



SME4DD

– Training SMEs for the Digital Decade



Co-funded by the
European Union

Training SMEs for the Digital Decade¹

D2.1. First-year report on short-term training programmes results

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1. Introduction

Work Package 2 (WP2) of the SME4DD project focuses on building and deploying short-term training programmes for SMEs and job seekers in the three key capacity areas: AI, Blockchain, and Cybersecurity. Each training provider, expert institutions in their specific fields, focuses on one of these three topics and delivers the training programs mainly in one of the four SME4DD focus countries.

- **Hyper Island** and **Inria** focus on **AI**, delivering courses mainly in Sweden and France.
- The **Budapest University of Technology and Economics** (BME) focuses on **blockchain**, delivering courses mainly in Hungary.
- **Talent Garden** (TAG) focuses on cybersecurity, delivering courses mainly in Italy.

In SME4DD, the partners work on a broader scope than their established technical areas of expertise. They align and extend their existing content to the target groups' needs; set up a common evaluation and quality process; improve the courses and their fit to the project objectives between course deployments; and share their good practices in digital skills development for their key focus area. During the upcoming year, the project partners will also harmonize the topic-specific courses in an EU professional master programme.

In the project's first 12 months, the consortium has been working to align courses with SMEs' needs. This activity has been aided primarily by work done in Work Package 1 of the project, which analysed the needs of European SMEs in terms of upskilling their personnel in the three key capacity areas.

As part of the WP2 activities, the partners also began to deliver the first editions of their short trainings. These editions are considered *pilot courses*; their learnings, successes and failures will be used to shape the training offerings of the project for subsequent continuous delivery.

This deliverable reports on the work performed in 2023. The structure of the report is as follows.

- Section 2 summarises the findings of WP1 on the training needs of European SMEs relevant to the design of the pilot courses and establishes the common set of training principles for the training provider partners. It also describes the quality assurance and improvement process defined and being implemented by the training providers, aimed to ensure that SME needs, and project goals are met.
- Section 3 describes the design rationale, course designs and learning objectives of the pilot courses.
- Section 4 reports on the pilot course deliveries.
- Section 5 describes, on a partner-by-partner basis, the risks identified, along with appropriate mitigating measures for 2024, the planned adjustments considering the evaluation of the already delivered courses, and the planned course delivery schedules for 2024.

2. Course targeting and quality process

In the context of WP1 of the project, the partners carried out a desk research, ran an online survey with approximately 200 people from European SMEs responding and organised workshops in the project partners' countries to understand the upskilling needs of European SMEs in the capacity areas targeted by SME4DD. The results and their analysis were presented in the SME4DD project deliverable "D1.1. Report on upskilling needs in AI, Blockchain and Cybersecurity in Europe".

WP1 found that in general, SMEs are interested in incorporating the three key capacity areas of the project into their business but face deep-running challenges in the relevant skills. External resources are often constrained by a shortage of adequately skilled professionals, leading to market conditions which are unfavourable for SMEs. Meanwhile, internal resources, even IT professionals, often lack the knowledge necessary to navigate emerging technologies. This lack of skills at the employee level is accompanied by a lack of understanding of the potential impact and relevance to the specific business at the decision-making and executive level.

2.1 Upskilling needs, training characteristics

With respect to training requirements, the research established several insights which drive work in WP2.

The overarching expectation regarding training content primarily revolves around the dissemination of **best practices, practical, real-world applications**, and the imparting of **technical know-how** that is instrumental for practical implementation.

Management training has also emerged as a priority. This prioritization is attributed to the recognition that managerial awareness and firm commitment are key elements in driving strategic planning and effective decision-making within SMEs.

At the employee level, the research concluded that there is a definite demand for **IT training** in the targeted capacity areas, to bolster operations and product development and to equip employees with the skills and insights necessary to navigate the emerging technologies.

There is also an expressed need for understanding the **regulatory environment** surrounding the application of these technologies to ensure legal compliance, an aspect that is increasingly important in the evolving business landscape.

Overall, the best targeted courses for the AI, blockchain and cybersecurity upskilling of SMEs must be **interdisciplinary**.

These joint findings underpin a **common set of training principles**, which are part of the characteristics identified in WP1 as able to address SMEs' specific barriers to advanced skills development. WP2 course provider partners all apply these principles in their course designs.

- **Targeted topic objectives:** courses should distinguish between developing managerial and business skills, and technology skills in a targeted way. However, these skills themselves are being redefined by the practice; for the emerging technologies in the scope of the project, SME managers and non-IT professionals increasingly need a deeper understanding of the principles and capabilities of technology than historically and even *some* technical skills. Conversely, the WP1 research also indicated a strong need for the transversal skill development of IT professionals for all three capacity areas (AI, blockchain and cybersecurity).
- A **practical approach** to learning: preference on problem-based learning and case-based learning (with real-life scenarios).
- Placing an emphasis on **interdisciplinary** learning.
- **Hands-on learning:** presenting and using demonstrational, testing, and prototyping environments.
- **Work-conscious training delivery:** blended educational models should be preferred, with course content following a modular structure. A key requirement is that learning should impose on business hours only in a limited way.

In AI and blockchain, when all courses have started in 2024 after the pilots, SME4DD will be offering trainings with a decision-maker/business level topic focus as well as in more specialized IT topics. In line with the project objectives and responding to the developing and interdisciplinary nature of the skill sets to be built, audiences are and will be constrained as little as possible by entry conditions. The technical courses pose only reasonable entry requirements (some preconditions are necessary considering the short-term training nature of the courses).

Cybersecurity is slightly different as for most SMEs, it is not a potential vehicle of business innovation and excellence, but an increasingly indispensable supporting function. Consequently, the single cybersecurity course provides a well-rounded blend of foundational professional and technical skills, appropriate for "upskilling" a very broad range of SME professionals who wish to enter the cybersecurity discipline.

The WP1 research concluded with several findings which are specific to the capacity areas. In addition to the general principles above, these informed the design of the courses we report on later.

For **blockchain**:

- SMEs are beginning to recognise the potential of blockchain technologies, especially for the established cross-organizational use cases.

- Even conservatively considering potential measurement and sampling biases, based on the survey, we can state qualitatively that an appreciable ratio of SMEs is already planning or evaluating investments in the application of blockchain-based technologies in the upcoming years.
- The envisioned project models vary, with full outsourcing not seen as a realistic option currently; but other not fully in-house models, such as partnership-based execution with internal project management and internal adaptation of existing solutions have been indicated in significant ratios.
- A lack of competence and a strong need for it at the advanced level was indicated for skills at the confluence of business, project management and technology: executing blockchain projects, defining RFQs and tenders and integrating blockchains with existing systems and services. This means that upskilling needs markedly extend to the existing internal business roles which connect strategic decision making and IT.

For AI:

- There is significant uncertainty about the benefits, and a limited understanding of the potential and the risks.
- The high cost of implementing AI technologies, especially upfront costs is a serious issue. (Note that the research was performed prior to the very recent emergence of generative AI and the proliferation of its use; these and other relevant Software-as-a-Service solutions have been reducing costs significantly.)
- Liability concerns, lack of citizens' trust in AI and regulatory barriers all limit the willingness of SMEs to engage in integrating AI technologies in their business.

For cybersecurity:

- 70% of responding SMEs already have some investments in the application of cybersecurity-based technologies, but the awareness of cybersecurity as a strategic issue needs to be raised further at the decision maker level.
- Interest for training is strong for all roles and at all expertise levels, but it is the highest at the management level.
- External threats are seen as a primary challenge, but lack of awareness of the employees takes the second place.
- Awareness and training are widely lacking even in IT roles.

2.2 Quality and improvement process

The WP1 research also outlined a set of general barriers to the advanced digital skills development of SMEs. Of the general SME4DD project risks deriving directly from these barriers, our common set of training principles cannot be sufficient to address the risk of a lack of fit between the specific training demand and offers. Despite the WP1 research and the existing competencies of the partners, the actual market needs may not match our offer well enough, either regarding the content or the delivery.

In the context of WP2 a quality plan was set up and adopted by the partners, with the objective to mitigate this risk and ensure the successful delivery of the courses, which will lead to the preparation of an EU professional master programme.

In the first phase of the WP2, based on the existing learning practices and established learning objectives of the training providers combined with the WP1 results, targeted exchanges were made for a collectively better understanding of the context of the SMEs and what their needs can be at a broader scale. As the second phase, the training providers designed their courses according to the research findings and the common training principles. For all training providers, course content relies on existing educational offerings, adapted, and extended to the needs identified in the project for SMEs.

The pilot course deliveries having begun, WP2 is beginning to implement a plan-do-check-act (PDCA) style quality management and improvement process. The aim of the process is to assure quality and to continuously improve fit to the needs of SMEs from course delivery to course delivery.

2.2.1 PDCA quality and improvement process

The first iteration of the cyclic PDCA process begins in early January 2024, with executing the plan phase with BME and Inria (see Section 3 below). As this is the first cycle, there are no previous actions to assess; regardless, planning will use the outcomes of the same “check” procedures as the cycle iterations will later.

WP2 defines and observes the PDCA phases the following way.

The **plan phase** must be conducted as soon as possible after each course is delivered. In it, the project quality manager and course providers focus on identifying areas that came short in the course. The planning phase must cover all areas of the quality assessment process: target group, alignment, aim statement, learning objectives, onboarding, course design and scope, delivery, risk factors, evaluation of learnings, and presumed impact from learnings. Based on the discussions, the necessary modifications are agreed on and documented to be tested (if applicable) and implemented.

The **do-phase** is based on the agreed-on improvement needs established by the quality manager and the course provider.

- The course provider addresses the improvements in their preparation for the deployment of the upcoming course.
- The course provider deploys the course according to established change needs.
- The course provider ensures that the expected effects of the improvements are measurable by the project, if necessary, through extensions of the course delivery evaluation requirements (requires agreement by the quality manager).

The **check phase** is supported by a set of course delivery evaluation requirements, common to all training provider partners (see the next section). Course providers perform the evaluation and share it with the project quality manager. The training providers are encouraged to perform mid-course evaluations for long-running courses (not prescribed by the quality and improvement process) and perform minor adjustments as necessary.

In the **act phase**, the course provider and the project quality manager discuss and internally document what has been learned about the identified, implemented and now-evaluated modifications. Successful modifications are codified and shared with the other training providers in the project; unsuccessful ones are discarded. Remaining and newly emerging shortcomings constitute input for the analysis in the plan phase of the next cycle. Due to this coupling, the "act" activities can be performed together with the planning, but it is recommended that they are covered by separate, dedicated meetings.

2.2.2 Common requirements on course delivery evaluation

To facilitate the PDCA process, the partners have agreed to establish and implement a common set of evaluation activities for each course delivery.

Onboarding questionnaire: after the participants have registered for a course, they are required to complete a questionnaire before starting the course. The partners have jointly created questionnaire templates. These are provided in the Appendix in English; for the course deliveries, versions translated to the course language are used. In addition to supporting the quality assurance and improvement process, the questionnaire results are provided to the teachers and faculty delivering the course before their lectures. This enables faculty to better understand the interests and needs of the specific cohort, as well as to perform adjustments in the delivered material if necessary and possible (such as the choice of emphases, omitting some material that promises to be too basic, too involved, or irrelevant for the cohort, and choosing the best-fitting examples).

Evaluation questionnaire: all participants are required to evaluate the course at the end of the last session, before leaving the course. The jointly created evaluation questionnaire templates are also available in the Appendix. In addition to translating to the course language, the training provider

partners may further customize both questionnaires, but the common core for SME4DD must remain intact.

Instructor debriefing: course instructors are required to be debriefed. The debriefing must cover the following four areas.

- **Overall reflection:** was the design of the course relevant to the audience, or should it be improved? How was the individual performance of the instructors perceived?
- **Learning objectives:** fulfilment for the course (realistic learning objectives, content, learning activities, directions, and timeframes). Lecturer assessment of the course (expectation and delivery).
- **Teaching strategy:** what learning elements were used to meet learning objectives (skills, knowledge, and competencies), and were they successful?
- **Participants'/students' engagement:** how well was the group working? Were all participants active? Could engagement and involvement be improved?

Self-evaluation: after each delivery, in preparation of the PDCA cycle, each provider is required to perform a self-evaluation of the course and how it meets the aim of the course and the learning objectives. The evaluation shall derive insights explicitly from earlier experiences (when already applicable) and WP1 findings as a baseline, the onboarding questionnaire, the evaluation questionnaire, and the instructor debriefing. Specific emphasis should be placed on the relevance and importance for SME development and competitiveness.

3. Pilot courses, expected outcomes

In this section, we present the design rationale, specific design, and the targeted learning outcomes of the SME4DD courses piloted in 2023 and early 2024. After the evaluation of the pilot editions and the application of the quality and improvement process (see Section 2.2.1), the courses will be regularly delivered until the end of the project. Table 1 presents an overview of the key characteristics of the pilot courses.

Table 1. Overview of the courses piloted in SME4DD.

Pilot course	Provider	Length	Format	Language	Topic objective and entry conditions
Blockchain for Small Businesses	BME	2 days	Hybrid	Hungarian	Emphasis on business-level and decision maker topics; a high-level overview of IT systems and a basic knowledge of English required (for handouts and supporting materials)
Cybersecurity and Data Protection	TAG	5x1.5 hours (weeknight) + 6x7 hours (weekend)	Blended (primarily online; first and last session onsite)	Italian	A blend of governance and technical topics; ideal candidate already works with technology in a business environment and is determined and motivated to enter the cybersecurity sector
Scikit-learn, the machine learning toolbox	Inria	1 day	Online	French	Technical, for SME engineers and data scientists. Basic programming skills in Python and familiarity with the use of Jupyter notebooks is required. Basic knowledge of NumPy and Pandas is useful.
Machine Learning: Tech Bricks for SMEs	Inria	1.5 hours	Onsite or online	French	Geared towards SME managers and executives
AI for Business	Hyper Island	Online version: 4x2.5 hours + self-paced reading and	Onsite as well as online version (for	English	Focus on business operations and leadership topics

independent work Onsite version: 2 days	different cohorts)
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SME4DD training programmes are built on existing content developed by the training providers, some of it in the EIT Digital Professional School context; two of the four training providers, BME and Talent Garden have already developed co-branded courses with EIT Digital. Building on existing content shortens the course design phase, allowing the partners to kick start the delivery process with pilots in the first year of the project implementation, with the objective to expand the target audience by adaptations and creating new modules.

The training programmes are designed to be delivered in different formats, but generally rely on blended modes. Face-to-face sessions are to occur at the training providers' premises or at the SMEs' premises, upon request of the participants and at the discretion of the course providers. Alternative venues (e.g., premises offered by EDIHs) can be also considered, depending on the requests of the audience. As a common principle, all training providers will try to be flexible in the delivery format and dates, facilitating the participation of people who need to continue running their business and be professionally active.

3.1 Blockchain for Small Businesses – BME

From the series of blockchain courses BME delivers in the SME4DD project², the two-day course “**Blockchain for Small Businesses**” is the shortest and least technical; it is intentionally scoped so that it fits a general audience, emphasizing SME business and decision-maker level topics without any requirement on the technological/business preparedness of participants.

The research in WP1 showed that blockchain-related positions/job descriptions vary a lot across companies and countries, reflecting a) the novelty of the field, b) the large variety of blockchain projects (from enterprise system integration to product tokenization for an SME) and c) the interdisciplinary nature of blockchain itself, where technical, business/financial, organisational and even legal innovations are often combined in one initiative. Thus, in addition to the clear and present need for it, piloting a truly general audience course has the best potential to avoid the risk of mistargeting the training.

Considering the established general and blockchain-specific upskilling needs covered in Section 2.1, the course focuses on the following main didactic goals.

² See Section 5.1 for further details.

- Explaining and illustrating the main concepts and characteristics of blockchain and Distributed Ledger Technology (DLT)
- Presenting the established use case patterns of blockchain and DLT
- Presenting specific business cases with a high relevance to SMEs
- Discussing the specifics of blockchain projects
- Presenting brief post-mortem analyses of blockchain projects that have failed
- Providing an overview of international trends (from a technological as well as a business point of view)

3.1.1 Basis of the course design

The training significantly relies on the existing university and professional course offerings of the Blockchain/DLT Lab at the Critical Systems Research Group (Dept. of Measurement and Information Systems) of BME. These include the BME elective courses “Blockchain Technologies and Applications”³ and “FinTech Foundations”⁴ and the professional school course “Blockchain for the Decision Maker” at EIT Digital. BME also draws on its professional blockchain application project experience, research cooperation on blockchain-based applications with MNB, the Central Bank of Hungary and technical education background (e.g., the compulsory MSc course “Reliable Distributed and Decentralized Systems”⁵).

3.1.2 Meeting SME needs

The synthesis of the course material, including research and the creation of novel material, targeted adaptation to the needs of SMEs; with collating and presenting the current best practice “dos and don’ts” for SMEs from the use case, business, and project points of view as a specific challenge.

As blockchain and its potential application areas have recently received significant attention and investment from the EU, the starting point was a thorough analysis of publicly available blockchain initiatives with an SME focus. For that purpose, the following projects were analysed:

From the INNOSUP3 programme (Blockchain and DLTs for SMEs):

- Blockchers (12 beneficiaries analysed)
- Blockstart (9 beneficiaries analysed)

From the INNOSUP1 programme (Cluster facilitated projects for new industrial value chains):

- Block.IS (6 beneficiaries analysed)

³ <https://portal.vik.bme.hu/kepzes/targyak/VIMIAV17/>

⁴ <https://portal.vik.bme.hu/kepzes/targyak/VITMAK50/>

⁵ <https://portal.vik.bme.hu/kepzes/targyak/VIMIMA28/>

The following aspects received focus:

- Public availability of the blockchain-based solution
- Technical and business maturity of the solution
- Information of actual users/services
- Information on later investment/income

Based on this analysis, several companies were included as examples in the "use case" part of the course, augmenting the infrastructure-like use of blockchains (e.g., for identity management or collaboration automation), and the enterprise solutions which are conceptually also business-relevant for SMEs.

However, it also became clear that the efficiency/effectiveness of these incubator projects could be significantly improved, as most of the companies that received support in the past four years were unavailable. All projects lacked a coherent and consistent evaluation report with uniform business/technical aspects (which BME could have utilized).

Moreover, in 2022-2023, several previously well-advertised blockchain solutions were terminated, which motivated BME to analyse these cases and summarise the lessons learned from these failures. The following solutions received a deeper evaluation:

- Fizzy: an insurtech solution that appeared in 2017, as one of the first blockchain projects from an existing company with a strong background in the insurance sector.
- B3i: A consortium for re-insurance, with investment from the major insurance companies of Europe. Although the project created a working blockchain solution, a data model, and a domain-specific modelling language for contracting and defining legal/business clauses, the initiative and the backing company filed for insolvency in 2022.
- TradeLens: A supply chain solution created by the leading container shipping logistics company Maersk and IBM, one of the key companies behind Hyperledger Fabric, the leading solution for enterprise consortial blockchains. TradeLens, however, faced the problem of integration with existing systems.

The didactically important causes behind these failures were integrated into the course (e.g. immaturity of the business model, misevaluation of the market, or the lack of supporting regulations). These failure analyses further motivated BME to cover in the course the upcoming EU regulations in the field (primarily MiCA and the DLT Pilot Regime, both accepted and under implementation/deployment by member states).

3.1.3 Course scope

BME created the course content for the following curriculum. There is significant room for adaptation and fine-tuning, depending on the needs of each specific cohort: the breadth and depth of the business case examples can be easily adjusted.

Day1 of the course:

- Blockchain basics
 - o The necessary cryptographic concepts (only descriptively, without the specifics)
 - o Basic principles and goals (transaction processing, consensus, block chaining, smart contracts, integrity as the primary extra-functional property, wallets)
 - o From Bitcoin to Distributed Ledger Technology (DLT) – DLT definition, network types (permissioned vs unpermissioned consensus, open vs permissioned access)
 - o Brief introduction to the Ethereum technology and Ethereum-based blockchains
 - o Illustrative examples: blockchain explorers, performing a simple transaction on a public blockchain, calling a simple smart contract
 - o Cross-organizational DLTs: Hyperledger Fabric, Blockchain-as-a-Service
- Blockchain use case patterns
 - o How and where is blockchain already used in various industries
 - o Turning the distinguishing characteristics of blockchains into business value
 - o Significant failures and their causes
- SME blockchain “stories” and use cases; current barriers
- Bring Your Own Problem (BYOP): idea collection

Day 2 of the course:

- “From zero to blockchain”
 - o Partnerships, suppliers, project types
 - o Project and technical risks
 - o Own project experiences: here, BME relies on the unique experience of instructors, who lead and have led successful blockchain projects in several application areas (CBDC, fintech, arts, IPR, industrial data collection, smart meters)
 - o BYOP idea evaluation
- An overview of the relevant, existing, and emerging national and EU regulatory environment (MiCA, DLT Pilot Regime, eIDAS, eID, EU Digital Identity Wallets)
- Decentralized identity handling
- An overview of blockchain-based payment
- BYOP idea elaboration (workshop)

3.1.4 Learning objectives

The course aims to empower SMEs by fostering blockchain application evaluation and innovation skills. In terms of learning objectives:

- **Understand** the high-level operational principles of blockchain and DLT networks, their types, and key extra-functional characteristics beyond integrity (as performance, cost, reliability, confidentiality, and privacy)
- **Understand** the main characteristics of the regulatory environment and its coming changes and apply it to **create** tasks for further legal and regulatory consultation.
- **Understand** the main blockchain use case patterns and **evaluate** their applicability in a concrete business context (to the extent where it can be decided whether an innovation effort would be warranted).
- **Understand** how blockchain projects are usually structured and what their common pitfalls are.

3.1.5 Adaptation of course delivery evaluation

To assess the success of learning, at the end of the course, the participants fill out a quiz, which covers the course's main topics and targets the Understand/Remember level of knowledge.

Based on experience from previous courses, participants like to have an intuitive, easy-to-overview picture of course impact. Therefore, the instructors collect words/concepts that the participants associate with "blockchain" at the beginning and the end of the course and create word/concept clouds of these to visualize how the "joint knowledge" changed/improved after the course.

3.2 Cybersecurity and Data Protection – TAG

The course offers comprehensive training in protecting digital assets and managing risks. It provides foundational knowledge on cyber security practices, compliance with legal regulations, and risk management strategies. Furthermore, it also focuses on practical skills like incident response, forensic analysis, and business continuity planning, ensuring SMEs are well-prepared to handle potential cyber threats. Overall, the course empowers SMEs by providing them with the necessary skills and knowledge to fortify their digital infrastructure.

3.2.1 Basis of the course design

The starting point of the involvement of Talent Garden was a short training programme, in which participants can learn about the motivation behind cybersecurity, become familiar with the key

concepts of the field, explore the types of attackers and their motivations, and finally, learn about the prevention and defence side and recognize the different types of cyber actors. These macro-objectives have been deconstructed and analysed in light of the findings on SMEs' needs.

3.2.2 Meeting SME needs

In Italy, the SMEs participating in the SME4DD survey were mainly ICT companies with more than 10 years of activity, typically having a staff count ranging from 0 to 9 members, but with an ICT department that comprises more than 20% of their employees. Italian respondents primarily operate in sectors such as Computer, Software, Telecommunications and Utilities. They invest more than 25% of their revenues in ICT, a value that has increased over the past 3 years, considering their turnover, with the aim of improving their processes.

The potential course participants the project was able to reach themselves can act as catalysts (via SME partnerships and movement of people between companies), instilling a cybersecurity culture within SMEs, and improving their security posture.

However, the course is not targeted only to ICT companies; it is designed to be highly valuable to all SMEs, whose business continuity may be affected by cyber-attacks, and to a diverse target group: professionals, entrepreneurs, managers, employees, and job seekers.

Regarding content, the survey showed that SMEs consider the most valuable areas to strengthen cybersecurity: software and operations, vulnerability management, and incident management. In addition, the SME4DD workshops in Italy allowed Talent Garden to test the interest and relevance of some topics for the course development, such as Security Operation Centre, Network Security, Malware Types & Vectors, Trends and Types of Threats affecting SMEs, and Proactive Defence and Prevention.

SMEs possess foundational IT competencies for day-to-day operations, encompassing basic computer literacy, operational expertise within their respective industries, and adaptability in navigating challenges. As SMEs often exhibit a budget-conscious approach and a reliance on cost-effective solutions due to limited resources, their cybersecurity awareness can be basic, focusing on simple security practices like password protection. At the same time, they increasingly need a comprehensive understanding of complex cybersecurity threats, dedicated cybersecurity personnel, and structured incident response plans. Additionally, while they may have a foundational grasp of compliance requirements, they often rely heavily on third-party vendors for cybersecurity solutions. Understanding these attributes guides the methodology adopted for designing the course material.

- Tailored Curriculum: the course curriculum covers topics relevant to SMEs' cybersecurity needs, focusing on practical, applicable knowledge rather than just theoretical concepts.
- Customized Modules: some modules directly address SME-specific cybersecurity challenges.

- Case Studies and Examples: incorporating real-world case studies and examples relevant to SMEs, demonstrating how cybersecurity principles apply in their context.
- Hands-on Learning: providing practical exercises, simulations, and labs within the course that mimic SME scenarios, allowing participants to apply the concepts they learned directly.
- Expert Guidance: engaging industry experts and consultants specializing in cybersecurity to contribute to the course content and offering guidance through Guest Talks and discussions.
- Resource Recommendations: providing guidance on cybersecurity tools, resources and strategies suitable for SMEs, ensuring practicality and feasibility.

3.2.3 Course scope

The aim is to create a cybersecurity curriculum that fosters transformational learning experiences for diverse professionals. Talent Garden seeks to cultivate an adaptive mindset and skill set by engaging participants in an iterative learning journey aligned with industry demands. Through collaborative knowledge construction, Talent Garden empowers participants to navigate evolving cyber threats, fostering a proactive and resilient approach to cybersecurity practices. Embracing emergent learning pathways aims to inspire continuous growth, enabling participants to address complex cybersecurity challenges and contribute meaningfully to a secure digital ecosystem.

The course offers comprehensive training in protecting digital assets and managing risks. It provides foundational knowledge on:

- cyber security practices,
- compliance with legal regulations and
- risk management strategies.

Furthermore, it also focuses on practical skills like:

- incident response,
- forensic analysis and
- business continuity planning.

This scope ensures that SMEs are well-prepared to handle potential cyber threats. Overall, the course empowers SMEs by providing them with the necessary skills and knowledge to fortify their digital infrastructure.

Practical application stands out as a priority. Hands-on experiences through simulations and labs offer direct and immediate application of theoretical knowledge. These practical exercises replicate real-world scenarios, fostering a deeper understanding and the ability to implement learned concepts effectively.

Understanding the current threat landscape emerges as another critical focus. Awareness of cybersecurity threats, evolving attack vectors, and trends is crucial. Equipping participants with updated knowledge prepares them to tackle the ever-evolving challenges SMEs face in safeguarding their digital assets.

Moreover, compliance and legal aspects are imperative priorities. Mastery of compliance measures and legal frameworks is essential to ensure that SMEs abide by cybersecurity laws and regulations. This understanding forms the foundation of robust cybersecurity practices within any organization, preventing potential legal complications and establishing stakeholder trust.

Additionally, incident response and management take precedence. A rapid and effective response to security incidents is paramount for minimizing their impact and ensuring uninterrupted business operations. Training individuals in incident response strategies equips them to handle security breaches efficiently, mitigating potential damage.

Furthermore, emphasizing risk management and mitigation holds significant importance. Identifying, assessing, and mitigating cyber risks are crucial to safeguarding digital assets. An adept risk management strategy allows SMEs to address vulnerabilities and potential threats before they escalate proactively.

Lastly, comprehending network security fundamentals is a priority. Understanding network architecture and security mechanisms is critical because networks are common targets for cyber-attacks. This knowledge aids in fortifying network infrastructure against potential threats and vulnerabilities.

3.2.4 Learning objectives

The course aims to empower SMEs by fostering essential cybersecurity skills through various learning objectives.

- Comprehension Level: **Understand** cybersecurity governance to **create** structured security policies and organizational compliance frameworks.
- Application Level: **Apply** risk management strategies to identify, assess, and mitigate SMEs' cyber risks. Respond effectively to cyber incidents, including identification, containment, eradication, and recovery. Ensure compliance with relevant laws and implement necessary measures in cybersecurity. Execute disaster recovery plans post-cyber incidents for business continuity. Gain a comprehensive understanding and practical application of Linux and network fundamentals.
- Application and **Evaluation** Levels: Develop forensic analysis skills to collect, preserve, and analyse digital evidence for cyber incident investigations.

- **Synthesis** and Evaluation Levels: Engage in blue teaming strategies, fostering the development and implementation of proactive defence measures and security assessments.

The specific **skills** developed:

- Identifying cyber risks.
- Understanding cyber threats.
- Understanding cyber incidents.
- Understanding how to recover from cyber incidents.
- Understanding relevant cybersecurity laws.
- Implementing compliance measures.
- Developing security policies and frameworks.
- Implementing business continuity.
- Basic Linux commands and system administration.
- Understanding network architecture.
- Basic analysis of digital evidence.
- Understanding how proactive defence strategies work.

The specific **competencies** fostered:

- Basic competence in risk assessment.
- Basic development of mitigation strategies.
- Understanding incident management.
- Understanding legal compliance.
- Basic continuity management.
- Basic competence in Linux systems administration.
- Understanding network infrastructures.
- Competence in security assessment and risk prevention.
- Collaborative security planning skills.

The specific **knowledge** gained:

- Basic knowledge of cyber risk identification and assessment techniques.
- Basic knowledge of effective incident identification and containment.
- Understanding recovery procedures and their implementation.
- Understanding relevant cybersecurity laws and compliance requirements.
- Understanding of disaster recovery planning and execution.
- Knowledge of continuity management principles.
- Knowledge of basic Linux commands and system administration.
- Understanding network architecture, security mechanisms, and infrastructure design.
- Understanding digital forensics methodologies.
- Understanding proactive defence strategies and security assessment methodologies.

3.2.5 Adaptation of course delivery evaluation

The course extends the common vehicles of course delivery evaluation with the following elements.

- Assessment of participant engagement, activity involvement, and completion of assigned tasks and exercises (quiz, technical labs) for every module.
- Quantitative and qualitative feedback (suggestion forms) survey assessing participant satisfaction with the course content, relevance, teaching methods, and overall learning experience for every module.
- Demonstrating acquired skills or knowledge through applied tasks, assignments, correct answers to the given quizzes or practical scenarios, showcasing competency and understanding of module concepts.

3.3 Scikit-learn – Inria

With the course “**Scikit-learn, the machine learning toolbox**”, Inria's aim is to train professionals from French and European SMEs on machine learning technologies by promoting the practical use of scikit-learn – a leading and EU-based technology – for the benefit of SMEs.

Scikit-learn makes the most common use cases of machine learning - clustering, classification, dimensionality reduction, and regression – easy to perform. Engineers can learn how to use the scikit-learn library in this course and explore the typical steps needed to work with models in it.

3.3.1 Basis of the course design

Inria is a public research institute, under the dual supervision of the Ministries of Research and Industry, dedicated to applied mathematics and digital information technologies. Scikit-learn is a machine learning library in Python, developed by Inria scientists. It is the driving force behind many artificial intelligence and data science applications. Scikit-learn is regularly used by over one million users worldwide, with applications ranging from medical imaging to product recommendation.

Inria Academy is a continuing education program of Inria. Its aim is to develop and provide educational offerings in digital technologies to facilitate the creation of highly qualified jobs in France and Europe. In addition to hosting the development of scikit-learn, the scikit-learn offerings of Inria Academy provide the foundation for the SME4DD course.

3.3.2 Meeting SME needs

AI is a strategic priority in France; in 2018, the French government launched a national strategy for artificial intelligence (SNIA). However, while French SMEs are highly innovative and digitization is advanced in France, AI is an outlier; only 15% of SMEs use it⁶. In line with the needs identified in SME4DD (see Section 2.1), common obstacles are a poor understanding of the associated issues (lack of skills among managers and IT specialists), a lack of resources (human, time, financial), and poor access to AI tools (financial and technical obstacles). Short-term business objectives due to market pressure and sometimes excessive expectations also play a hindering role.

Inria performed a follow-up analysis on SME needs, with the following sources.

- The SME4DD survey and findings.
- Bibliographical sources, in particular: "Artificial Intelligence, current challenges and Inria's engagement"⁷, a white paper edited by Inria in 2021. The white paper presents the views of internationally distinguished scientists from Inria on the main trends in AI. Olivier Ezratty's White paper on Artificial Intelligence⁸ (2019) also proved valuable.
- Actus AI⁹ – a portal for artificial intelligence and AI startups. It is a leading source of information on artificial intelligence in French:
- Qualitative interviews: during Vivatech 2023, Inria interviewed 14 SME CEOs and engineers. They did similarly during some other important AI-focused events in France.

The aim was to qualify the needs of small businesses according to their field of activity, their data, their maturity in understanding them, and their human resources. What Inria wanted to understand first and foremost are the following:

- What type of data do SMEs have?
- What are their main characteristics (Volume, Velocity, Variety, Veracity, Value)?
- What is the scope of the analyses that SMEs need?
 - o "what happened" (reporting, dashboards);
 - o "why did it happen" (data forensics and data mining);
 - o "what is happening" (real-time analytics);
 - o "why is it happening" (real-time data mining);
 - o "what is likely to happen" (predictive analytics);
 - o "what should I do about it" (prescriptive analytics).

⁶ https://travail-emploi.gouv.fr/IMG/pdf/enquete_laboria.pdf

⁷ <https://www.inria.fr/fr/livre-blanc-inria-intelligence-artificielle>

⁸ <https://www.leslivresblancs.fr/editeur/olivier-ezratty>

⁹ <https://www.actuia.com/tag/cas-dusage/>

From the follow-up analysis, a strong, recurring, sector-independent need emerged: *making SME engineers rapidly 'operational' in Machine Learning (ML), a specific sub-domain of AI.*

Inria translated this need to an adaptation of their existing scikit-learn course. In addition to providing an understanding of the algorithms, Inria enriched the content with use cases along the two dimensions presented above (type of data and scope of analyses).

3.3.3 Course scope

The course covers the basics of statistical machine learning and its implementation aspects with scikit-learn. It looks at how to load a dataset for exposing it to scikit-learn, what kinds of questions statistical learning can answer, and how to use scikit-learn to answer them. This intuitive understanding of machine learning is necessary to avoid methodological pitfalls.

Specifically, supervised learning is covered, with model selection and validation. Assembling data shaping pipelines is also covered, with particular attention to certain model types, such as linear models and decision tree ensembles. The training is, above all practical, focusing on example applications with code run by the participants.

The structure of the course is as follows.

- Basics of supervised machine learning (45 min)
- Loading a dataset for exposure to scikit-learn and exploratory data analysis (30 min + 30 min hands-on)
- Model training using purely numerical data (30 min)
- Categorical data processing (10 min. + 30 min. hands-on)
- Assembling a scikit-learn pipeline to link data shaping and learning (30 min + 30 min hands-on)
- Model evaluation, including cross-validation (30 min + 30 min hands-on)
- Model selection with hyper-parameter settings (30 min + 30 min PD)

3.3.4 Learning objectives

The course has the following learning objectives.

- **Understand** the benefits of using ML for an SME with use cases
- Define the basic principles and notions of machine learning and the different types of model families (**Remember**)
- Handle Scikit-learn with different datasets (**Create**)
- Understand the Scikit-learn processing chain (**Analyze**)
- **Evaluate** and select Scikit-learn models for optimum performance in each type of problem

3.3.5 Adaptation of course delivery evaluation

At the end of the course, the acquired knowledge is evaluated via a quiz.

3.4 ML: Tech Bricks – Inria, 2024/Q1

In the short course “**Machine Learning: Tech Bricks for SMEs**”, managers can learn about the various ML technological building blocks and how to use them optimally. They learn how scikit-learn is positioned in machine learning, concerning, e.g., deep learning and neural networks. They can see how ML is used in business for different applications, including financial and strategic planning, decision-making, building competitiveness and operational efficiency.

The course provides a comprehensive understanding of the benefits of using ML for an SME through use cases, defines the basic principles and concepts of machine learning, compares the technology building blocks available to SMEs, and introduces one of them: scikit-learn, one of the leading ML technologies.

3.4.1 Meeting SME needs

The executives Inria interviewed (see the previous section) further confirmed the SME4DD finding that managers are a target group themselves. AI is a vast domain (see Figure 1) and ML is “just” one of the AI subdomains. Executives expressed their need to get started with ML for business and learn what ML is and how businesses use it.

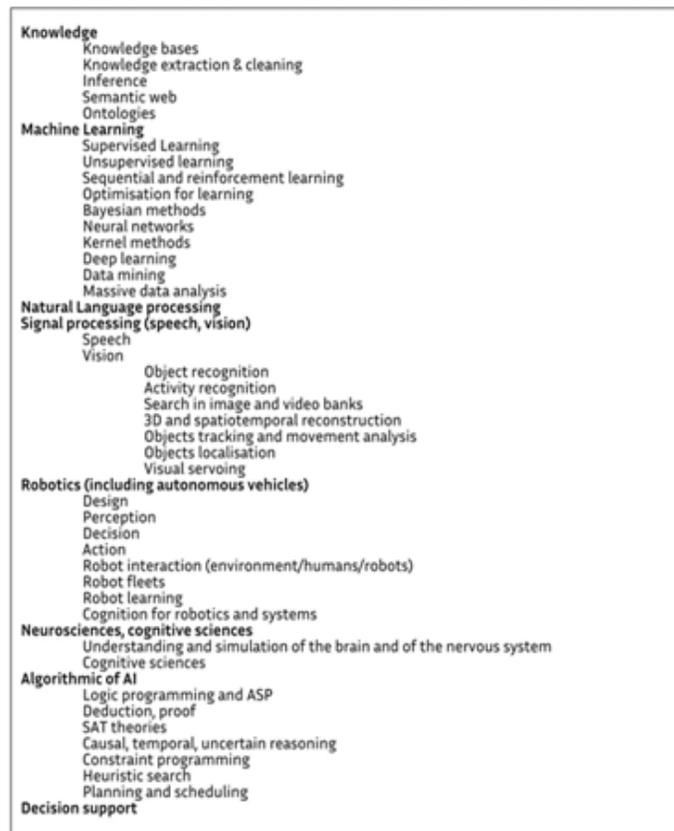


Figure 1. AI domain taxonomy proposed by Inria.

To meet this need, Inria developed this course (it did not exist previously in the Academy catalogue).

The executive and managerial target group must first be taken through the basic concepts of ML. Then, an understanding of the different kinds of technologies currently used in the industry must be built. Upon successful completion of the course, the participants will have a firm grasp on ML and its possibilities in a business. A wide range of illustrative use cases from different sectors is also essential for this course.

3.4.2 Course scope

Inria's "Machine Learning: Tech bricks for SMEs" (planned as a 1h – 1h30 session): the course enlightens the target group on the various technological building blocks available to SMEs in Machine Learning, and provides AI scenarios applied to Human Resources, fraud management and predictive maintenance (further use cases are being collected). The structure of the course is as follows:

- Introduction in AI
- What Is Machine Learning?
- Three types of machine learning: supervised, unsupervised, and reinforcement learning
- The Machine Learning key Tech Bricks: PyTorch vs TensorFlow vs scikit-learn

- A Closer Look at Scikit-learn Library

3.4.3 Learning objectives

The primary learning objective of the course "Machine Learning: tech bricks for SMEs" is to **understand** the benefits of using ML for an SME with use cases.

3.5 AI for Business - Hyper Island, 2024/Q1

Hyper Island's aim is to equip business leaders, experienced managers, and professionals leading or working for SMEs with a comprehensive understanding of artificial intelligence (AI) and its transformative potential within organizational settings. Through a learner-centred and practical approach, this course empowers participants to strategically integrate AI, fostering innovation, maximizing operational efficiency, and cultivating responsible and empathetic leadership. By exploring ethical considerations, harnessing generative AI tools, and promoting continuous learning, the goal is to instil a culture of adaptability and innovation, enabling participants to navigate the evolving AI landscape confidently, drive positive change within their organizations, and create value in an increasingly digital and networked world.

Hyper Island designed an adaptable course that focuses on the following key topics.

- **Understanding AI's impact:** how AI transforms traditional business models, offers disruptive innovation, and changes the business landscape.
- **Harnessing AI's potential:** leveraging AI for decision-making, operational streamlining, and organizational innovation.
- **Importance for leaders:** significance of AI understanding for leaders in today's rapidly changing environment.
- **Business transformation:** how AI can revolutionize operations, from task automation to predictive insights.

3.5.1 Basis of the course design

The course is based on the curriculum available under: <https://www.hyperisland.com/programs-and-courses/ai-for-business/syllabus>

3.5.2 Meeting SME needs

According to the SME4DD research on upskilling needs, SMEs are motivated to invest in AI to increase efficiency and competitive advantage. Overall, SMEs are eager to integrate AI into their daily business operations and are keen to acquire the necessary skills.

However, their current knowledge of the subject needs to be improved. By taking the AI for Business Course at Hyper Island, participants will discover how AI impacts, disrupts, and transforms traditional business models. From automating routine tasks to unlocking predictive insights, AI has the potential to revolutionize how organizations operate. Participants will learn how to harness this power to stay competitive and relevant.

As discussed in Section 2.1, management training has emerged as a priority. Managerial awareness and firm commitment are pivotal in driving strategic planning and effective decision-making within SMEs.

The AI for Business course at Hyper Island will facilitate leaders in understanding AI and will empower participants to make sense of the quickly changing technology, fostering an environment where AI is a valued ally. Leaders will be able to embrace the potential of AI to enhance decision-making, streamline operations, and drive innovation.

All of Hyper Island's courses are customized and practical by nature, focusing on leadership development. In doing so, the courses meet the needs identified in SME4DD so as to bridge the knowledge gap and facilitate the successful integration of technology and digitalization within these enterprises.

3.5.3 Course scope

The course encompasses a wide range of topics and objectives, aiming to provide a comprehensive understanding of artificial intelligence (AI) within business operations and leadership.

The scope covers:

- **Foundational knowledge:** providing participants with a robust foundation in AI principles, technologies, and non-coding tools relevant to business problem-solving.
- **Strategic integration:** understanding how AI can be strategically integrated into business operations to maximize efficiency, foster innovation, and drive decision-making processes.
- **Ethical considerations:** exploring AI adoption's ethical implications and societal impacts within organizations, fostering responsible and empathetic leadership in an AI-driven environment.
- **Generative AI and innovation:** as the research (including the survey sent out to SMEs) conducted during WP1 to extract knowledge about the needs of the participants in the courses was conducted before the current generative AI boom, it is difficult to foresee which generative AI tools will be covered during the course. With that in mind, the AI for Business course will offer some hands-on exploration of generative AI tools, encouraging participants to unleash creative possibilities and seamlessly integrate these tools into organizational workflows.

- **Leadership development:** developing leadership skills that combine AI knowledge with Emotional Intelligence, adapting leadership styles to meet the challenges presented by AI in business settings.
- **Continuous learning mindset:** instilling a mindset of continuous learning and experimentation in AI, preparing participants for ongoing advancements and changes in the field beyond the course duration.
- **Real-world application:** encouraging the application of learned AI insights to real-world business scenarios and fostering a culture of innovation and adaptability within organizations.

The scope is not limited to theoretical understanding. Practical application, collaborative learning, and reflective practices are emphasized to ensure that participants gain hands-on experience and insights that can be immediately applied within their respective business contexts. Ultimately, the scope aims to empower participants to confidently navigate the evolving landscape of AI, driving positive change and value within their organizations.

Based on the Hyper Island methodology, the course rests on the format of experiential learning and the constructivist approach to learning, where participants learn from each other and self-lead on creating added value and meaning to the set curriculum that Hyper Island provides. With the course curriculum as a foundation, participants, together with course leaders, set goals and take responsibility for their learning journey. In this context, the curriculum and encouragement for active learning lead to a natural adaptation to the fact that the participants represent SMEs.

3.5.4 Learning objectives

Hyper Island's course develops a range of cognitive skills (Remember, Understand, Apply, Analyze, Evaluate, Create), ensuring participants gain a comprehensive understanding and practical skills for effective AI integration in organizational settings.

- Building a Solid Foundation
 - o **Understanding** AI Principles
 - o Knowledge (**Remember**): Recall and explain AI's foundational principles and non-coding tools in business contexts.
- Fostering Innovation through Problem-Solving
 - o Application (**Apply**): apply acquired knowledge and skills to innovate and solve complex business problems using AI.
- Exploring AI's Impact
 - o Understanding (**Understand**): Understand AI's societal impact, its role in businesses, and how it's evolving in strategic decision-making.

- Developing Comprehensive View
 - Understanding (**Understand**): Comprehend AI's holistic role in business operations and its implications for strategic decision-making.

- Identifying AI Integration Opportunities
 - Application (**Apply**): Apply skills to recognize opportunities for AI integration, enhancing operational excellence.

- Leveraging AI for Efficiency
 - Application (**Apply**): Apply knowledge to maximize efficiency in organizational workflow using AI.

- Engaging in Ethical Discussions
 - Analysis (**Analyze**): Analyze and engage in meaningful discussions on the ethical implications of AI, demonstrating responsible leadership.

- Navigating Ethical Dilemmas
 - Application (**Apply**): Apply ethical considerations to navigate and resolve ethical dilemmas surrounding AI integration in businesses.

- Generative AI Integration
 - Implementing Generative AI Tools:
 - Application (**Apply**): Apply understanding to explore and implement generative AI tools, integrating them effectively into organizational processes.
 - Unleashing Creative Potential:
 - Creating (**Create**): Create innovative solutions by integrating generative AI into workflows and organizational processes.

- Developing Superintelligence Leadership:
 - AI-Emotional Intelligence Fusion:
 - Evaluation (**Evaluate**): to foster adaptive and empathetic leadership, evaluate and synthesize AI with emotional intelligence.
 - Cultivating Adaptive Leadership:
 - Creating (**Create**): create adaptable leadership styles for AI-driven environments.

4. Reporting on pilot course delivery

During December 2023, BME delivered the pilot course edition of “Blockchain for Small Businesses” and Inria delivered the pilot of “Scikit-learn, the machine learning toolbox”. Talent Garden began the delivery of the pilot of “Cybersecurity and Data Protection”. This section reports on the course deliveries; Table 2 presents an overview of the pilots. The reason for the “AI for Business” pilot starting only in 2024 is that Hyper Island joined the project as full partner from September 2023.

Table 2. Overview of pilot course deliveries.

Pilot course	Provider	Date and modus	Participants who successfully completed the course
Blockchain for Small Businesses	BME	Dec. 4 th -5 th , hybrid (2d)	7 in classroom + 8 online
Cybersecurity and Data Protection	TAG	From Dec. 16 th , blended, <i>ongoing</i>	10 completed the first session
Scikit-learn, the machine learning toolbox	Inria	Dec. 4 th , online (1d)	2 online
Machine Learning: Tech Bricks for SMEs	Inria	<i>Upcoming (Feb. 8th, 2024), onsite</i>	
AI for Business	Hyper Island	<i>Upcoming (From Feb. 19th, 2024), online</i>	

Course descriptions and registration forms were and are available at the central project webpage, hosted by EIT Digital: <https://professionalschool.eitdigital.eu/sme4dd-courses>.

As specified and described in Section 2.2.1, having completed the pilot delivery with the course delivery evaluation requirements observed, BME has performed the self-assessment and begins PDCA cycle in early January. As of this writing, Inria has not received the evaluation input from the participants. As its course is ongoing, Talent Garden has only been able to execute the onboarding questionnaire yet.

4.1 Blockchain for Small Businesses – BME

The course was delivered on December 04-05 in a hybrid mode, with 58 registrations received, of which 20 turned into actual participation, by 7 participants appearing in-person at the premises of BME and 13 logging in via Microsoft Teams. The instructors were Dr. Imre Kocsis and Dr. László Gönczy (BME).

4.1.1 Delivery

BME considers the delivery successful, with the following notable aspects.

Involvement of SMEs from different sectors: the participants of the course (counting only registrants who took part in the course) came from SMEs of various sectors: manufacturing, marketing, agriculture, law, ICT, logistics, banking, consulting, construction, etc. Experience in these domains contributed significantly to the discussion/interactive phases of the course.

Participation of real decision-makers in the course: based on the answers to the survey, participants of the course were of heterogeneous job positions, with "decision maker", "IT operational manager", "CIO" and "branch lead" included. This heterogeneous set of participants allowed the course to cover a broad range of ideas.

The audience of a heterogeneous background could follow the course well. Based on the initial survey and the input from the CRM, participants with quite heterogeneous backgrounds were interested in the course. This was true both for the general interests, professions and education, and their previous knowledge of the course topic.

Involvement in case study definition and evaluation: participants defined 8 different use cases according to the following aspects:

- Stakeholders
- Biggest challenge in implementation
- Why better than existing solutions?

Later in the course, in the idea elaboration phase, in an instructor-lead workshop-like session, additional aspects were evaluated:

- Number of potential users affected (qualitative scale)
- Need for additional regulation (qualitative scale)
- Blockchain network participants (active stakeholders)
- Decrease of operational cost (qualitative scale)
- Need for cryptocurrencies to implement the solution
- Involvement of new business partners (qualitative scale)

To support this session, instructors previously collected existing blockchain-based implementations (or at least pilot projects or initiatives) for all ideas.

Based on these aspects, BME staff performed a collective "Balanced Scorecard" evaluation of the ideas.

4.1.2 Evaluation

BME evaluated the feedback from the participants. Some excerpts from the textual comments (translated from Hungarian):

- *'Both the fundamental knowledge and the solutions presented through examples were very valuable.'*
- *'For me, digital identity management was very interesting because it has far-reaching applications. But all the topics were otherwise very interesting.'*
- *'Practical examples [...] were great...' and a deeper presentation of case studies (screen-level presentation of Hyperledger use case).'*
- *'Thank you for the opportunity and thanks for the wealth of useful new information.'*
- *'We appreciate the preparation and the effort put into it [the course]; it was truly a useful and high-quality training with a lot of valuable content and practical cases.'*

As for the **most interesting parts**, participants mentioned:

- digital identities and wallets
- EU initiatives
- use cases
- blockchain interoperability
- good and bad examples
- and the comprehensive overview on the basics.

BME asked for **topics** that were **missing/should be extended**:

- more details on applications
- hardware wallets (note that this is a quite specific topic, to be covered in other courses)

Otherwise, all responses stated that the course covered what they expected.

As for suggestions for changes/improvement in the way of delivery/**education method**:

- Improve focus by requiring personal attendance
- Use more visuals in course material

An interesting generic feedback for the entire project can be synthesized from the answers to the question "What would you change to make the **course more useful for SMEs**" and "Any other comments" (answers shortened):

- Digitalization itself can bring values for SMEs, it is not always clear why blockchain is needed. (This refers to one value which blockchain can bring in: fostering digitalization. Besides this,

BME will consider it in upcoming courses by introducing a more uniform structure for case study evaluation.)

- Based on the use cases, it still seems to be risky for an SME to start a blockchain initiative (with the remark that the respondent is risk-averse). (That is partly true and a part to be more elaborated in upcoming courses).

As for ordering the topics according to their relevance (decreasing order), the overall result was the following:

1. Blockchain basics
2. Evaluation of blockchain in a concrete business context
3. Decision level knowledge for making strategic decisions
4. Define blockchain tenders/RFQs
5. Implementing blockchain projects
6. Integration of blockchain with existing systems
7. Blockchain interoperability

Figure 2 presents a breakdown of the preferences of the participants.

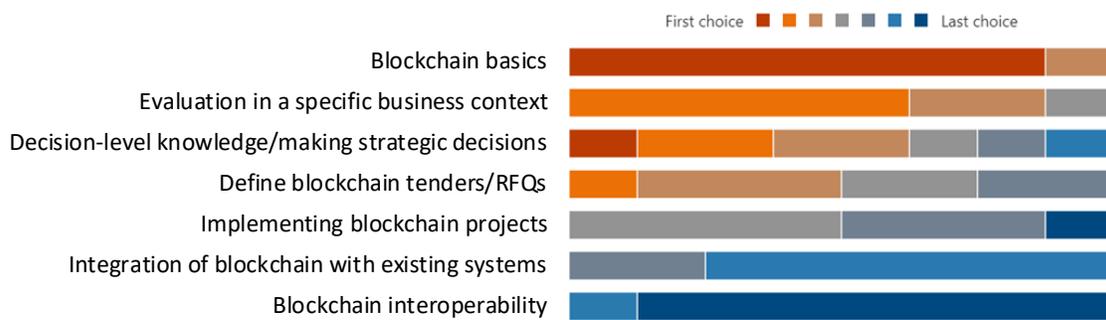


Figure 2. Participant preference/relevance of the course topics

Finally, Figure 3 provides a summary of the answers to the scaled/ordered evaluation questions (with their average).

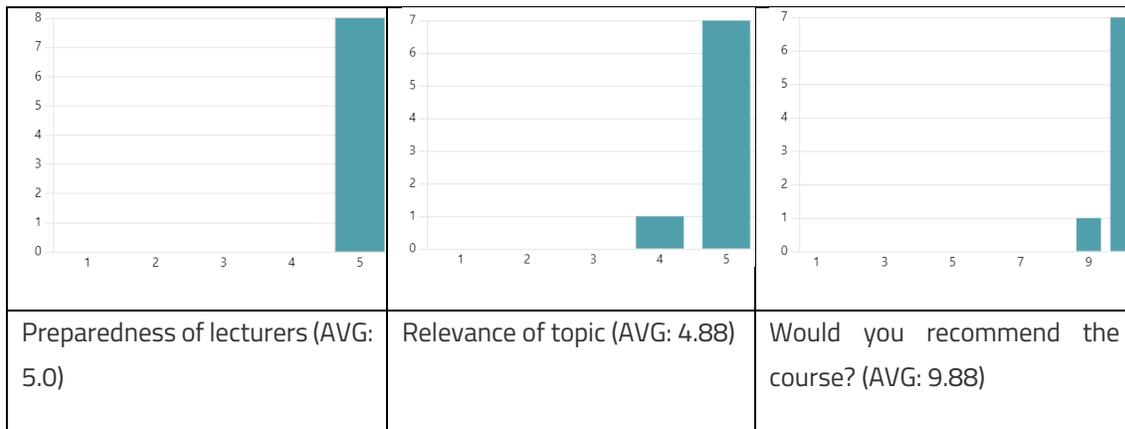


Figure 3. Key quantitative results of the blockchain course evaluation questionnaire.

4.2 Cybersecurity and Data Protection – TAG

The course started on 16/12/2023 and ends on 09/03/2024 with the following timing: Wednesday 18-19.30 and Saturday 9-13, 14-17 with the following schedule:

- Saturday, December 16th
- Wednesday, January 10th
- Saturday, January 13th
- Wednesday, January 24th
- Saturday, January 27th
- Wednesday, February 7th
- Saturday, February 10th
- Wednesday, February 21st
- Saturday, February 24th
- Wednesday, March 6th
- Saturday, March 9th

4.2.1 Delivery

During the onboarding phase, an interview with the participants was conducted to provide relevant information about their background and assess their expectations and needs. In addition, an onboarding questionnaire was administered to enrolled participants. Relevant information collected during the onboarding process was provided to the faculty to better understand the target group and their interests.

The course primarily takes place online, featuring the initial and final sessions at Talent Garden facilities in Naples. Faculty members, comprising highly qualified professionals, curated the course materials.

These materials, meticulously prepared by experts in their respective fields, serve as the foundation for the course delivery.

The faculty is composed of professionals with extensive knowledge and experience in the cybersecurity sectors. Their profiles include:

- Chief Information Security Officer (CISO)
- Data Protection Officer (DPO)
- Security Analyst
- Compliance Manager
- Ethical Hacker / Penetration Tester
- Risk Manager
- Legal Counsel
- Security Consultant

The first lesson carried out on 16/12/23 took place at Talent Garden facilities in Naples. It started at 9 a.m. and concluded at 1 p.m. The topics covered involved Governance in Cybersecurity and ISO 27001 and the lesson was carried out by Gaia Guadagnoli, Security Lead at Ericsson. The class adopted a blended format, with only a few individuals attending in person while the majority participated online. There was notably high engagement from the class, particularly during the exchange of information regarding specific topics related to the cases of the companies whose employees were enrolled in the course and present during the initial session. Throughout the duration, there was sustained and active interest, leading the instructors to exceed the scheduled time by about an hour due to the class continuously posing questions.

4.2.2 Evaluation

The course cannot be evaluated yet; Talent Garden can only report on the onboarding questionnaire as the course is ongoing. The main findings of the questionnaire were the following:

- Current **position** of the participants: Answers varied (corporate management, GDPR compliance, domain expert, consultant, IT manager, et). The audience was/will be a mix of technical and domain experts.
- Current **knowledge**: On a 1-5 scale, most responses were at the level of 2-3, with two participants answering 5.
- **Age of the company**: Most participants came from a company with a maximum age of 10 years, with only one exception where the company is older (considering that SMEs were the target, this does not contradict initial expectations).
- **Ratio of ICT** department w.r.t. number of employees: All respondents had a budget with a maximum of 10 percent (in one case, 20 percent) for ICT, in terms of employees.

As for the course-oriented questions, we summarize the answers for questions related to concrete courses and the topic of cyber-security:

- Do you see the **usage of data is important** for your business development and competitiveness? Scale 1 to 5 (very high importance – not important):
Answers varied from 2 to 5, with an overall impression that data would be essential for the responding companies in the upcoming years.
- What areas are the **leverage data most valuable** (with Cybersecurity aspects) for you to develop your business?
Here the customer answers cover all potential aspects (Operational Data, Customer Data, Third-party Data, Sales Data, Insights and Analytics) which underlines the importance of data protection mechanisms.
- Do you have a **process** to secure the quality of your data?
The answers here varied from N/A to “Yes, we have a clear process”, however, the answers for the next question highlighted the need for data management.
- **Rank** in order the **main challenges** your company faces in terms of cybersecurity: *answers here showed a variation from internal/external threats to the lack of qualified staff, all of which are targeted by TAG's course.*

4.3 Scikit-learn -Inria

The course was delivered on the 4th of December, with two French engineers as participants, who are IT developers from an SME specialising in digital architecture. In terms of skills, both are C and Perl developers with a good knowledge of Python. The engineers currently have a project in which ML could play an important part; they need to be upskilled on ML technology, and they are particularly interested in scikit-learn. The questionnaire was sent to the participants right after the session, but the response has not been received yet, the evaluation is still in process.

4.4 ML: Tech bricks – Inria (Upcoming)

Inria will pilot the SME4DD course “**Machine Learning: Tech bricks for SMEs**” on the 8th of February 2024, at WAICF 2024.

On the 26th of September 2023, Inria presented its executive targeted course content for “Machine Learning: Tech bricks for SMEs” as a workshop at Vivatech 2023, an important startup and tech event with overall 22 participants, and 15 participants from 14 SMEs. The feedback was overwhelmingly positive.

4.5 AI for Business– Hyper Island (Upcoming)

As **Hyper Island** came into the project nine months later than the rest of the project members, they have not had yet the opportunity to deliver any courses. They are promoting their first courses, with the first running in February 2024. To spark interest in the subject matter, they have run two workshops around AI in the autumn of 2023, one online and one onsite in Karlskrona at their campus.

Hyper Island's online, pilot cohort begins in February in the following way.

- The online course starts from February 19 and ends on March 17, together with
- 4 interactive live sessions taking place online every Thursday between 13:00 – 15:30 CET (February 22, 29 & March 7, 14).
- Self-paced pre-reading, deep dives and individual tasks/assignments are to take place between online live session dates.

5. Delivery planning for 2024

In 2024, all SME4DD courses will transition out from piloting and begin delivery. This section reports on the risks foreseen during course design, their pre-planned mitigations and where already applicable, the effectiveness of the mitigations is evaluated. For the already piloted courses, adaptation suggestions are also outlined and will be used as an input to the quality and improvement process in January 2024. The expected course schedule for 2024 is also documented.

5.1 Blockchain courses – BME

5.1.1 Risks and evaluation of mitigations

Before the course delivery, BME identified a set of key risks and defined the necessary mitigations. These mitigations have been either successful or did not have to be engaged as the risk did not manifest itself. That said, BME acknowledges that there is room for improvement with respect to the course being optimally adapted to SMEs.

For the upcoming courses of BME, this list of risks and mitigations will serve as a baseline.

Participation: The major risk in a new course is always getting the first participants, especially in a relatively new field that covers multiple aspects.

Mitigation (successful): BME builds on its existing partner network and its role in the Hungarian Blockchain Coalition, where it has a direct outreach to companies that are already active/interested in the field. BME coordinates with KIFÜ to leverage its partner network. Moreover, as a motivating factor, the pilot course was free, with the possibility of hybrid participation.

Background of participants: As the pilot course is a generic one for decision makers, strong assumptions cannot be made on their technical background or previous experience in any related activities. On the other hand, some companies are already involved in blockchain developments, initiatives, and tenders. Therefore, there is a risk that the audience will have a too heterogeneous background and expectations. Such diversity can make it challenging to deliver a course in a way that all participants can follow and find it useful.

Mitigation (successful): The course was structured in a way that it was self-contained, explaining all concepts to those with no previous knowledge of the topic. However, BME also referred to advanced concepts and technologies in the examples. Additionally, the course covered a large part of the

blockchain landscape (in the conceptual sense), which helped those with experience in some of the related fields to get a comprehensive overview.

Implementation of courses: The courses cannot be deployed due to a lack of human resources.

Mitigation (unnecessary): The blockchain/DLT Lab of FTSRG (Critical Systems Research Group) at BME has 1 Professor, 3 senior members and 5 PhD students associated with the blockchain field, with several MSc students also involved in R&D and teaching support activities. BME formed a dedicated "task force" for the adaptation and experimentation needs of SME4DD. The course lectures could have been held by at least 3-4 different group members; the courses could have been deployed even in the case of unexpected events.

SME focus: The course needs more of an SME focus.

Mitigation (successful, with room for improvement): Although there is a clear trend in adapting blockchain in large-scale enterprise systems (logistics, insurance, etc.), SMEs may have different connections to such systems. BME also identified different potential uses of blockchain for SMEs, as an SME can be, e.g., a user of a blockchain platform, a provider of a blockchain service, or use a blockchain to share/trace information. The course covered these options. Moreover, the outcome and experience of recent EU initiatives supporting SMEs' blockchain experimentation was evaluated.

Engagement during the course: The engagement of participants is low, especially for those participating online.

Mitigation (successful): the course had multiple interactive sessions to test participants' knowledge and collect feedback from them. The Bring Your Own Problem session was split across the two days to have an idea collection and an idea elaboration phase, with course instructors performing background work to analyse the ideas and support an effective and informative evaluation session, pointing to existing real-life solutions or initiatives wherever available.

Finally, BME had to perform (at the time) ad-hoc expectation management. There was a very significant gap between the self-reported existing knowledge of the participants (Figure 5, with color coding in Figure 4) and the level of knowledge they expected to gain (Figure 6).

-  No background
-  Basic knowledge
-  I (want to) know technical details
-  I (want to) apply technology in my everyday work

Figure 4. Color coding for levels of blockchain knowledge.



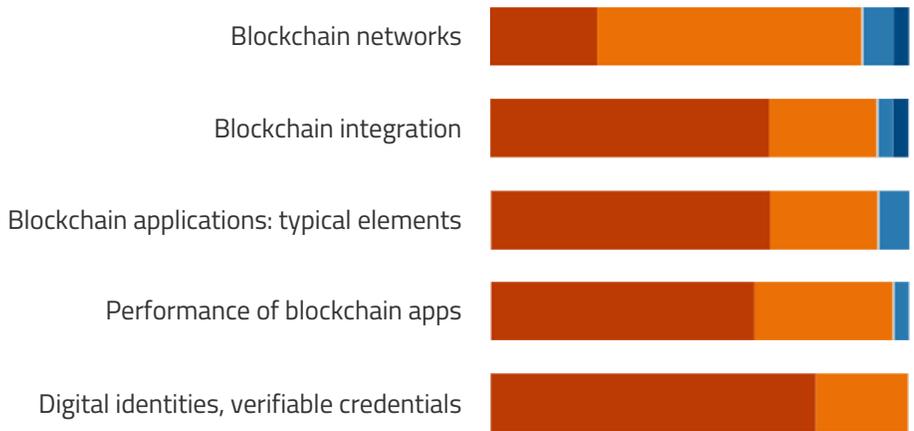


Figure 5. Self-reported level of existing knowledge of the registered blockchain pilot course participants.

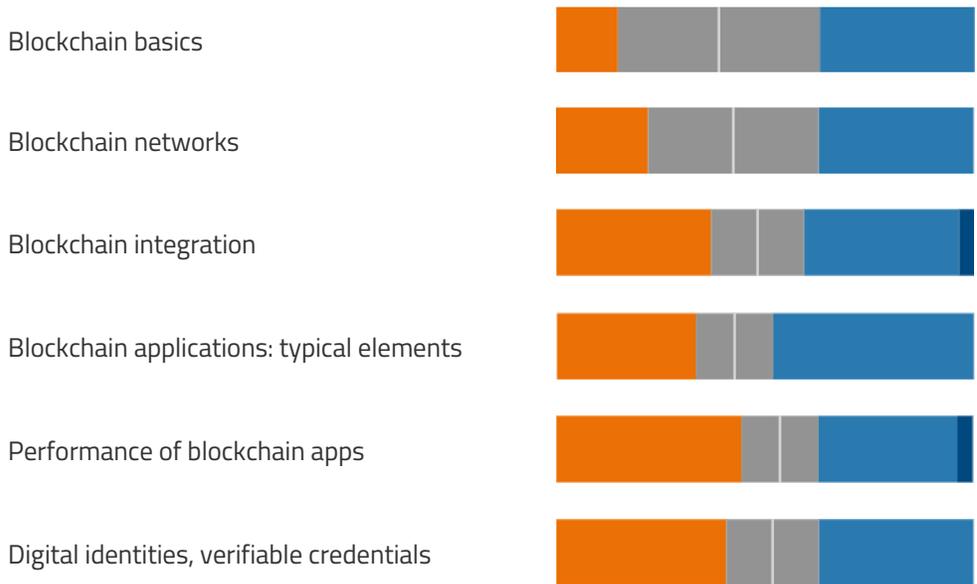


Figure 6. Post-course expected level of knowledge of the registered blockchain pilot course participants.

As this level of improvement is clearly over the possibilities of a 2-days course, these figures were directly communicated to the participants during the introduction section.

Based on the feedback of the participants, BME succeeded in managing their expectations with respect to learning goals; even the most prepared ones took evaluated the course very positively.

5.1.2 Planned adjustments

When evaluating the course execution, BME identified the following points of potential improvement (partly caused by the pilot delivery mode):

- **Earlier close of registration:** the engagement of last-minute participants was not high, while managing late registrations took significant effort. Also, the number of preparatory survey forms sent back did not significantly increase in the very last days. Therefore, at a next intake, BME will consider choosing a stricter and earlier deadline for registrations, to allow better preparatory work for the course.
- **Participation fee:** as a pilot course, BME chose to announce the possibility of free participation. While this was clearly motivating for some of the participants, this might have contributed to the relatively large number of no-shows. BME plans to evaluate this decision after the February intake of the same course.
- **Personal participation:** as in case of all courses since the CV-19 lockdowns, the course was offered in a hybrid mode. To improve the level of engagement of participants, BME will consider offering in-person-only editions, potentially with a smaller focus and shorter content. The potential impact and benefits of other forms of delivery (such as workshops/seminars/case study presentations) will be evaluated after the February intake.
- **Gamification:** similar to previous experience and expectations, participants were active when they could express their opinions (“Bring Your Own Problem”). BME plans to improve the ratio of such parts by introducing a simple gamification approach (possibly by emulating a blockchain-based token game).

Based on the primary feedback of the courses, the SME focus needs additional emphasis, as multiple answers underlined that the current entry knowledge required in the field needs a significant increase in the digitalization preparedness of companies.

5.1.3 Planned schedule for 2024

In 2024, in addition to repeating the piloted course, BME will begin to deliver its further planned courses which have been being prepared in 2023: a project manager and domain expert level short course, an IT expert training (with a Hyperledger and an Ethereum edition) and a blockchain system engineering course.

- “Blockchain for Small Businesses” (decision maker level): Feb. 18th (16 contact hours)
- PM and domain expert course: end of Q1 and Q3 (24 contact hours)
- Blockchain for SME IT experts course (40 contact hours):
 - o Q2: Hyperledger edition
 - o Q3: Ethereum edition
- Blockchain system engineering: Q2 (16 contact hours)

5.2 Cybersecurity and Data Protection – TAG

5.2.1 Risks and mitigations

Talent Garden has identified the following risks and is applying the following mitigations.

Participants' Lack of Technical Background. Mitigation: offer introductory materials to familiarise non-technical participants with essential concepts and provide additional support throughout the program.

Teacher Unavailability for a Scheduled Session. Mitigation: Have backup faculty members or subject matter experts who can step in if a scheduled teacher is unavailable.

Dropout Rate Among Participants. Mitigation: implement regular check-ins with participants to address concerns, provide academic support and create an engaging learning environment to maintain motivation.

Technology Glitches and Connectivity Issues. Mitigation: conduct technology readiness assessments for participants, offer technical support, and have contingency plans such as alternative communication channels or recording sessions for offline viewing.

Difficulty in Meeting Course Expectations. Mitigation: set clear expectations at the beginning of the course, provide detailed syllabi, offer study groups or tutoring sessions, and encourage peer support networks.

Insufficient Engagement or Interaction. Mitigation: foster active participation through group discussions, case studies, interactive assignments, and peer-to-peer collaboration, encouraging a dynamic learning atmosphere.

Inadequate Course Material Relevance. Mitigation: regularly update course content to align with the latest industry trends, gather participant feedback, and ensure the material remains relevant and practical.

Limited Access to Necessary Resources. Mitigation: ensure easy access to required materials, software, and resources; provide alternatives if access issues arise; and offer guidance on utilizing free or open-source tools.

Difficulty in Balancing Work Commitments with Course Load. Mitigation: offer flexible scheduling options and recorded sessions for asynchronous learning to help participants manage their workload effectively.

5.2.2 Planned schedule for 2024

In the second year of the project, the course intakes on cybersecurity are planned as follows:

- Intake 2: 06/04/24-08/06/24
- Intake 3: 29/06/24-12/10/24
- Intake 4: 23/11/24-22/02/25

5.3 ML: Tech Bricks & Scikit-learn – Inria

5.3.1 Risks and mitigations

Inria has identified the following risks and mitigations.

- **Lack of registration**
 - o Major risk: Lack of registrations for the Scikit-learn course.
 - o Mitigation: paying careful attention to the recruitment and marketing strategy.
- **Limited impact on participants**
 - o Minor risk: "passive trainee", in particular for an online course. Online delivery requires an increased level of motivation and discipline from the participants.
 - o Mitigation: respect the break time (15 minutes in the morning, lunch time at least 1h, 15 minutes in the afternoon). Paying particular attention to the quiz results of seemingly "passive" participants. If they need to be better, contact the person for further discussion.

The mitigation for the lack of registration has not been successful; Inria will have to reconsider its mitigation approach.

5.3.2 Planned adjustments

The two courses provide a valuable opportunity to evaluate and understand what works and what can be improved in the teaching of this complex discipline. The lessons learned can serve as a basis for perfecting and refining future machine learning training programs.

The following axes for improvement were identified: data, problem, and advantage.

Data: the foundation of a solid AI strategy is the data that drives the results of ML models. Having high-quality data is crucial for training them. As data powers AI decision-making, businesses need to ensure their data is securely stored in the cloud and accessible to AI solutions. This requires data storage and a proper strategy. Many companies have accumulated mountains of data, but suffer from lack of data

quality, fragmentation or siloing of data sources, a lack of data literacy and/or a culture that talks about data, but who does not use it daily. It is essential that companies can collect, clean, and make more accessible the underlying data of AI models. More than half of the time spent “doing AI” or even just adding value to data is spent on mundane processes, such as data acquisition and processing. Another problem that can arise is what to do if the company has no or little data: either it can outsource or it can use simulation tools (simulation tools constitute one of the disciplines of AI).

Problem: the question of problems common to companies of this size regardless of their sector of activity (document classification, optimization of inventory management, customer targeting and fraud prevention).

- Improve customer experience – SMEs can integrate smart chat and voice bots into call centres, analyse interactions and transactions to make service improvements and recommendations, and create personalized web experiences tailored to preferences and customer behaviour.
- Improve employee productivity and automate business processes – with fast and efficient automated document processing, businesses can easily summarize and analyse information from a wide range of documents, then consolidate it into easy-to-digest reports. Coding companions can support developers with code generation, and voice user interfaces can help employees identify important information and summarize content. In some sectors, AI and ML can also help SMEs optimize supply chains, improve logistics and reduce costs, by providing different scenarios.
- Improved security and fraud detection: SMEs can protect their most important assets by automating alerts, identifying anomalies that lead to improved protection strategies, generating incident reports that shed light on best practices and using tools that detect and prevent fraud before they occur.

Advantage: the advantage of SMEs compared to large groups: in fact, SMEs generally have, through their structuring, an agility that allows them to adapt more quickly, iteratively, and incrementally to AI. The course should show them their strength through examples. Each time, it is necessary to make the distinction between training and consulting. The course is in no way consulting.

The development of the Y2 courses will be adapted according to the two identified sub-targets.

“Machine Learning: Tech bricks for SMEs”: to cover the three points identified during 2023 deployment - Data, Problem, Advantage – the content will be enriched, with a focus on:

- data (collection, extraction, completion, maturity, reliability)
- simulation tools (to face the case there is no data)

Also, a part including a **“problem-based learning” approach will be added by building an AI-business Canvas**. In this approach, participants are grouped into teams and work together to solve a complex problem that is always real or realistic. A problem will be considered complex if it cannot be solved by

the application of a systematic procedure or already known rules. To solve the problem posed, students must therefore seek to explain the underlying phenomena by formulating hypotheses, verifying them by searching for information and carrying out a synthesis of the information collected. The process is guided by the trainer who plays the role of facilitator. Learners through this approach will develop problem-solving skills while, at the same time, acquiring content knowledge about AI and data. Thus, problem-based learning aims to operationalize the various specific knowledge in AI seen in the course.

“Scikit-learn, the machine learning tool box”: the same structure of the course but using other data from the open.data.gouv.fr site to cover three points identified during pilot deployment: Data, Problem, Advantage.

5.3.3 Planned schedule for 2024

Inria’s delivery schedule plan for the first semester is as follows.

“Machine Learning: Tech bricks for SMEs” (1h – 1.5h):

- 8th February (at WAICF 2024)
- 22-25th May (at Vivatech)

“Scikit-learn, the machine learning tool box” (6h):

- 12th April 2024
- 8th July 2024

The second semester is still under planning.

5.4 AI for Business – Hyper Island

5.4.1 Risks and mitigations

Hyper Island has identified the following risks and will apply the following mitigations.

- **Alignment with SME Needs:**
 - o Risk: Misalignment of course content with evolving SME requirements identified in WP1 could reduce relevance and impact.
 - o Mitigation: Establish regular feedback loops with SME representatives, conduct periodic needs assessments, and continuously update course content based on real-time insights from the SME4DD program.
- **Adaptability and Flexibility:**

- Risk: Inflexible course structures may hinder adaptation to changing technological advancements or unexpected SME needs.
- Mitigation: Design the course with modular components, allowing easy updates, embrace blended learning formats for flexibility, and maintain open channels for real-time course adjustments.
- **Quality Assurance and Continuous Improvement:**
 - Risk: Insufficient focus on self-evaluation and improvement cycles might lead to stagnation in course quality.
 - Mitigation: Implement a robust quality assurance plan involving regular self-evaluations, debriefing sessions, and utilization of feedback mechanisms from various sources to drive continuous enhancement.
- **Collaboration Challenges with Consortium Partners and EIT Digital:**
 - Risk: Lack of effective collaboration with consortium partners may impact the development of co-branded courses or integration of the latest technology advancements.
 - Mitigation: Establish clear communication channels, collaborative frameworks, and regular meetings to ensure alignment, exchange best practices, and capitalize on shared expertise.
- **Economic Volatility and Inflation:**
 - Risk: Economic fluctuations and rising inflation may impact budget allocations, funding availability, or participants' ability to afford courses.
 - Mitigation: Potentially offer the courses at a reduced price for the targeted audience.
- **A saturated market:**
 - Risk: With the increased number of offerings in the field of courses on AI, there is a risk that the competition grow to the extent that it will be difficult for Hyper Island to compete with other course providers.
 - Mitigation: Solid marketing strategies within the SME4DD project and within the organization itself, i.e., internal marketing strategies at Hyper Island.

5.4.2 Planned schedule for 2024

Hyper Island plans four deliveries of its “AI for Business” course in 2024.

February online cohort (pilot):

- This online course starts from February 19 and ends on March 17, together with
- 4 interactive live sessions taking place online every Thursday between 13:00 – 15:30 CET (February 22, 29 & March 7, 14).
- Self-paced pre-reading, deep dives and individual tasks/assignments are to take place between online live session dates.

May online cohort:

- This online course starts from May 20 and ends on June 16, together with
- 4 interactive live sessions take place online every Thursday between 13:00 – 15:30 CET (May 23, 30 & June 6, 13).
- Self-paced pre-reading, deep dives, and individual tasks/assignments to take place between online live session dates.

April onsite cohort:

- This onsite course starts from April 11 and ends on April 12
- 2 full days, 9AM-5PM
- Location: Hyper Island, Virkesvägen 2, 120 30 Stockholm.

July onsite cohort:

- This onsite course starts from July 04 and ends on July 05
- 2 full days, 9AM-5PM
- Location: Hyper Island, Virkesvägen 2, 120 30 Stockholm.

Appendix: questionnaire templates

5.5 Participant onboarding questionnaire

Questions common to the course providers

Q1 - Is your company an SME? *Yes/no*

Q2 - What is your current position in relation to AI/blockchain/cybersecurity? *Multiple choice*

- Corporate management
- ICT management/development
- ICT specialist/data scientist/data analytics
- Domain expert (marketing, logistics, finance, ...)
- Other (please specify)

Q3 - How do you rate your current knowledge in AI/blockchain/cybersecurity?

On a scale of 1 (beginner) to 5 (expert)

Q4 - How old is your company?

- < 1 year
- 1-5 years
- 5-10 years
- > 10 years

Q5 - What is the size of your ICT department (as a percentage of your employees)?

- We do not have one
- From 1% to 5%
- From 5% to 10%
- From 10% to 15%
- From 15% to 20%
- More than 20%

Q6 - Do you see the usage of data as important for your business development and competitiveness?

On a scale of 1 (not important) to 5 (very high importance)

Q7 - In what areas is leveraging data the most valuable for you to develop your business?

(max. three alternatives)

- Operational data
- Sales data
- Insights and analytics
- Legacy, supply chain
- Environmental data (i.e., for taxonomy)
- Financial data, financial reporting
- Customer data
- Third-party data

Q8 - Do you have a process to secure the quality of your data? *Single choice*

- Yes, we have a clear process
- Yes, to some extent
- No
- I don't know

Questions specific to INRIA and Hyper Island (AI)

Q3b (Inria) – Rate your current knowledge in Python, Jupyter and NumPy/Pandas!

On a scale of 1 (beginner) to 5 (expert)

Q9 (AI) - Do you see AI supported innovation potential/need for your company in the following areas?

Yes/no

- Data management and data visualization
- AI-Powered Assistants
- Fraud prevention
- Recommendation systems
- Data security
- Supply chain
- Other (please specify)

Q10 (AI) - Rank in order of importance the following areas of Artificial Intelligence for you and your company!

- Understanding principles of Artificial Intelligence
- Understanding the challenges of AI technologies
- Executives' ability to incorporate AI in strategic decision making
- Competence in RFQs and tenders for AI solutions
- Understanding how AI investments can be deployed

- Efficient tools for machine learning and statistical modeling
- Competence in extracting and exploiting complex data
- Competence in executing AI projects

Questions specific to BME (blockchain)

Q9 (Blockchain) – Do you see blockchain-supported innovation potential/need for your company in the following areas? *Yes/no*

- Trusted data sharing with partners
- Creating digital marketplaces/auction platforms
- Track physical or virtual assets
- Securing cross-organizational document management
- Creating FinTech services
- Orchestrating cross-organizational processes
- I already have specific blockchain-based digitalization ideas (please specify)

Q10 (Blockchain) – Rank in order of importance the following areas of Blockchain from your own perspective!

- Understanding the basic principles of blockchain technologies
- Understanding and evaluating the potential of Blockchain solutions in a specific business context
- Executives' ability to incorporate Blockchain in strategic decision making (e.g., management of supply chains, collaboration with partners, improving efficiency)
- Competence in RFQs and tenders for blockchain-based solutions
- Competence in executing Blockchain projects
- Competence in integrating Blockchain with existing systems and services
- Knowledge of the basics of Blockchain interoperability

Questions specific to Talent Garden (cybersecurity)

Q9 (Cybersecurity) – Rank-order the main challenges your company faces in terms of cybersecurity!

- Lack of awareness among employees
- External threats (criminal hacker, phishing, malware, ...)
- Internal threats (human errors, negligence, ...)
- Lack of financial sources for training
- Lack of qualified staff
- Other (please specify)

5.6 Questionnaire after the course

Q1- How likely are you to recommend this course to a colleague or friend?

On a scale of 1 (I would not recommend it at all) to 10 (I would highly recommend it)

Q2 (AI) – Considering the course learnings, rank in order of importance the following areas of Artificial Intelligence for you and your company!

- Understanding principles of Artificial Intelligence
- Understanding the challenges of AI technologies
- Executives' ability to incorporate AI in strategic decision making
- Competence in RFQs and tenders for AI solutions
- Understanding how AI investments can be deployed
- Efficient tools for machine learning and statistical modelling
- Competence in extracting and exploiting complex data
- Competence in executing AI projects

Q2 (Blockchain) - Considering the course learnings, rank in order of importance the following areas of blockchain for you and your company!

- Understanding the basic principles of blockchain technologies
- Understanding and evaluating the potential of Blockchain solutions in a specific business context
- Executives' ability to incorporate Blockchain in strategic decision-making (e.g., management of supply chains, collaboration with partners, improving efficiency)
- Competence in RFQs and tenders for blockchain-based solutions
- Competence in executing Blockchain projects
- Competence in integrating Blockchain with existing systems and services
- Knowledge of the basics of Blockchain interoperability

Q2 (Cybersecurity) – Considering the course learnings, rank-order the main challenges your company faces in terms of cybersecurity!

- Lack of awareness among employees
- External threats (criminal hacker, phishing, malware, ...)
- Internal threats (human errors, negligence, ...)
- Lack of financial sources for training
- Lack of qualified staff
- Other (please specify)

Q3 - Prerequisites: do you believe you had the right level of skills and knowledge prior to the course to gain the most value?

Single choice for each area: I was overqualified; my skills and knowledge were sufficient; I lacked some knowledge/skills; I do not know

- Managerial skills
- Soft skills
- Target technology
- Supporting technologies

Q4: question group evaluating the course content and its presentation

Q4a – Were the different parts of the course following a clear structure?

On a scale of 1 (not at all) to 5 (very clear structure)

Please specify what could be improved!

Open question part

Q4b – Were the tools and practices presented and used in the course relevant for your needs?

On a scale of 1 (not at all) to 5 (very relevant)

Please specify what could be improved!

Open question part

Q4c – How do you rate the faculty of the course (rate each module/faculty)! *On a scale of 1 to 5*

- Instructor Knowledge (1: questionable knowledge -5: very knowledgeable)
- Clarity of presentation (1: questionable quality of presentation – 5: very clear presentation)
- Content relevance (1: irrelevant content – 5: perfectly relevant content)

Q4d – Were use/business cases and hands-on tasks, in your opinion, adapted to the needs of SMEs?

On a scale of 1 (irrelevant for SMEs) to 5 (well aligned with the needs of SMEs)

Please specify what could be improved!

Open question part

Q4e – What specific aspects of < Name of Faculty>'s teaching did you find the most valuable and informative, and why? *Open question*

Q4f – Are there any general areas for improvement or topics you would have liked to see covered during the course? *Open question*

Q4g – How can we enhance future teaching to better meet the participants' expectations? *Open question*