address them. In particular, there is a fear of unfavorable clauses in investor

agreements and a feeling that the costs of legal services are disproportionate to the capabilities of startups.

"We are signing a contract, but we don't know how
to conclude it so that we don't stumble somewhere - they are the stronger party."
Čačak

"Privacy policy and terms & conditions are asking us for
over a thousand euros, and everyone is only talking about GDPR."
Belgrade - Voždovac

"That 'double click' is missing – specifically what applies to the EU and what to the US."
Belgrade

Key Finding 3: Accounting and taxes for digital models are ongoing challenges

Startups face conflicting interpretations from accountants and tax rules, especially when it comes to SaaS models, cloud services, and sales through app-store platforms. This leads to wasted time and increased risk of errors. Patent protection is also recognized as strategically important, but participants lack a clear understanding of costs and how to plan, making discussions with investors difficult.

"There is no clear guide on how to pay for software from a business account."
Belgrade - Palilula

"Some say we need a cash register,
others say we don't - and we sell through Google and the App Store."
Belgrade - Voždovac

- "Maybe we don't need training, but a document with those five to ten things that are repeated to everyone."
Niš

"No one knows how to say: you need so much money for IP, that we can include it in the plan."
(Čačak)

Key Finding 4: External support is needed "on the fly" – mentoring and practical assessment

Participants emphasize the lack of reliable support that would help them "get through" the concrete steps: preparing for grants, presentations to investors, and structuring projects.

"We don't have any support from someone telling us what it should really look like." (Čačak)

"It would mean that there is someone who will look at it and say: this is okay, fix this." (Čačak)

"We need a list of verified accountants and lawyers so that a new startup doesn't have to wander around." (conversation)

Preferred training models

The preferred model is online with short, applicable materials (playbooks, guides, templates), as well as **hybrid:** online resources + live mentoring.

Key findings – summary

- Startups generally **do not seek technical training** , because technical and digital literacy already exists; the priority is **"startup business" knowledge** : legal framework, finance and accounting, sales, marketing, and entering international markets.

- The biggest practical risk is **legal and regulatory uncertainty** – from investor agreements to Terms & Conditions / Privacy Policy and the differences between the EU and US markets.
- There are serious uncertainties in **the accounting and tax treatment of digital businesses** (SaaS, cloud services, app-store sales), which creates additional costs and the risk of unintentional non-compliance.
- Startups are looking for **structured external support** , not just another lecture: mentoring, reviews and assessments, practical guides, and access to proven experts.
- Hardware and deep-tech startups have **significantly different cost profiles** than software startups, which current support models do not sufficiently recognize.
- The need to educate **external stakeholders** (accountants, lawyers) who work with startups was also highlighted.

Implications for EDIH

- Design programs for startups as **Startup Business & Compliance** support, not as technical training.
- Introduce regular **legal clinics for investor contracts and key documents** .
- Develop practical modules for Terms & Conditions and Privacy Policy by market.
- Create a startup playbook for accounting and tax dilemmas of digital business.
- Create special **training for accountants and lawyers for the digital and startup economy.** This can also form a cluster of preferred accountants and lawyers who are familiar with the startup and innovation economy.
- Establish a "grant readiness" service with mentoring and a peer-review approach.
- Specifically segment support for hardware/deep-tech startups.
- Provide a practical package for IP planning and indicative costs.

Interview – Deep-tech Startup

This presentation is based on an in-depth interview with a representative of a deep-tech startup. The interview was conducted in December 2025, in a semi-structured format, with the aim of gaining a deeper understanding of the specific challenges, needs, and obstacles that hardware startups face in the process of developing and commercializing innovative products. The interview was audio-recorded, after which a transcript and analytical notes were prepared, which served as the basis for the thematic analysis presented below. The insights presented do not represent statistically representative findings, but rather an illustrative example that deepens and contextualizes the results of the survey and focus groups.

Challenges of deep-tech startups

Hardware (deep-tech) startups face specific challenges that set them apart from “classic” software teams. First, there is the issue of costs and funding. Developing a hardware product requires significantly higher investments – from prototypes and equipment to production – while the available grants and support programs are often the same for everyone. “A software startup usually needs money for people and time, while someone who deals with hardware has much more costs. We are all put in the same basket – grants are the same for everyone, and in fact there is a serious difference between one and another.” This mismatch means that hardware teams have to find additional sources of funding or achieve more

with the same funds, which slows down their development and growth. They also note that the ecosystem's attention is often focused on software and AI solutions, while their needs are neglected.

Another major experience is the lack of understanding of the environment – potential clients, partners, and even institutions – for what these startups do. The technology they develop is often new and complex, so there is a lack of awareness of its value and application. "The other side often does not understand what we do and whether they even need it... They may need education more than we do," indicating that it is necessary to educate the market and institutions about the innovations that a hardware startup brings. These experiences illustrate that the challenges of hardware startups are not only technical in nature, but also structural: how to secure sufficient resources and how to convince the environment of the value of their innovative solution.

Support and training: what's missing

Participants emphasize that technical knowledge is not their primary problem – they have enough of it, given their education and experience. What is missing are business and entrepreneurial skills adapted to the digital economy. "We are technically educated and digitally literate; our only needs are around startups." In other words, they need training that covers "startup business" knowledge – the legal framework of business, finance and accounting, sales and marketing development, creating a growth strategy and entering international markets. These are areas in which founders often have no formal experience, and they are crucial for the success of the company. "We need to better understand how to engage in the digital economy and how to operate in it."

The lack of this knowledge becomes apparent as the startup moves towards the market. "We have no idea what awaits us when we need to market a product outside the local market." The questions they face are: how to open a company in the EU, what are the differences in laws and regulations – all of these are areas of knowledge they lack and for which training or advice would be extremely useful. Similarly, startups only on the verge of commercialization realize that they will also need marketing and sales skills that they currently do not have on their team. "Great, you need money for marketing, but… you need someone to explain to you which direction to go," – meaning that it is not enough to secure a budget, but also to know how to use it most effectively.

Financing and regulation

Funding issues are closely linked to the above challenges. Hardware teams point out that their costs are significantly higher, and that existing support programs do not sufficiently take this into account. Not only do they need more initial capital, but the path to revenue is also usually longer than for software companies. Therefore, they highlighted the need for better access to financial sources – from domestic and foreign grants to investors and corporate partners. "We need more support for European funds," they suggested, suggesting that it would be helpful if there were mechanisms or tools that would connect them to funding programs at the European Union level. Specifically, it was proposed to create a tool or platform where startups can find relevant European funds, events and networks, and even seek mentorship in the application process. Such a "hub" would make it easier to find the information and partnerships necessary to raise more capital.

In addition, startups see regulatory uncertainty as a risk to long-term planning. They don't have a clear picture of all the obligations they face as they grow and enter new markets. "I have no idea what's in store

for us. I believe there are things that are defined – you have to do this, you have to do that, you have to do that… The more we know about it now, the better prepared we are." This statement reflects a general feeling that it would be helpful for startups to be guided through important regulatory steps in advance – whether it's product safety and standardization requirements, export procedures and paperwork when opening a company abroad, or something else. Similar situations indicate that regulations often impose obligations before startups have the resources or knowledge to meet them, and they need additional help and advice to stay compliant while maintaining the pace of development.

Lawyers and accountants for the digital economy

High-quality support from external experts – primarily lawyers and accountants – is crucial for a growing startup, but there are obstacles in working with them. One problem is the mismatch between the offer of traditional legal/accounting services and the reality of startups. Startups often do not have the capacity to hire expensive large offices, and yet they face specific issues that classic experts do not know enough about. The preparation of basic legal documents such as Privacy Policy and Terms & Conditions documents requires over 1,000 euros, which is often a large and unplanned expenditure for a startup. "There is obviously an imbalance here – either they take it too seriously, or we do not take it seriously enough," and the classic approach of lawyers does not take into account the early stage and capabilities of the startup. In other words, they need lawyers who understand digital business and who can offer specific solutions tailored to the startup, either through consulting or through customized templates for key documents.

They share similar experiences on the accounting side. Accounting and tax rules in the field of digital business are often unclear or contradictory when applied to a startup. This gap in the interpretation of regulations puts the team at risk of inadvertently making mistakes, and certainly distracts them from product development. The solution he sees is to educate and adapt these external actors to new business models. "We need training for accountants - how to treat grant income, how to invoice cloud services, what is taxed and what is not." This idea resonates with the views expressed in the focus group rather than each individually wasting time and paying different advisors to come up with answers. In this way, accountants who want to work with startups could themselves expand their competencies for the digital economy. The same goes for lawyers: instead of each startup explaining to its lawyers what it needs, it would be better to have some kind of "startup legal clinic" or at least a database of proven lawyers versed in investment contracts, intellectual property, terms of use, and similar issues that inevitably arise in this world.

Access to mentors and markets

There is a lack of systematic mentoring and advisory support during the development of a startup. The necessary advice is mostly obtained informally or through trial and error, which slows down progress. "We don't have any support to tell us what it really should look like," summing up the feeling that it would mean a lot to them to have experienced mentors to guide them through critical steps. A specific suggestion was to create a centralized hub or online platform for mentoring. "A hub where we could find some mentoring would be really good – just like there is a job portal, there should be a portal for finding mentors… If there is one, great; if not, it should be created." The idea is that such a system would allow startups to find suitable experts or more experienced entrepreneurs for consultation, either locally or across Europe, depending on where they want to expand their business.

In addition to the mere existence of mentors, access to markets – especially international ones – is also important for startups. Many innovative teams in Serbia have global ambitions, but they do not have direct experience with foreign markets. “I don’t know if you are going that far… but if you can guide us to some practices and knowledge needed for the European or global market?” In essence, they need help to “conquer” the market: to understand business cultures, regulations, customers and competition outside Serbia. Without this kind of support, startups are left to their own devices in the very complex undertaking of internationalization. They do not know how much money or how much time they need to plan for a serious penetration of a foreign market – which is why these plans are often postponed. Here we see room for EDIH and similar programs to help them prepare better. Mentors who have gone through the process of scaling a company or exporting products could provide invaluable advice, and connecting with networks abroad would open the door to their first clients outside of their home country.

Focus Group Report – Small and Medium Enterprises (SMEs)

A focus group with representatives of small and medium-sized enterprises (SMEs) was held on December 18, 2025, in an online format. The discussion was conducted in a semi-structured manner, with the aim of identifying: the ways in which SMEs access information about new technologies, key barriers to the implementation of digital solutions, needs for training and advisory support, and preferred models for organizing training and learning. The analysis is based primarily on moderator notes, which represent a reference source for the findings, while the transcript of the discussion was used as additional material to understand the context and illustrate the views of the participants. The focus group was attended by representatives of various SMEs, including: media companies (radio and digital media), ICT and consulting firms, companies in the field of financial services and payment systems, companies that develop or support medical and healthcare technologies, and companies with manufacturing and infrastructure activities. The participants differ in their level of digital maturity, size and geographical distribution (Belgrade, Vojvodina, Southern and Eastern Serbia), but they are connected by a common challenge: limited internal capacities for strategic management of digital transformation and complex regulatory requirements.

Key Finding 1: Informal networks are the main source of knowledge about new technologies

SMEs most often learn about new technologies through conferences, seminars, fairs, international events and exchange of experiences with colleagues from the industry. These forms of learning are recognized as valuable and useful, but insufficient for the systematic application of technologies in business. Participants emphasize that such events give them inspiration and ideas, but that there is often a lack of support in the next step - implementation and adaptation of technologies to their own business processes.

"At conferences we get ideas and see what's trending, but then we all come back to the company and we don't have a clear idea of how to apply it in practice." — (small company, Belgrade)

"Events are good for networking, but we lack someone who will guide us through a concrete step – what first, what next." — (medium-sized company, Southern and Eastern Serbia)

"Everyone talks about AI, but few explain how to actually incorporate it into our existing business." — (micro-enterprise, Niš)

Key finding 2: AI and cybersecurity are crucial but sensitive areas

Artificial intelligence and cybersecurity have been identified as two central areas of the digital transformation of SMEs. AI is seen as a tool for automation, improving efficiency and developing new

products and services, while cybersecurity is perceived as a necessary prerequisite for any serious digitalization. At the same time, there is a pronounced caution regarding data security, especially when it comes to the use of publicly available AI tools and cloud solutions. SMEs emphasize the need for solutions that can be used internally or in a controlled environment, with a clear understanding of regulatory constraints.

"AI is interesting to us, but the first question is always – where does our data go and who has access to it." — (medium-sized company, Belgrade)

“We can't take risks with security, especially if we work with sensitive customer data.” — (small business, Vojvodina)

"All the tools seem useful, but no one tells us what is safe and allowed in our case." — (medium-sized company, Belgrade)

Key Finding 3: Regulatory Compliance and Standards as a Condition for Growth

For many SMEs, especially those operating in regulated sectors (finance, healthcare, infrastructure), regulatory requirements represent one of the biggest barriers to innovation. Participants point out that international partners and investors expect clear evidence of compliance with standards, certifications and regulations (e.g. data security, AI governance). Without such evidence, SMEs are unlikely to be in a position to even start cooperation.

"The first question from foreign partners is not what we do, but what certificates we have." — (small company, Vojvodina)

"Without paper and standards, we can't even enter into a conversation, regardless of the quality of the solution." — (medium-sized company, Belgrade)

"Regulation often slows us down, but we know that without it there is no growth." — (medium-sized company, Belgrade)

Key Finding 4: The Need for External Perspective and Process Improvement

Several participants highlighted that SMEs often believe that their processes are digitalised and optimised, but that it is only through specific AI or digital projects that structural problems in data and processes are identified. There is a strong need for external assessments (digital assessments) and advisory support to help SMEs realistically assess the situation and identify priorities for improvement.

"We thought we were digitalized until we embarked on an AI project – then all the holes came out." — (micro enterprise, Niš)

“We need someone from the outside to tell us where we really stand, not just where we think we stand.” — (medium-sized company, Southern and Eastern Serbia)

"When you dig deeper, you realize that the data and processes are not as ready as they seem." — (micro enterprise, Belgrade)

Preferred training models

Focus group participants clearly expressed preferences regarding the organization of training:

- online training is acceptable and often the most practical,

- Live trainings bring added value through direct interaction,
- The hybrid model (online + live workshops) was rated as optimal.

There is a consensus that training should be organized in cycles (e.g. spring and autumn), with a clear plan, predefined topics and application deadlines, so that SMEs can plan the engagement of employees. SMEs show a high willingness to invest in the development of employee knowledge, but under certain conditions: training must be relevant to specific job positions, it is desirable to be linked to certification, the content should be practical and based on real examples. In terms of employee motivation, experiences vary. Some employers note low employee initiative for independent training, which is partly attributed to lack of knowledge of the opportunities offered by new technologies. In these cases, initiative and support come primarily from management.

Key findings - summary

- Small and medium-sized enterprises (SMEs) in Serbia show a high level of awareness of the importance of digitalization, artificial intelligence (AI) and cybersecurity, but their challenges and needs differ significantly from the public sector. For SMEs, the key problem is not basic digital literacy, but **how to translate existing knowledge, tools and ideas into sustainable, secure and regulatory compliant business solutions** .
- SMEs rely heavily on **informal learning networks** – conferences, professional events, international trade fairs, industry peers and partners – as their main source of information about new technologies. At the same time, there is a need for **systematized, structured and practically oriented support** , especially **in the areas of AI, cybersecurity and regulatory compliance** .
- **standardization, certification and evidence of capacities** is highlighted , which are crucial for SMEs to cooperate with large companies, investors and to enter international markets. Without formal confirmation of knowledge and processes, SMEs find it difficult to position themselves as credible partners, regardless of the actual quality of their solutions.
- SMEs are largely **willing to invest time in training their employees** , especially if the training is practical, linked to specific business problems and leads to certification. Online and **hybrid training formats** are widely accepted, with a consensus that a combination with live workshops is the optimal solution.

Implications for EDIH

Based on the above findings, the following implications and guidelines for the design of EDIH programs aimed at SMEs are clearly defined:

- In response to the need for SMEs to transform knowledge into applicable business solutions, EDIH programs **should develop training that integrates technology (AI, cybersecurity), regulation, and business processes** , instead of isolated technical or theoretical courses.

- Given SMEs' reliance on informal sources of knowledge and lack of structure, EDIH should offer **systematized and clearly curated support programs** , with an emphasis on practical application of AI and cybersecurity within specific industries and business models.

- Given the crucial importance of credibility and evidence of capacity, EDIH programs should provide training leading to **recognized certificates, standards and formal attestations** , as an instrument for strengthening the market position of SMEs and their entry into international markets.

- **In response to the heterogeneity of SMEs and different levels of maturity** , it is recommended to introduce **digital and AI assessments** as entry points, which would enable personalized support and more efficient guidance of SMEs towards relevant services and training.
- **In line with SMEs' preferences for flexible yet practical learning** , EDIH should develop **hybrid training models** that combine online content with live workshops, work on real business challenges, and mentoring support.

Interview - SME Perspective

Complementing the quantitative analysis conducted through the SME survey, this interview provides a deeper insight into **the thoughts and experiences of one focus group participant** . The results of the previous research showed that the need for artificial intelligence (AI) and cybersecurity are among the key priorities of companies. However, the numbers alone do not fully reflect the context and challenges faced by SMEs. That is why we spoke to SME representatives through a focus group held on December 18, 2025, and here we highlight the perspective of a technology-oriented company in the medical sector. Through the conversation, we examined **how information about new technologies is obtained, experiences in the application of AI , attitudes towards cybersecurity, as well as training and support needs ,** thereby completing the picture obtained by the survey. The conversation in this text is conveyed through direct quotes with analytical commentary.

Technology awareness

The representative points out that the company constantly tries to **keep up with technological innovations** in several ways. First of all, they listen to the needs of their clients and partners, which often shows them in which direction to look for solutions. In addition, they actively follow developments in the profession: *"We attend large conferences such as Medica in Germany... some webinars and seminars on the subject. LinkedIn is also a place where certain profiles often share the latest technologies and achievements* ." This multidisciplinary approach – a combination of direct information from the market and participation in international events – allows it to identify relevant innovations. She also emphasizes the importance of professional networks and online platforms, where experts exchange news about the latest technological achievements.

At the same time, the company is trying to put the knowledge into practice **through internal efforts** . As it explains, its internal team is continuously *"preparing a training program and how to automate some processes"* because today *"artificial intelligence is present everywhere and its presence in all processes... drives that energy, creates synergy and automatically improves day by day"* . In other words, awareness of current trends is combined with practical skills in introducing innovations. This informal "learning network" inside and outside the company helps it assess which opportunities are realistically applicable in business. All this indicates that, although there are enough opportunities for learning, SMEs often make significant efforts on their own to gather information and stay up to date, which is something that formalized support (such as that through EDIH) could further facilitate and systematize.

Application of artificial intelligence (AI)

Artificial intelligence is an inescapable theme in this participant's experiences. She notes that *"AI… has really exploded in our field in the last two years, or a year, and now everyone is trying to integrate some AI functionality into medical devices* ." In other words, the medical technology sector is rapidly

incorporating AI components, which are expected to improve data processing and efficiency. The company is aware of the potential, but also of the fact that some companies and experts may be ahead of them in terms of knowledge: *"I believe there are people who deal with AI every day and know much more than us, because we don't deal with it every day* ." This admission illustrates a typical situation for SMEs – although they see the value of AI , they feel **a gap in specialized knowledge** compared to the leading players.

The participant states that they have started AI adoption initiatives: *"We have started building systems and processes that will recognize these AI frameworks* ," she says, emphasizing a planned approach to integrating intelligent solutions. However, she is quick to add that they have noticed certain limitations in the AI training they have had so far: the available training often remains at a general level and *"is not enough, it is at a high level… we need the substance* ." This statement suggests that **implementing AI in SMEs requires more practical and deeper knowledge** – not just theoretical insights or general information, but also concrete guidance on how to integrate AI tools into specific business processes.

She also draws attention to new **regulations related to artificial intelligence** , which complicate the introduction of these technologies. The European Union, for example, is introducing the Artificial Intelligence Act (AI Act) that sets new obligations for companies. *"The Artificial Intelligence Act is... one of the new regulations, where practically every company that uses artificial intelligence... has to comply with the regulations. In that part... a lot of education is needed,"* she emphasizes. So, in addition to technical knowledge, SMEs now also have to take into account legal compliance when implementing artificial intelligence solutions. This confirms the experience of the participants that *identifying the right tools for artificial intelligence is* a big challenge: they need **to choose solutions that are both efficient and compliant** . *"We need help in choosing the tools themselves… our specific field is medicine… tools that are compliant with regulatory requirements* ," suggesting that external support in assessing and selecting appropriate AI technologies would be very helpful. In light of these insights, it is clear that support programs (such as EDIH) should include **expert advice on AI** – not just how to implement it, but also how to do so safely and in compliance with standards.

Cyber security

In addition to the enthusiasm for new technologies, the experiences also reflect **concerns about cybersecurity** , especially in the context of innovation. She notes that many companies, in the race to create a functional solution, overlook key questions: *"How safe is it, how secure is it, how calibrated is the database from which the information is used to make decisions, etc. Where do our documents end up... there are a lot of unknowns* ." Her observation illustrates **a typical failure in practice** - the focus on the usefulness of AI tools sometimes neglects the consideration of data protection and privacy. When other companies approach them to work together on an AI product, the first question she asks is precisely related to **standards and security** : *"What standards have you identified, which are applicable, how did you solve that? ... Almost no one has even looked... it all comes down to 'let's make something that works, without thinking about regulation* . '" This experience suggests that there is a serious need to raise awareness and knowledge about security aspects - from data protection to the validation of artificial intelligence models. Otherwise, the benefits of artificial intelligence may be compromised by risks to confidential information and business continuity.

Interestingly, the participant recognizes that the answers to these questions exist, but may not be readily available to the average business. She *believes that "there are experts who deal with these aspects every day"* and that their knowledge should be utilized. This statement once again highlights the role of

intermediary organizations , which should connect SMEs with cybersecurity experts and help them act proactively. For policymakers, this means that, in parallel with promoting the introduction of artificial intelligence, there must be **equally strong support in the field of cybersecurity** – through education, advice and possibly accessible risk assessment tools – in order for the digital transformation to be safe and sustainable.

International competitiveness and standardization

Competitiveness depends in particular on standards and certificates. From experience, foreign companies they come into contact with first look for **evidence of competencies** : *"Many European and generally global companies will first look at certificates, how much training we have at the company level and... how many of these innovations we have actually implemented. And how else can we do that than through various certificates, licenses* ." In other words, certification and formal training are a prerequisite for trust in business cooperation. She adds that all potential partners *"are looking for evidence... to clearly see that first you have proof that you are certified, and then we can talk about further cooperation"* . These comments clearly indicate that for SMEs, too, certificates and standards are not a bureaucratic burden, but **a key to market positioning and credibility** . Standardization, whether internally by establishing our own quality standards or externally through harmonization with international norms, represents an investment in the future for her: *"As a company, we want to have our own standards, but we also want to standardize services or products... That will open up future activities for us and show us what is most important"* . This need for **objective verification of our own progress** indicates the desire of SMEs not to stop at individual attempts, but to reach a certain level that is measurable and recognized in the wider business environment.

Training need

The need for training permeates almost every aspect of the conversation – from AI to security and standards. The participant describes how her company tries to educate its staff, but faces limitations. *"We are ready... we have one colleague who is young and profiled to be the management representative for AI according to the standard and every time something happens... we send him [to a training or event]* ." Through this practice – where one employee acquires knowledge and shares it within the team – they try to keep up with innovation, however, this approach has limitations that the company itself acknowledges: *"But again, it is not enough, it is not the essence... We need necessary knowledge – which are tools that automate the process, but… are secure for information processing and can be used in medicine"* . It is clear that SMEs are **willing to invest time in learning** , but they expect **better quality and more specific training from support programs** . Her experience with previous training suggests that more advanced courses and workshops are needed, focused on specific skills (e.g. managing AI projects while complying with regulations or cybersecurity for employees). Also, the drive towards certification means that **training programs should lead to recognized certificates** – whether it is in AI management skills , handling sensitive data or compliance with standards (such as ISO security standards, etc.).

It is also important to note that the participant sees room for the EDIH initiative to fill gaps in knowledge and skills. She openly states that such a project is an opportunity to assess how much knowledge has been acquired and what needs to be done next. The responses indicate that **a centralized place of knowledge and support is needed** where practical problems would be solved and where knowledge would be certified. This confirms the mission of the EDIH Center to serve as an "academy" or advisory body to which SMEs can turn for a set of tailored services and training.

Conclusions and recommendations of the educational needs analysis

The training needs analysis builds on a review of the existing legislative, strategic and programmatic framework, as well as an analysis of the existing training programs of the project partners. A review of key domestic and European strategies and comparative practices indicates that there is **a positive and encouraging legal and strategic framework** for digital transformation, which clearly indicates **the knowledge and skills gap** is one of the key challenges for further digital and innovation transformation. National strategies and relevant European documents particularly emphasize the need to improve digital competencies, integrate artificial intelligence into work and business processes, strengthen cloud capacity, cybersecurity and business analytics skills. At the same time, data from European and national surveys consistently indicate that organizations in different sectors lag behind in the practical application of advanced digital solutions such as artificial intelligence, cloud and digital analytics, despite the existence of strategic commitments. In this context, the project partners have already developed **an initial set of training courses** that provide a good basis for the work of the EDIH center, especially in the areas of **artificial intelligence basics, the green agenda and the regulatory framework**. The analysis of the companies' needs showed that these training courses largely correspond to the identified priorities, but also that there is a clear need for their further development and expansion, especially in the domains **of cybersecurity and business analytics**.

On this basis, the findings of the survey, focus groups and interviews allow existing training programs to be viewed in relation to the real needs of users and to identify priorities for their improvement and adaptation to different target groups:

1. **Public sector (local government).** Findings indicate that key challenges are related to insufficient basic digital skills, limited staff capacity and a dominant top-down introduction of digital systems. There is interest in AI and advanced solutions, but they are primarily perceived as a tool to support administrative processes, with a strong need for systematic and practically oriented training.
2. **Startup community. Startups demonstrate a high level of technical literacy and interest in AI and advanced technologies, but identify a lack of knowledge in the field of business in the digital economy as a key gap. In particular, the need for training in regulations,** grant applications and accounting is highlighted, adapted to the early stage of development and the specificities of innovative products.
3. **Small and Medium Enterprises (SMEs)**. SMEs recognize the importance of digitalization and AI, but face limited internal capacity to implement them. Findings indicate a need for practical training that links technology to specific business processes, especially in the areas of cybersecurity, cloud solutions and business analytics, as well as support in understanding regulatory requirements.

Implications for EDIH S4AI_HUB

- Maintain and further develop training in the basics of artificial intelligence, the green agenda, and the regulatory framework, and **expand the offer of training in the domains of cybersecurity and business analytics**, as areas in which the largest gap between needs and existing capacities has been identified.

- Introduce **modular " learning paths"** by maturity and by target groups - clear levels/modules that are combined into packages for public administration, startups and SMEs, to adapt training to different needs and capacities.
- Implement flexible and **intensive learning formats** (block training, practical workshops), which have proven to be more effective than short online training sessions. Ensure that EDIH support, in addition to training, also includes **advisory and mentoring elements** , especially for startups and SMEs with limited internal capacities.
- In the **bottom-up** news, **especially in the public sector,** through needs analysis with future users, formalize peer learning/mentoring during working hours, update systematizations - positions for digital transformation and innovation , ensure basic digital literacy and strengthen infrastructure in parallel.
- Organize a "**Legal & Accounting for Digital Economy" club** for startups, but also for lawyers and accountants who need to understand SaaS, IP, GDPR, Terms/Privacy, digital services invoicing and grants
- Encourage cross-sectoral learning and exchange of experiences, through joint workshops and formats connecting public administration, SMEs and startups, in order to encourage knowledge transfer, understanding of different perspectives and the development of sustainable digital solutions adapted to the wider ecosystem.

7.2. Methodology Of The Training Program

Defining the structure and content of the program

During the educational needs assessment phase, a set of trainings that they can deliver was obtained from all project partners. Information on the trainings was obtained through a single questionnaire (an example of the questionnaire is given in the annex). In this way, a total of 24 trainings were obtained, for which 8 trainers were nominated. Each training should contain the following set of information:

Training Elements	Description
TRAINING GOAL	Defines the main objective of the training, i.e. what is intended to be achieved through its implementation at the strategic and/or practical level.
PURPOSE OF TRAINING	Describes the rationale for the training and the specific need or problem it is intended to address within the target group.
TARGET GROUP	Specifies the profile of participants for whom the training is intended (e.g. SMEs, public administration, startups, IT professionals).

Training Elements	Description
ENTRY CRITERIA	Defines the minimum level of knowledge, experience, or competencies required for successful participation in the training.
LEARNING OUTCOMES	Specifies what participants will be able to do upon completion of the training, using clear and measurable statements.
EVALUATION AND CERTIFICATION	Describes the methods used to assess participants' knowledge and the type of certification or confirmation issued upon completion of the training.
TRAINING CONTENT	Presents the main thematic areas and key topics covered by the training.
THEORY AND PRACTICE	Specifies the balance between theoretical and practical components, expressed either as a percentage or descriptively.
TEACHING METHODS	Describes the methods and techniques used during the training (e.g. lectures, workshops, case studies).
MODE OF DELIVERY	Specifies whether the training is delivered in person, online, or in a hybrid format.
TRAINING DURATION	Describes the total duration of the training and the schedule of activities by day or module.
TRAINING MATERIALS	Specifies the materials used and/or provided to participants during the training.
MATERIAL AND TECHNICAL RESOURCES	Describes the technical and other resources required for the delivery of the training.

Due to the diversity of topics and content of the trainings, it was necessary to carry out a thematic classification, so that all trainings were classified into six areas. The areas were defined according to their predominant technological affiliation, but taking into account the context of the economy and future participants who should be able to recognize the areas even without knowledge of technology. The thematic areas are as follows:

Training Area	Description
AI IN BUSINESS	Includes systems based on intelligent technologies such as text mining, chatbots and virtual agents, speech recognition, and natural language processing and generation, with the aim of improving analytics, supporting

Training Area	Description
	more advanced decision-making, and enabling outcome prediction in finance, sales, marketing, human resources, and other business processes.
AI IN INDUSTRIAL PROCESSES AND PRODUCTION	Refers to the application of intelligent technologies such as computer vision, machine learning, and deep learning to optimize production processes, maintenance, and logistics, improve quality control, and increase the level of robotization and automation.
CYBERSECURITY	Includes measures, controls, and procedures applied to an organization's ICT systems to ensure the integrity, authenticity, availability, and confidentiality of data and systems, including authentication, backups, VPN, risk assessment, and security testing.
DIGITAL BUSINESS AND ANALYTICS	Refers to the use of technologies, methods, and software solutions for data analysis in order to identify patterns and trends, generate insights, and support better decision-making, with the aim of improving business performance (e.g. ERP, CRM, Big Data, BI tools, data from smart devices, satellite data, Open Data).
CLOUD SERVICES	Includes the use of paid ICT services accessed via the internet, enabling on-demand use of software, computing resources, data storage, and other digital services.
ICT AND THE ENVIRONMENT (GREEN ICT)	Refers to the application of ICT solutions in line with the Green Agenda, with the aim of improving energy efficiency, enabling more efficient use of resources and materials, and supporting the circular economy (e.g. carbon footprint, greenhouse gas emissions, renewable energy sources, Green IT).
SPECIALIZED TRAINING	Includes thematic training programmes tailored to specific target groups, such as startups and entrepreneurs, with a focus on entrepreneurship, innovation, intellectual property protection, finance, and the development of sustainable business models.

Structure of the training program by area

Below is a list of training titles sorted by subject area:

Training by domain	Number of trainings
AI-BUSINESS	9
Advanced implementation of DSA, DMA and NIS2 – challenges and opportunities with AI	1
Natural language processing	1
GDPR basics and an introduction to the application of AI in data protection	1
Fundamentals of artificial intelligence	1
Basics of digital services and EU regulations (DSA, DMA, NIS2) with an introduction to AI	1
Application of artificial intelligence in tourism	1
Development of RAG agents using large language models (LLM)	1
Regulatory framework for the application of artificial intelligence	1
Advanced GDPR implementation and the challenges of AI in data protection	1
AI-INDUSTRY	2
Artificial intelligence and machine learning	1
Advisory training in the field of materials and welding with the possibility of further training in a specific area	1
BUSINESS ANALYTICS	1
Monitoring disaster risk using satellite imagery	1
CLOUD SERVICES	2
E-commerce infrastructure (NoSQL , CLOUD)	1
Modern mobile telecommunications networks, 5G in the case of a Smart City	1
CYBER SECURITY	1
Cybersecurity basics	1
GREEN-ICT	4
Digital innovations for carbon footprint management	1
Advanced application of AI in ESG strategies and reporting	1
Green Development Digital business model	1
Introduction to AI and ESG – new technologies for sustainable development	1
SPECIALIZED TRAINING	5
Access to Finance – Strategies and tools for securing investments	1
Launcher	1
Intellectual property protection in technological innovations	1
Innovation School – a specialized bootcamp program for startups	1
Total	**24**

Selection of training participants

The project envisages that the training will be provided to all three target groups: startups, traditional industry and the public sector. The needs analysis has shown that startups have developed technical knowledge and that they need to develop business skills for the digital and innovation economy, which

should expand the Hub's educational offer. Traditional industry needs to be introduced to various technologies at a basic and advanced level, while it has been shown that the public sector has the greatest need for basic training in the most dominant technologies: artificial intelligence, cybersecurity and cloud .

An important role in this process is played by digital consultants who assess the level of digital maturity of organizations in all business domains and based on that know which trainings are most appropriate to attend. They will make recommendations to the organization's management, which will decide on the number of employees to be included in the training program. In addition to organizations that are selected for the transformation process through a public call, the call for training should not be limited or closed only to them. After assessing the availability of lecturers and interests in training, the call for training should be opened publicly to other companies and the public sector that have not applied for the transformation, and from which employees want to participate, in a rational scope. The goal of EDIH is to raise the digital maturity of the entire country, so in accordance with the available resources, it should contribute to the achievement of this mission.

Conducting training and quality assurance

The quality of training is ensured by controlling the process within **the organizations** that are the carriers of training, then by checking the competences **of the lecturers** and finally by assessing the relevance and topicality of the content of **the educational programs themselves**. For each of these segments, there is a prescribed international and national set of standards, which formal and non-formal education organizations adhere to. It is the degree of application of these standards, as well as the degree of organization and systematicity of the training process, that determines the difference between formal and non-formal educational programs. EDIH According to its basic idea, it does not pretend to become an institution of formal education, but rather belongs to **non-formal education institutions** that provide occasional, short and relevant training cycles for the purpose of raising awareness or acquiring basic knowledge and skills.

The required quality of trainers is assessed through their domain knowledge, recognition in professional circles and possession of training competencies. Each consortium partner should assess these parameters and involve trainers in the work based on them. In order to ensure the uniqueness of the quality of educational activities, all trainers undergo a joint training for trainers, with the aim of harmonizing and developing a unique method of teaching and testing knowledge. Trainings of trainers should be held as needed, as new trainers are involved in the work of EDIH academies. The quality of the program in terms of content is checked by the partner institution, consulting with experts and researchers from the given field. The quality of the program in terms of the form of delivery is standardized through unique syllabi of each training.

Training quality standards

Below are the relevant standards governing the field of non-formal education:

- **ISO 29990:2010** (Learning services for informal education and training): initial service standard for providers service non -formal learning education; prescribes analysis need, defining outcome, design and execution program, assessment achievements and continuous improvement, with emphasis on competence the artist and clearly informing student.
- **ISO 29993:2017** (Learning services outside formal education – Service requirements): service standard for providers training outside formal system; defines how everything they work analysis

need, outcomes learning, design program, information of participants, performance, evaluation and continuous improvement.

- **ISO 29994:2021** (Distance learning services): upgrade 29993 for online / distance learning training; technical and pedagogical requirements for platforms, support participants, integrity check knowledge.
- **ISO 21001:2018** (Educational Organizations Management System - EOMS): "ISO 9001 for education"; system management educational organization (quality policy, goals, processes, internal checks, student satisfaction).
- **ISO 10015:2019** (Guidelines for competence management and training): how training directly closes competence gap (planning – execution – checking – improvement) .
- **ISO/IEC 40180:2017** (Quality for learning , education and training – e- learning frame): reference frame for e-learning quality (content, technology, support, outcome measurement).
- **ISO/IEC 17024:2012 (Conformity assessment - General requirements for bodies operating certification of persons):** standard which defines requests for independent certification bodies which confirm competence individuals; provides transparency, impartiality and international comparability certificate, separating process training from process certifications.

At the national level, the field of education and training is regulated by the Law on Adult Education and its accompanying bylaws. The law provides for the accreditation of legal entities with the acquisition of the status of a publicly recognized organizer of adult education activities (JPOA). An organization accredited as a JPOA implements various activities aimed at the acquisition, improvement or change of knowledge, skills and competences of adults - from basic education and functional literacy programs, through additional qualifications and requalifications, to various forms of non-formal learning and training for the labor market. During accreditation, the existence of professional staff with appropriate teaching and andragogical competencies is assessed , as well as whether the organization has adequate space, equipment and teaching materials, whether it maintains prescribed pedagogical-andragogical documentation and applies clear procedures for monitoring and evaluating learning outcomes, whether connectivity and cooperation with the local community, the labor market and competent institutions are ensured, as well as the level of compliance of the program with the National Qualifications Framework.

The EDIH Academy should be aware of all these standards and strive towards them, and when it is clearly shown that there is a need for its work and education models, it should initiate the accreditation process with the Qualifications Agency and the Accreditation Body of Serbia.

Curriculum evaluation

An expert evaluation of the training programmes was conducted, including an analysis of the training objectives and learning outcomes, the structure and content of the programmes, the applied teaching methods and techniques, the balance between theoretical and practical components, as well as the alignment of the programmes with the needs of the target groups and relevant standards and frameworks.

Based on the evaluation, recommendations for the improvement of the training programmes were formulated. These include revisions and updates to the training content, adjustments to the learning outcomes, enhancement of the methodological approach, and optimization of the duration and delivery

format of the training. The findings and recommendations serve as the basis for the final version of the curriculum and contribute to ensuring the quality, relevance, and practical applicability of the training programmes within the EDIH Academy.

As part of the Training of Trainers programme aimed at developing the andragogical competencies of trainers, structured feedback will be provided for each individual training programme. Following the Training of Trainers, each trainer will be required to integrate all received comments and submit the revised training programme in accordance with the defined standards. Upon submission of the improved training programmes, an additional evaluation will be conducted to ensure full compliance with quality requirements.

Training calendar

Trainings are implemented after assessing the digital maturity of companies, and before the Test before Invest phase. This means that in order to determine the exact start and end dates of the training process, it is also necessary to know the dates of the other phases that are currently in process and development. In this regard, it is possible to predict the implementation of the training in a way that defines their duration, and the start and end will be determined subsequently. Below is a table of recommended implementation dynamics:

Thematic units	1 week	2 weeks	3 weeks
AI-BUSINESS			
AI-INDUSTRY			
BUSINESS ANALYTICS			
CLOUD SERVICES			
CYBER SECURITY			
GREEN-ICT			

Timely and adequate information for participants

All training courses implemented within the EDIH Academy should be publicly announced and available to participants with all relevant information. This means that biographies of all lecturers must be obtained and their references from the fields they attend must be clearly highlighted. Given that all lecturers will undergo training to conduct EDIH training, it is necessary to highlight this fact on the web presentation, which indicates that the trainings are standardized and that quality control of the training is ensured. Also, the rooms in which the trainings are conducted are part of the general impression of the participants and influence their motivation, and images of these rooms in which education is held should also be placed on the web presentation.

A solution based on artificial intelligence would bring special value in identifying needs and selecting candidates, which, according to the company profile and the work profile of the employees, provides training suggestions and connects them with one or more training courses. In marketing terms, it is necessary to point out the importance of training both for the job they currently perform, and on the other hand, the benefits for their personal development and private life. This will increase the motivation of the training participants and ensure more interactive participation.

Assuming that the training will begin in the second quarter of 2026, it is important to publish the dates of the training, all training programs and information about the lecturers already during the first quarter of 2026. This is important so that participants can plan their attendance obligations at the training in a timely manner and to ensure a critical mass of participants. For trainings in categories where a high educational need has been identified, such as artificial intelligence and cybersecurity, additional reserve dates should be immediately planned with the lecturers in case of greater interest from participants.