R4.3 "Report on the piloting activity"

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Executive Summary

This report validates the pilot phase of the **AI4GreenSME** programme, aimed at equipping European small and medium-sized enterprises (SMEs) with skills in **artificial intelligence (AI)** to support their transition to **sustainable and circular business models**. Conducted from February to June 2025, the pilot combined an online training platform with international collaborative activities. The evaluation integrates quantitative data (three satisfaction surveys) and qualitative insights (activity reports), aligned with needs identified in WP2 and recommendations from Report R4.2.

Key Findings

- **High satisfaction**: The training platform and collaborative activities received average ratings above 4/5. 91% of internal and 89% of external users believe the course will help their companies become greener with AI.

- **Strong impact of collaborative activities**: Over 65% of participants reported a significant increase in knowledge on AI and the circular economy. Organisational quality (average > 4.6) and the creation of a European peer network were highly valued.

- **Micro-credentials and scalability**: The badge-based system and Europass-certified diploma support long-term adoption and scaling, with open-access content under a CC BY 4.0 licence.

- **Thematic relevance**: The programme addresses real-world SME challenges and includes technical, ethical, and social dimensions of the green and digital transition.

Main Conclusions

1. The pilot confirms the programme's **strong value proposition**, with well-structured and practical content aligned with SME needs.

2. The blended approach of **e-learning and peer collaboration** fosters meaningful learning and transnational networking.

1.Introduction

The **AI4GreenSME** project aims to "provide training in artificial intelligence and machine learning to managers of small and medium-sized enterprises to boost their transition to the circular economy". It falls within the horizontal priorities of **environmental sustainability** and **digital transformation**, and responds to the sectoral need to equip SMEs with new green and digital skills.

WP2 carried out mixed research (surveys and focus groups) that revealed gaps in areas such as DigiComp, GreenComp, circular models and the use of AI. This led to the development of a skills profile and a micro-credential proposal that structures the online course. On this basis, **WP4** carried out the pilot between February and June 2025, combining the training platform with international collaborative activities.

The purpose of this **Report R4.3** is **to validate the pilot phase** by analysing the results of the satisfaction surveys (internal and external users) and the collaborative activities, as well as the recommendations of Report R4.2. In accordance with the description of the result, the report:

- evaluates achievements and areas for improvement of the platform and training materials,

- proposes adjustments for their long-term exploitation and for the future accession of new SMEs to the AI4GreenSME network, and

- demonstrates consistency with the needs identified in WP2.

In this way, the document serves as a bridge between the pilot experiment and the final version of the programme, providing evidence to guide decision-making and ensure its impact on the circular and digital transformation of European SMEs.

2. Methodology and data sources

2.1 General approach

To validate the pilot phase of the AI4GreenSME programme, a **mixed and triangulated** design was adopted.

- Quantitative→ three structured satisfaction surveys with closed items on an ordinal scale and open-ended questions.

- Qualitative→ thematic analysis of the report on collaborative activities and comparison with the R4.2 recommendations report.

This approach allows user perceptions to be compared with narrative evidence and with the pedagogical guidelines already approved in the project, ensuring a holistic view of effectiveness and areas for improvement.

2.2 Primary data sources

Source	Sample	Instrument	Key content
Survey Internal review platform	23 completed questionnaires	10 questions (1–5, Yes/No and open-ended)	Overall effectiveness, seven design aspects, practical usefulness
External review platform survey	28 completed questionnaires	11 questions equivalent to the internal survey, plus country of origin	Geographic reach, effectiveness, platform quality, usefulness
Collaborative activities survey	38 valid responses	8 questions (attendance, preparation, organisational and content quality, open-ended)	Logistics, learning and networking assessment
Report on collaborative activities	10 documented bilateral sessions	Narrative record and list of participants	Description of objectives, dynamics and conclusions of each session

2.3 Sources for contextualisation and comparison

- **Report R4.2 – Recommendations for implementation**: provides the pedagogical rationale and guidelines for improvement that are verified against empirical results.

- **Project reference documentation (WP2 and WP4)**: establishes the competence criteria, course structure and validation plan that underpin this report.

2.4 Analytical procedure

1. **Purification and descriptive statistics** of closed items (frequencies, averages, deviations) in the three surveys.

2. **Thematic coding** of open responses and activity reports, identifying patterns of usability, learning and collaboration.

3. **Triangulation**: quantitative results were compared with qualitative evidence and with the R4.2 recommendations to validate matches and detect discrepancies.

4. **Synthesis**: conclusions were structured around satisfaction, relevance to the AI-based circular economy and proposed improvements for the final version of the platform and training activities.

With this methodology, the R4.3 report provides robust evidence, both numerical and narrative, to support the programme update and its long-term exploitation, aligned with the needs identified in WP2 and the roadmap for the creation of the AI4GreenSME network.

3. Main results

3.1 Training platform

Indicator	Internal users (= 23)	External users (n= 28)	Reading
Overall effectiveness (scale 1-5)	4.26± 0.61; 65% rated≥ 4	4.29; 68% scored≥ 4	The course fully meets its learning objectives.
Design quality (7 aspects)	Averages 4.13-4.61; best "logical sequence"≈ 4.6	Averages 4.05-4.52; similar pattern	Content and structure are perceived as very solid.
Practical value for SMEs	91% believe it will help them operate in a greener way with AI	89% agree	High transferability to the workplace.
Recurring suggestions	Improve navigation, translate more clearly, add AI demos	Incorporate local examples and additional case studies	These will guide the next UX-pedagogical iterations.

Evidence of learning

The combination of high effectiveness scores and the majority belief that they can apply what they have learned indicates that the platform already generates meaningful learning aligned with the objectives of AI-based circular economy.

3.2 Collaborative activities

Dimension	Key result	Reading
Participation	38 valid surveys; the "Circular Economy Literacy" session accounted for 40% of attendance	Confirms interest in the fundamentals before delving deeper.
Prior preparation	87% reviewed the general documentation; 76% opened the activity sheet	Preparation has a positive influence on the experience.
Organisational quality	Averages 4.18-4.76; the facilitator's preparation was rated highest (4.76)	Logistics and facilitation were strong points.
Usefulness of content	Average 4.32-4.58; two-thirds stated that their knowledge of CE-IA had increased *significantly*	High perception of training impact.
Network creation	The item "European peer network" obtained 55% "Excellent", with requests for more continuous exchange and comments calling for forums and regular meetings	There is a basis for consolidating the **AI4GreenSME network** as a community of practice.

3.3 Overall conclusion

The pilot phase shows **very high satisfaction** with both the platform and the collaborative activities. The quantitative metrics (4/5 in almost all indicators) and the consistency of the qualitative comments underline that the programme already brings tangible value to SMEs. Immediate opportunities for improvement include:

- Navigation and branding adjustments,

- Inclusion of AI demonstrations and case studies,

- Formalisation of networking spaces and post-course support.

These findings form the basis for the recommendations in the next section and support the feasibility of scaling up the initiative and the AI4GreenSME network.

4. Recommendations and improvement/exploitation plan

4.1 Priority adjustments to the training platform

- **Simplify navigation** and add breadcrumbs and a clear progress tracker. Internal and external users point to this as the main improvement they would like to see.

- **Refine the translation and visual consistency** (logos/disclaimers) to reinforce the programme's identity.

- **Incorporate demonstrations of AI tools, local case studies and interaction** (guided videos, mini-simulations) that respondents request to help them understand concepts.

- **Maintain and enhance accessibility** (contrast bar, legible typography) and infographics, which are already positively valued.

4.2 Priority adjustments to collaborative activities

- **Add practical mini-workshops** (live cases, demonstrations) and interactive tools to deepen real-world application.

- **Maintain the summarised pre-reading packages**: they increase participants' preparation and satisfaction.

- **Establish a European community of practice** (forums or meetings) to continue the networking that emerged in the pilot.

- **Strengthen the role of facilitators** – their preparation is a strong point – and include methodological guides and clear logistics for local replication.

- **Diversify participants and rely on Digital Innovation Hubs** to expand the sector and technical support.

4.3 Micro-credential strategy and new SME membership

1. **Badge and certificate system**
   - Each module generates a verifiable *badge*; upon completion of the course, a global certificate with Europass validity and micro-credential format is issued.

2. **AI4GreenSME membership package**
   - Aimed at chambers of commerce, clusters, vocational training centres, universities and NGOs that can freely reuse the resources (CC BY 4.0 licence).
   - The R4.3 report will serve as proof of value in the **recruitment campaign** planned in the Network Plan (WP4, R4.4).

3. **Onboarding route**
   - Registration on the platform → modular course with monitoring → obtaining micro-credentials → participation in collaborative activities → incorporation into the network and access to annual events.

4.4 Long-term roadmap (2025–2027)

Phase	Deadline	Key milestones
Completion of version 2.0 of the platform	September 2025	Integrate UX improvements, AI demos and local cases. Quarterly feedback loops through *pulse surveys*.
AI4GreenSME network plan (Activity 4.5)	May-Oct 2025	Document setting out objectives, requirements and timetable for new members; led by Malta Business Foundation.
Launch micro-credential & initial membership	Sep 2025	Active Europass certificate; first external cohort of SMEs registered.

Phase	Deadline	Key milestones
Operational community of practice	Dec 2025	According 4.5.
Scaling & sustainability	2026	Ongoing promotion (presence at events, social media, newsletters) according to WP5 plan; monitoring of environmental, social and governance KPIs with ISO/SDG frameworks. Revisable and "living" roadmap to adapt to new technologies and regulations.

With these actions, the programme will consolidate an **open, validated and scalable training offer**, backed by recognised micro-credentials and a European network that supports SMEs in their transition to AI-supported circular business models.

5 · Conclusions

The pilot phase confirms that the **AI4GreenSME** programme delivers on its promise to empower European SMEs to integrate artificial intelligence (AI) in their transition to circular economy models. Both the training platform and the collaborative activities have achieved levels of satisfaction and effectiveness that exceed the initial objectives, providing solid evidence for continuous improvement and long-term exploitation.

Performance of the training platform.

- Internal users gave an average rating of **4.26/5** with no ratings below 3, indicating high perceived effectiveness.

- **91%** of internal users and **89%** of external users believe that the content will help them operate more sustainably with AI.

- Aspects such as logical sequencing and linguistic clarity received the highest marks (4.05–4.61), while the main suggestions were to improve navigation and add more practical demonstrations.

- The overall conclusion highlights **"high satisfaction"** and the need to adjust only minor details.

Impact of collaborative activities.

- The organisation is rated between **4.18 and 4.76**, with the preparation of the facilitators and time management standing out.

- The content and perceived usefulness are rated between **4.32 and 4.58**, with two-thirds of participants reporting a "high" increase in AI-CE knowledge.

- Qualitative comments call for more case studies and the creation of a **community of practice** to prolong cooperation.

- Overall, the survey concludes that satisfaction is "very high" and that the programme strengthens SMEs' competence at the intersection of AI and the circular economy.

Micro-credentials and scalability.

The system of **badges per lesson and final certificate** acts as a verifiable incentive and is aligned with European trends in online learning recognition. Combined with the **CC BY 4.0** open licence, the programme offers a solid basis for scaling up and attracting new SMEs to the AI4GreenSME network.

Contribution to project objectives.

The results support the priorities of **WP2** —green skills, digital transformation and labour market readiness— set out in the original proposal. The necessary improvements are limited to the user experience and the enrichment of sectoral examples.

Final summary.

AI4GreenSME has robust content, an effective pedagogical approach and a collaborative ecosystem that is already generating tangible value for SMEs. With specific UX adjustments, the expansion of case studies and the launch of the community of practice and micro-credential scheme, the programme is ready for full deployment and to become a European benchmark in AI and circular economy training.

Appendices

Annex 1 - Satisfaction Survey Results Report: AI4GREEN Training platform – Internal review

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1 · Purpose

This internal survey measured users' perceptions of the **AI4GREENSME online training platform**. The questionnaire explored which e-learning lesson was reviewed, overall effectiveness, satisfaction with specific platform aspects, and perceived usefulness for greener SME operations.

2 · Method

- **Instrument** – 10 questions:

    - **Q1** Multiple selection → lesson(s) assessed

    - **Q2** Single rating 1–5 → overall effectiveness

    - **Q3** Scale A–E (mapped to 1–5) → seven design/quality aspects

    - **Q4** Yes/No → value for environmental improvement

    - **Q5–Q10** Open text → clarity, missing topics, application ideas, improvement suggestions, most useful sections

- **Sample** – 23 completed questionnaires.

- **Analysis** – Frequencies, percentages and means were computed; open comments were thematically coded.

3 · Key Findings

Dimension	Evidence	Interpretation
Lesson reviewed (Q1)	Highest traffic to **"Circular Economy Literacy"** (20 responses). Other popular lessons: "AI Literacy" and "Applications of AI in CE" (19 each).	Foundational CE & AI modules attract most interest; advanced lessons register slightly lower but still solid engagement.
Overall effectiveness (Q2)	Mean = **4.26/5** (SD ≈ 0.61). **65 %** rated 4 or 5. No rating below 3.	Users view the platform as highly effective in meeting learning goals.

Dimension	Evidence	Interpretation
Design & quality (Q3)	Mean scores **4.13 – 4.61**. Top items: *"Logical sequence of topics"* and *"No language/grammar errors"* (≈ 4.6). Lowest (still positive 4.1): *"Logos & disclaimers included"*.	Structure, clarity and language are strong; branding elements could be further refined.
Practical value (Q4)	**91 % "Yes"** believe modules will help SMEs become greener using AI.	Content is perceived as actionable for environmental performance.
Open comments (Q5–Q10)	• Navigation could be smoother; consider fewer clicks and clearer Spanish translation. • Users request more AI tool demonstrations and interactive elements. • Most useful sections: graphics, core content on AI-driven product design and CE business models.	Fine-tuning UX and adding practical demos will enhance learning impact.

4 · Conclusions

1. **High satisfaction**: Mean ratings all > 4 highlight overall platform quality.

2. **Content relevance**: Nearly all respondents expect tangible benefits for greener operations.

3. **Usability tweaks** (navigation, branding) and **interactive demos** are the primary opportunities for improvement.

5 · Recommendations

- **Streamline navigation** and review translations to improve UX.

- Integrate **live tool demos** or guided walkthroughs within lessons.

- Strengthen visual identity (consistent logos/disclaimers).

- Use feedback loops (e.g. in-platform polls) to evolve content iteratively.
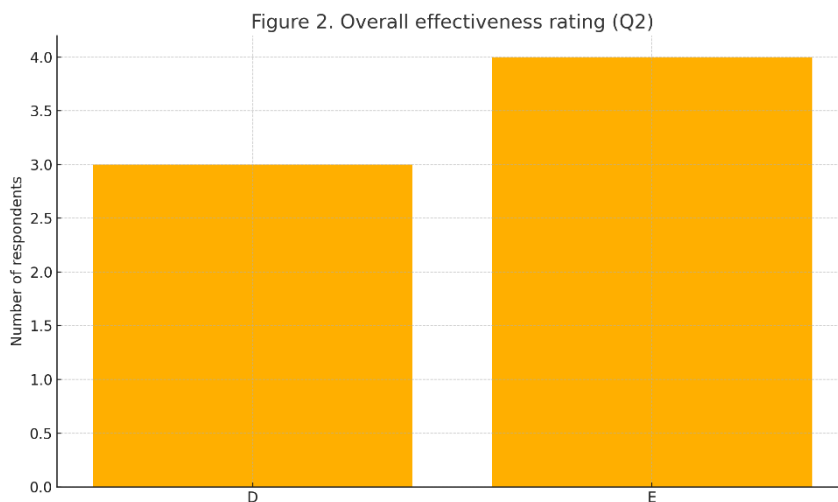
Annex I – Data Summary and Figures

Interactive tables and graphics (see above) include:

1. **Figure 1** – Lesson assessed (Q1) + counts/percentages table.

Figure 1. Lesson assessed (Q1)

2. **Figure 2** – Overall effectiveness rating distribution (Q2).
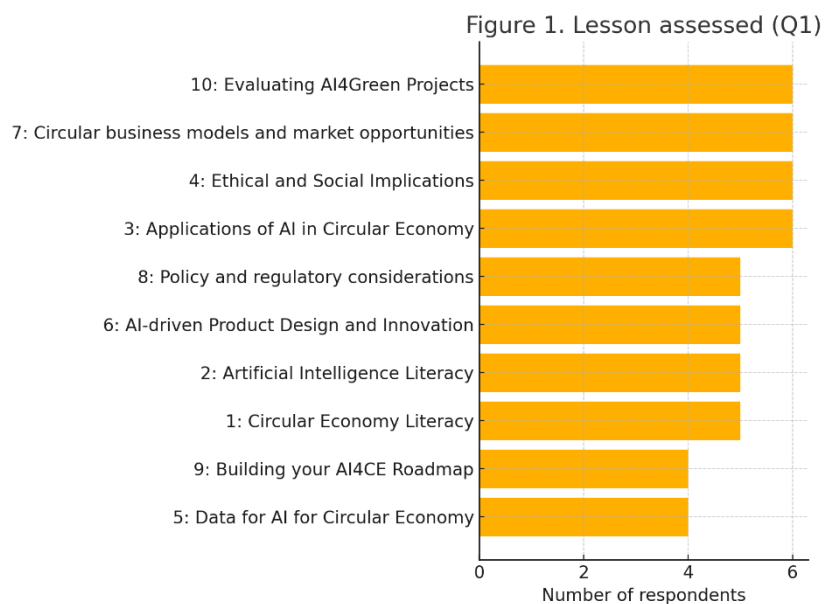
Figure 2. Overall effectiveness rating (Q2)

3. **Figure 3** – Satisfaction with seven platform aspects (means) (Q3).

Figure 3. Satisfaction with platform aspects (Q3)
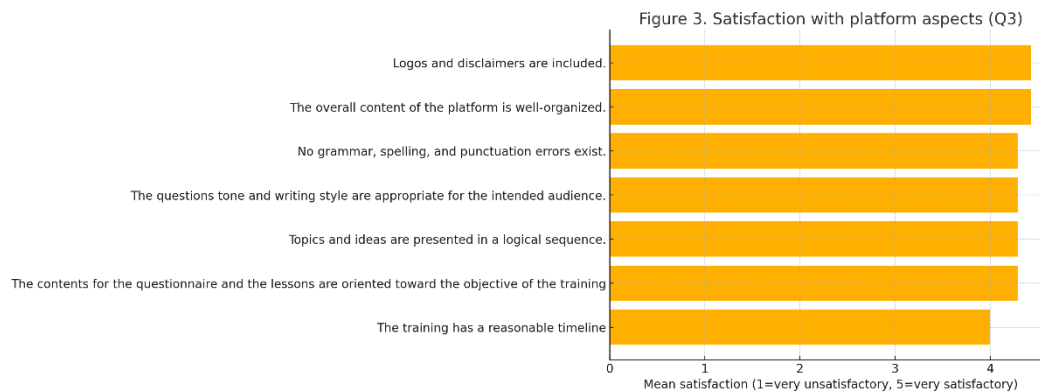
4. **Figure 4** – Value for greener operations (Q4) + frequency table.

Figure 4. Value perceived for greener operations (Q4)
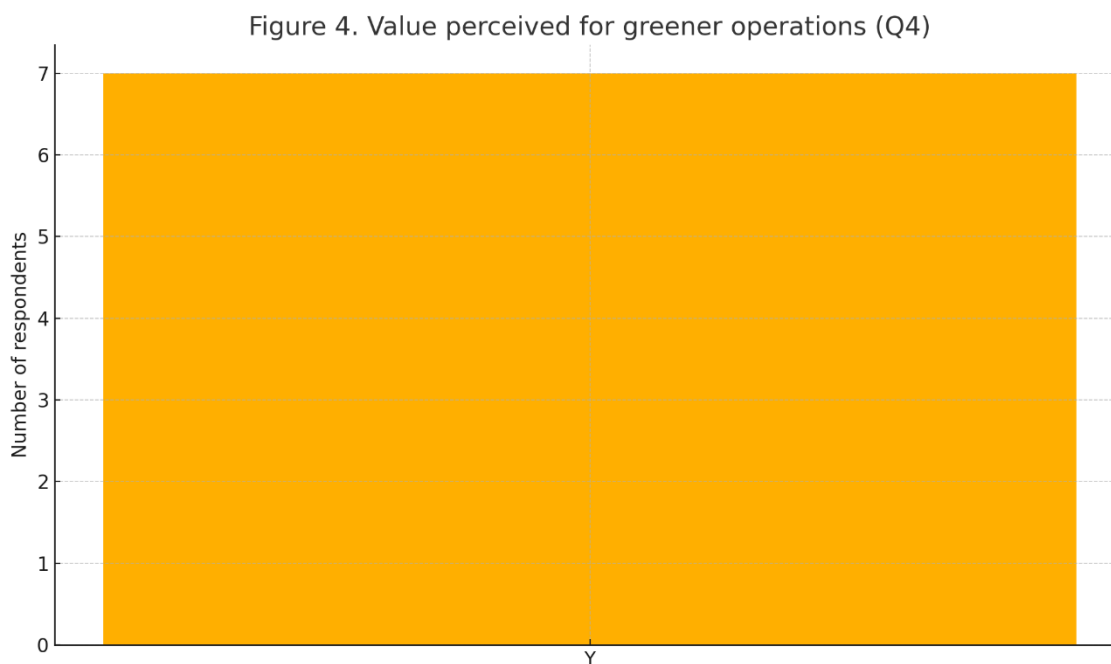
Annex 2 - Satisfaction Survey Results Report: AI4GREEN Training platform – External review

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1 · Purpose

An external group of professionals/SME staff evaluated the **AI4GREENSME e-learning platform**. The survey captured country of origin, lessons reviewed, perceived effectiveness, satisfaction with specific platform attributes, and practical usefulness for improving environmental performance.

2 · Method

- **Questionnaire** – 11 items:

    - **Q1** Country (single choice)

    - **Q2** Lesson(s) assessed (multiple choice)

    - **Q3** Overall effectiveness (A = 1 ... E = 5)

    - **Q4** Seven platform-quality aspects (A–E)

    - **Q5** Value for greener operations (Yes/No)

    - **Q6–Q11** Open questions on clarity, missing topics, examples, improvements, etc.

- **Respondents** – 28 completed surveys.

- **Analysis** – Frequencies, percentages and means; open answers thematically coded.

3 · Key Findings

Theme	Evidence	Interpretation
Geographic reach (Q1)	**Spain (46 %)**, Malta (18 %), Greece (14 %), Cyprus (11 %), Bulgaria (11 %).	Southern-EU focus but broad Mediterranean coverage.
Lessons reviewed (Q2)	Top three: "Circular Economy Literacy" (75 %), "AI Literacy" (71 %), "AI Applications in CE" (68 %). Advanced modules were still reviewed by 43-57 % of respondents.	Demand centres on foundational CE+AI knowledge while deeper topics maintain interest.

Theme	Evidence	Interpretation
Overall effectiveness (Q3)	Mean = **4.29/5**; 68 % rated 4 or 5.	External audience sees the platform as highly effective.
Platform quality (Q4)	Mean scores **4.05 – 4.52**. Best-rated items: *logical sequence of topics* (4.52) and *error-free language* (4.48). Lowest (yet positive 4.05): *logos & disclaimers present*.	Content structure and clarity are strong; branding elements could be polished.
Practical value (Q5)	**89 % "Yes"** believe modules will help SMEs operate more sustainably with AI.	High perceived applicability to real-world environmental goals.
Open feedback (Q6–Q11)	Requests for: clearer navigation paths, more localised examples, and additional case studies on AI-driven circular business models. Praise for visually engaging graphics and concise explanations.	Minor UX tweaks and richer examples will further raise impact.

4 · Conclusions

1. **High satisfaction** across all metrics; the platform resonates well with an external audience.

2. **Foundational modules** are most in demand, but advanced content also shows solid uptake.

3. **Actionability confirmed**: Nearly nine in ten expect to apply learnings to greener operations.

4. **Enhancement opportunities**: strengthen visual identity consistency, streamline navigation, and expand case-based content.

5 · Recommendations

- Optimise **branding & disclaimers** to meet external quality expectations.

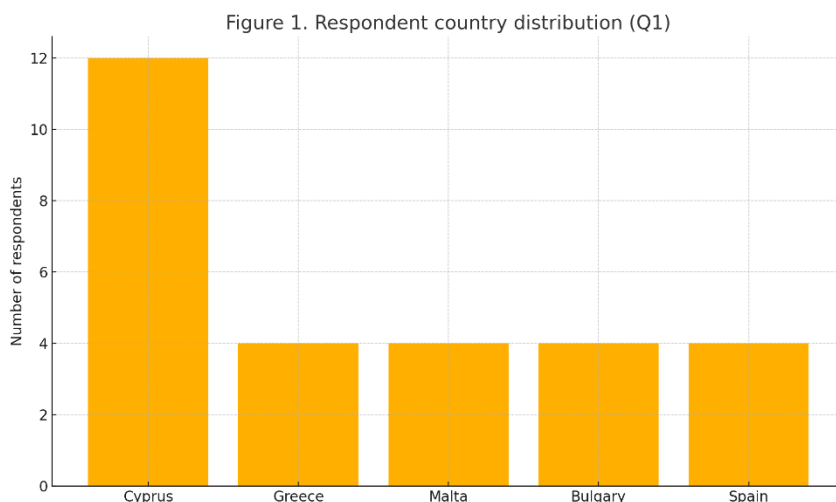- Add **region-specific AI/CE case studies** to widen relevance.

- Introduce **guided navigation cues** (breadcrumbs, progress tracker).

- Continue monitoring feedback via iterative pulse surveys.

Annex I – Data Summary and Figures

- **Figure 1** – Respondent country distribution (Q1)

Figure 1. Respondent country distribution (Q1)

- **Figure 2** – Lessons evaluated (Q2)

Figure 2. Lessons evaluated (Q2)
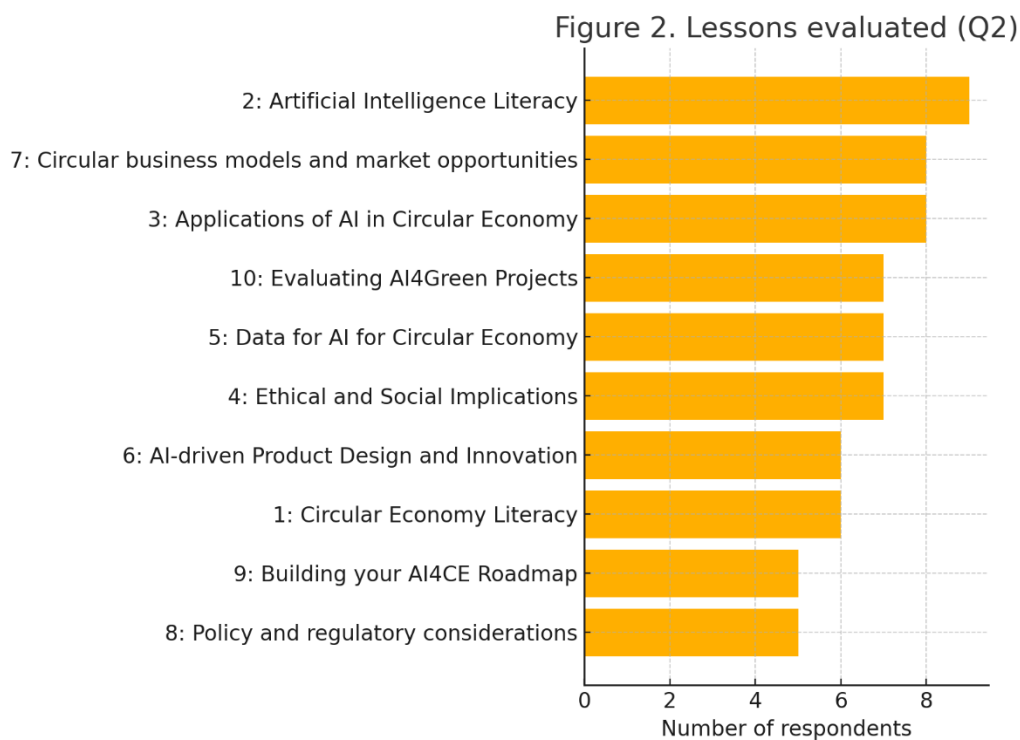
- **Figure 3** – Overall effectiveness rating distribution (Q3)

Figure 3. Overall effectiveness rating (Q3)
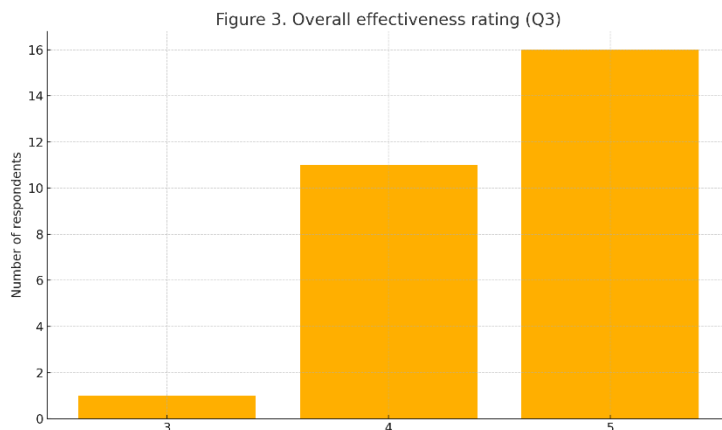
- **Figure 4** – Satisfaction with platform aspects – mean scores (Q4)

Figure 4. Satisfaction with platform aspects (Q4)
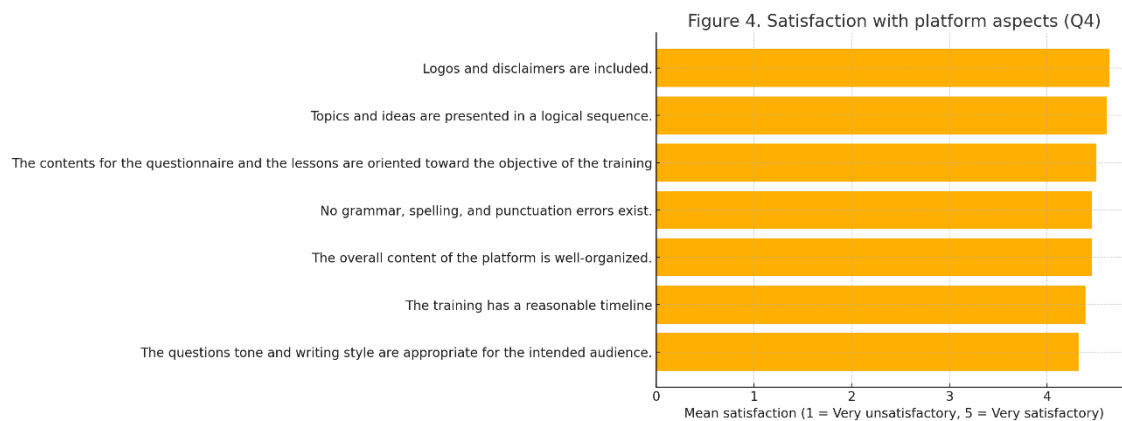
- **Figure 5** – Value perceived for greener operations (Q5)

Figure 5. Value for greener operations (Q5)

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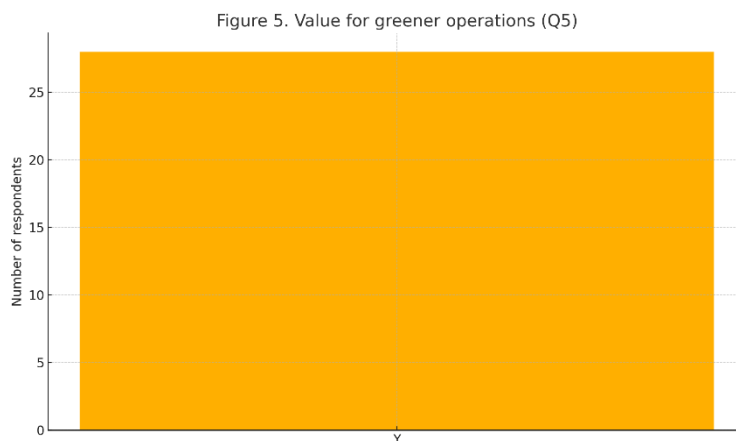
Annex 3 - Satisfaction Survey Results Report: AI4GREEN Collaborative Activities

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1. Purpose

To assess participants' experience in the online collaborative sessions of the **AI4GREEN** project, a post-event survey was administered. This report distils quantitative and qualitative insights and highlights actionable recommendations.

2. Method

- **Instrument** – 8-item online questionnaire:
    - **Q1** Multiple choice: session(s) attended.
   - **Q2–Q3** Yes/No: whether preparatory materials were reviewed.
    - **Q4–Q5** Likert scale (A = Very poor … E = Excellent): organisational quality and content usefulness.
    - **Q6–Q8** Open questions: concerns, key take-aways, suggestions.
- **Respondents** – 38 valid surveys (100 % of attendees who accessed the form).
- **Analysis** – Coded responses, computed frequencies and means (A–E → 1–5).

3. Key Findings

Dimension	Evidence	Interpretation
Attendance (Q1)	"Circular Economy Literacy" drew **40 %** of respondents; "AI Tools…" and "Data-Driven CE Strategies" attracted **21–24 %**. Lesser-attended sessions ranged **5–16 %**.	Topic breadth was adequate, but the CE literacy module remains the flagship attraction.
Preparation (Q2–Q3)	**87 %** consulted the general documentation; **76 %** opened the Activity Sheet.	High pre-work engagement suggests that advance materials are valued and influence perceived benefit.
Organisation (Q4)	Item means **4.18 – 4.76** (out of 5). Highest-rated: *facilitator readiness* (4.76) and *time management* (4.63). Only **2–5 %** rated any item ≤ "Poor".	Logistical execution is a clear strength; negative feedback is minimal.

Dimension	Evidence	Interpretation
Content & Usefulness (Q5)	Means **4.32 – 4.58**. Two-thirds said the session increased their CE-AI knowledge "a lot". The *European peer network* item had the widest spread but still **55 % "Excellent"**.	The curriculum meets learning needs; networking potential is attractive but could be clarified.
Open comments (Q6–Q8)	*Recurrent themes:* practical case studies, peer perspectives, clarity of trainers, relevance to real challenges. *Suggested improvements:* more live demonstrations, interactive tools, continued peer exchange.	Participants want deeper hands-on content and ongoing community support.

4. Conclusions

1. **Overall satisfaction is very high** across organisational and substantive dimensions.

2. **Facilitator preparation** and **time discipline** drive positive perceptions.

3. The programme **effectively raises awareness and competence** at the AI–circular-economy interface.

4. Future value lies in **expanding practical demonstrations** and nurturing a **networked learning community**.
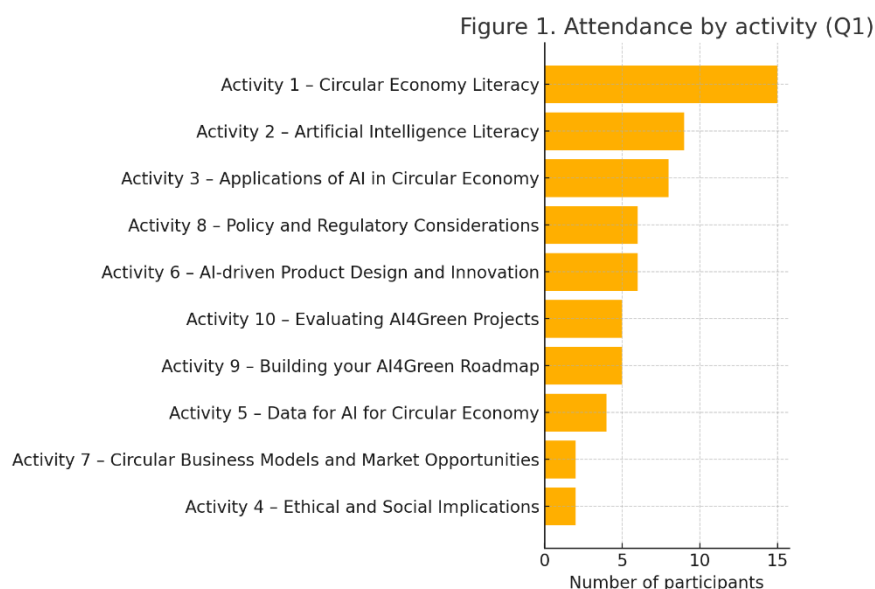
5. Recommendations

- Keep summarised **pre-reading packages**; they correlate with higher engagement.

- Incorporate **live, case-based mini-workshops** to deepen applied skills.

- Launch a **European community of practice** (forums, quarterly meet-ups) to sustain collaboration.

- Periodically refresh the survey to capture new priorities (e.g. generative-AI tools for circular design).

Annex I – Data Summary and Figures

Interactive tables and plots:

1. **Figure 1** – Attendance by activity (Q1) + table "Q1 – Attendance by activity".

Figure 1. Attendance by activity (Q1)

Activity	Number of participants
Activity 1 – Circular Economy Literacy	15
Activity 2 – Artificial Intelligence Literacy	9
Activity 3 – Applications of AI in Circular Economy	8
Activity 8 – Policy and Regulatory Considerations	6
Activity 6 – AI-driven Product Design and Innovation	6
Activity 10 – Evaluating AI4Green Projects	5
Activity 9 – Building your AI4Green Roadmap	5
Activity 5 – Data for AI for Circular Economy	4
Activity 7 – Circular Business Models and Market Opportunities	2
Activity 4 – Ethical and Social Implications	2

2. **Figure 2** – Prior documentation review (Q2) + table.

Gráfico 2. Revisión de Documentación previa (Q2)
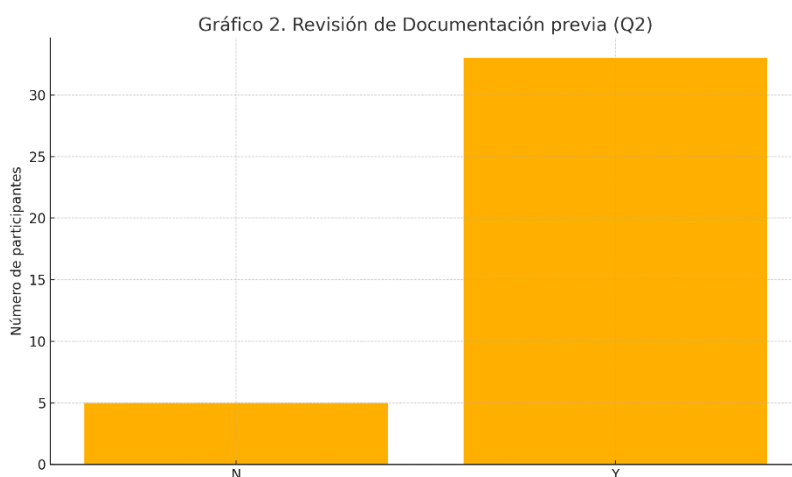
3. **Figure 3** – Activity Sheet review (Q3) + table.

Gráfico 3. Revisión de Activity Sheet (Q3)
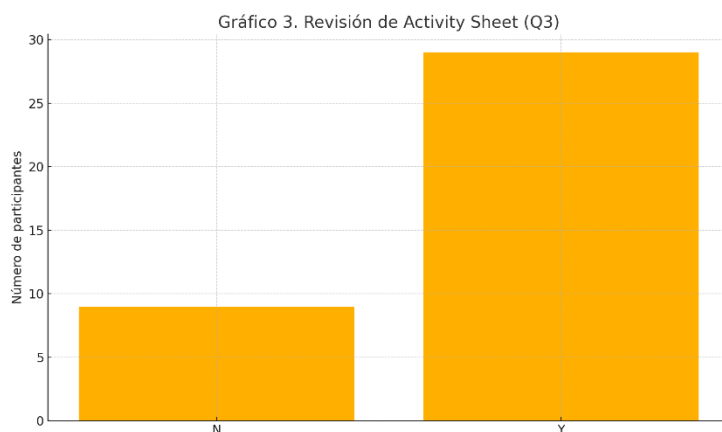
4. **Figure 4** – Organisational aspects (Q4) + table "Q4 – Organisational evaluation (Mean)".

Figure 4. Organisational aspects (Q4)
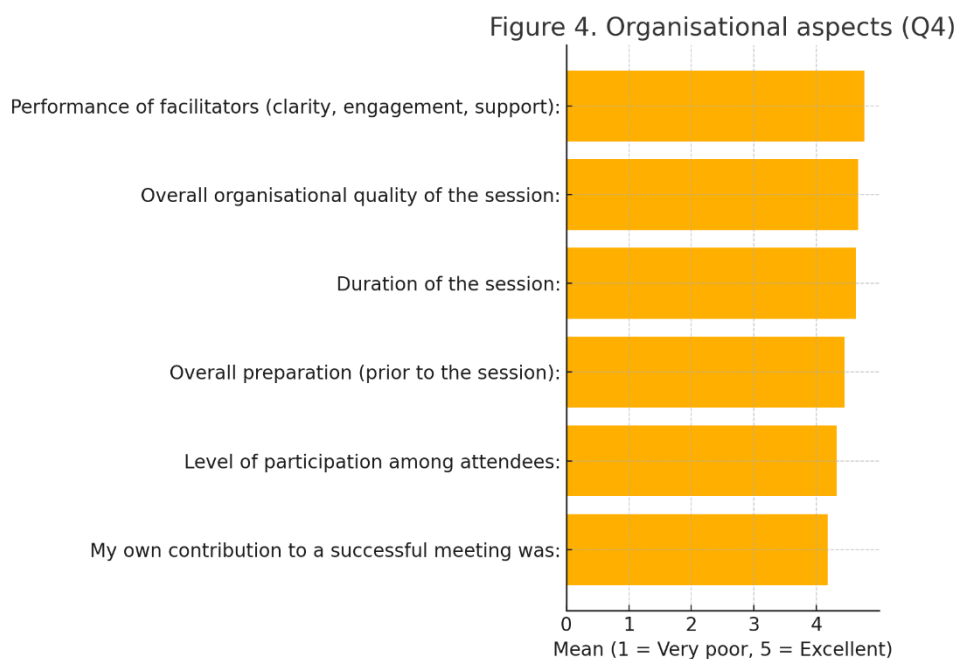
5.

6. **Figure 5** – Content & usefulness (Q5) + table "Q5 – Content and usefulness (Mean)".

Figure 5. Content and usefulness (Q5)
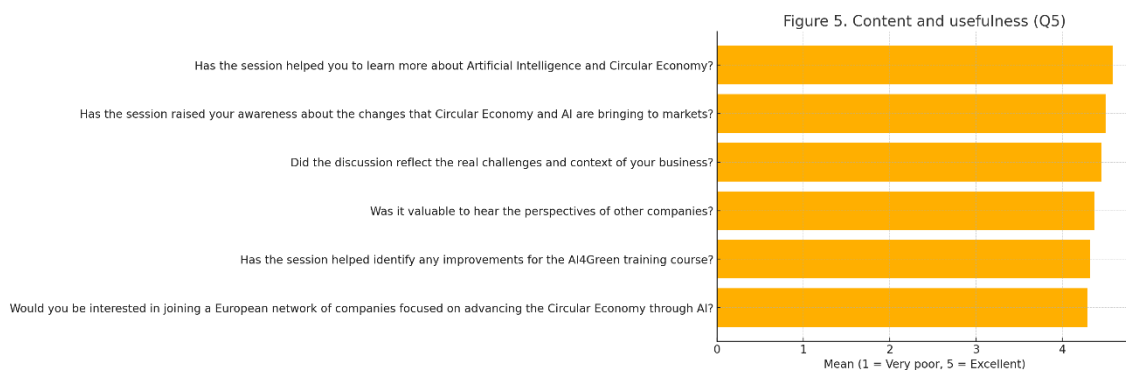
Annex 4 - Report on AI4GreenSME collaborative activities

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Introduction

The collaborative activities of the AI4GreenSME project form an essential part of the training process, complementing the theoretical learning of the course with practical and dynamic experience. These activities are designed to enable participants, mainly managers of small and medium-sized enterprises, to put into practice the knowledge acquired during the course.

Through interactive meetings, participants have the opportunity to exchange experiences and work together to solve specific challenges related to the circular economy and the implementation of AI-based solutions. The activities are structured according to the course topics, ranging from sustainable product design to the impact assessment of AI projects, and fostering collaborative work between companies from different sectors and countries.

This peer-learning approach reinforces the course content and promotes an environment in which participants can develop innovative solutions, enriched by the cultural and sectoral diversity of the companies involved.

The collaborative activities carried out are described below.

Activity 1: Introduction to the concept of the circular economy

- **Online** event**:** 19 May 2025, 10:00 AM
- **Organising countries**: Cyprus, Bulgaria
- **Participating companies from**: Cyprus, Bulgaria

Objective:

The objective of this activity was to introduce participants to the fundamentals of the circular economy, explaining how it differs from the linear economy and showing how circular principles can be applied to business models. Emphasis was placed on sustainability and the importance of maximising the use of resources.

The session was designed as a space to consolidate knowledge acquired during the course and as an opportunity to link sustainability concepts with technological tools such as artificial intelligence and the Life Cycle Analysis methodology.

Topics covered:

- **From a linear to a circular economy**: The traditional "take-make-dispose" model was presented and how it has a significant impact on natural resources and the environment. In contrast, the circular economy seeks to maintain the value of products, materials and resources for as long as possible through redesign, reuse, repair and recycling. The benefits were highlighted, not only environmental, but also economic and social.
- **Measurement tools**: life cycle assessment (LCA): It was highlighted that, although AI is essential for modelling and automating processes, LCA is the fundamental tool for quantifying environmental impacts at all stages of a product's life cycle, from raw material extraction to final disposal ("cradle to grave").
  The four phases of LCA were detailed:
    - Definition of objectives and scope
    - Life cycle inventory
    - Impact assessment
    - Interpretation of results

In addition, the combined use of AI and LCA was discussed as a means of improving accuracy, identifying impact "hot spots", avoiding the transfer of environmental burdens and facilitating circular design.

The European regulatory framework (ESRS, ISO 14040 and 14044) was also presented as a driver for mandatory sustainability reporting, which is currently aimed at large companies but will soon extend to SMEs.

Participants:

The participants came from various small and medium-sized enterprises that are transitioning to more sustainable business models. The activity was moderated by Ekaterina Nikolova, the event facilitator, and was accompanied by Andreas Angeli, an expert on the circular economy.

Registration list:

- Stelios Theocharous, Cyprus
- Stavroula Aggeli, Cyprus
- Andreas Angeli, Cyprus
- Pavlina Konstantopoulou, Cyprus
- Kalinka Tabakova, Bulgaria
- Daniela Ivanova, Bulgaria
- Ekaterina Nikolova, Bulgaria
- Maria Tsolova, Bulgaria
- Svetlana Georgieva, Bulgaria

Interaction and Feedback:

During the activity, participants were given the opportunity to share their experiences and reflect on the applications of the circular economy in their respective sectors. The importance of involving the entire value chain, from suppliers to consumers, in the transition to circular models was highlighted.

Ekaterina Nikolova asked participants what circular practices they were already implementing, which led to an interesting discussion about the barriers SMEs face when trying to integrate these models into their operations.

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Andreas Angeli facilitated an interactive exercise in which participants analysed cases of companies that had successfully implemented circular practices, allowing participants to visualise possible applications in their own businesses.

Conclusions:

Participants recognised the importance of education and ongoing training in the circular economy for SMEs, and mentioned that a lack of resources and knowledge was a significant barrier to adoption.

The meeting concluded with a clear reflection: although adopting a circular economy may seem complex, the first step for SMEs is to analyse how their products or services can have a second life or be integrated into other production processes.

Some key recommendations were:

- Start with small actions that introduce circularity (such as waste management, energy efficiency or material reuse).
- Incorporate tools such as LCA to make informed decisions and truly understand the environmental and social impact of the company.
- Take advantage of European institutional support, from financing to training, to facilitate the ecological transition.
- Prepare for sustainability reporting, which will be mandatory in the coming years even for small businesses, especially those that collaborate with large organisations or seek external financing.

Activity 2: Artificial Intelligence Literacy

- **Online event**: 30 May 2025, 12:00 - 14:00
- **Organising countries**: Greece, Bulgaria
- **Participating companies from**: Malta, Bulgaria, Greece

Objective:

This activity aimed to strengthen participants' artificial intelligence literacy by introducing key AI concepts, their applicability in SMEs, and criteria for responsible implementation.

Topics covered:

The session was led by Alexandros Tzoumas and Ekaterina Nikolova. Four main blocks were addressed:

- **Conceptual introduction to artificial intelligence**: The concept of AI was explained as an "umbrella" term encompassing different approaches and methodologies. Key elements were introduced, such as types of models, technological maturity and relevant European regulations, such as the AI Act and the General Data Protection Regulation (GDPR).
- **Criteria for selecting AI tools**: In a collaborative document, participants reflected on the key factors for choosing AI technologies, such as:
    - Specific business needs
    - Type and quality of available data
    - Level of human intervention required
    - Budget
    - Regulatory compliance and ease of integration

- **Interactive activity with the Thales robot**: A teaching tool developed by SciFY and NCSR Demokritos was used to teach an AI (the Thales robot) to differentiate between apples and oranges.

    Through attributes such as colour, weight and the presence of a stem, the concept of decision trees was introduced intuitively, along with how they enable a machine learning model to learn rules for classifying data.

- **Viewing of an explanatory video**: Part of the video "New Research Reveals How AI Thinks (It Doesn't)" was shown, which helped to demystify how current AI systems work and their cognitive limitations.

Participants:

This session was moderated by Alexandros Tzoumas and Ekaterina Nikolova, with experts such as Afroditi Darzenta and Toni Hristov participating. They gave a practical demonstration using SciFY's Thales tool, which teaches a robot to distinguish between apples and oranges using AI.

Registration list:

- Rachel Xuereb, Malta
- Alexandros Tzoumas, Greece
- George Fragkos, Greece
- Ekaterina Nikolova, Bulgaria
- Ivana Ivanova, Bulgaria
- Toni Hristov, Bulgaria
- Madlen Danailova, Bulgaria
- Panayotis Tselengkidis, Greece
- Vasilis Salapatas, Greece
- Afroditi Darzenta, Greece

Interaction and Feedback:

The activity generated active participation, especially during the demonstration with the Thales robot. Participants found this exercise particularly useful for visualising how AI makes decisions. It was rated as a very suitable resource for SMEs without specialised technical staff.

In addition, following the activity guide, attendees contributed ideas on how AI can be applied in their sectors.

In logistics and transport, the use of AI to plan efficient routes based on traffic, weather and fuel costs was mentioned.

Sectors such as sustainable tourism also reflected on flow prediction and energy optimisation.

The discussions also addressed ethical and technical aspects such as:

- The importance of context and quality data.
- The need to adopt mature and regulated tools.
- The recommendation to start with limited, scalable pilot projects.

Conclusions:

The conclusions point to the need to prepare SMEs for the informed and strategic use of AI, especially in the context of the green and digital transition. Some key recommendations were:

- Carefully evaluate tools before adopting them, considering both business value and regulatory compliance.
- Start with simple and understandable solutions, such as those using decision trees, which allow you to visualise and explain how AI works.
- Foster a culture of testing and learning, starting with low-risk experiments that allow for impact assessment before scaling up.
- Afroditi Darzenta highlighted the need for small businesses to understand the key criteria for assessing which AI tools are best suited to their needs, which sparked a discussion on the budgetary constraints of SMEs.
- Participation showed that this type of practical training is particularly useful for SMEs interested in incorporating emerging technologies without losing sight of their operational reality and resource constraints.

Activity 3: Applications of AI in the circular economy

- **Online event**: 30 May 2025, 12:00 AM
- **Organising countries**: Greece, Cyprus
- **Participating companies from**: Cyprus, Greece

Objective

The purpose of this meeting was to encourage collective, open and interdisciplinary reflection on how artificial intelligence can be applied to circular economy strategies within small and medium-sized enterprises. The aim was to generate concrete ideas, share good practices and explore the challenges faced by organisations seeking to become more sustainable through technology.

Topics covered:

An initial space was set aside for attendees to share their professional backgrounds and their connection to sustainability, AI or the circular economy. The profiles were very diverse, ranging from satellite engineering and hotel management to 3D printing, art and cultural activism. This diversity enriched the debate and allowed for the identification of cross-sector opportunities for AI application.

- **Assessment of knowledge level:** Through the chat, attendees rated their familiarity with the concepts of circular economy and artificial intelligence on a scale of 1 to 5. It was concluded that most were quite familiar with both topics, which allowed for a more applied dialogue.
- **Proposed application scenario:** Participants were invited to imagine that their company or organisation wanted to become a leader in sustainability through an AI-supported circular economy strategy. Based on this premise, questions were raised about:
  - Optimising product design to facilitate repair or recycling.
  - Failure prevention through predictive analytics.
  - Improving reverse logistics.
  - Classification of reusable materials.
- **Real challenges shared by participants:** Specific cases were presented in which AI could be applied for circular purposes:
  - In construction: waste control and detection of illegal dumping.
  - In hospitality: wastewater treatment and recycling for irrigation.

- In photography/videography: management of technological waste such as SD cards and hard drives.
- In music: exploration of technological solutions that reduce the use of physical sound equipment.
- **Ethics, collaboration and sustainability of AI itself:** Discussions arose on the ethical dilemmas of AI, its energy footprint and the need to use it responsibly. There was also discussion on how AI-based tools could facilitate collaboration between SMEs, especially if promoted by public bodies or through shared solutions.

Participants:

Harris Angeli and George Fragkos moderated the discussions. It was particularly rich in professional and cultural diversity. Representatives from sectors such as construction, hospitality, aerospace engineering, 3D printing, culture, music, education and technology participated, as well as non-profit organisations focused on sustainability and community development.

Registration list:

- Pavlina Konstantopoulou, Cyprus
- Giannos Hadjiloizou, Cyprus
- George Armaos, Cyprus
- Harris Angeli, Cyprus
- Ioannis Koutoudis, Greece
- George Fragkos, Greece
- Nikolaos Kazantzidis, Greece
- Chariton Zacharioudakis, Greece

Interaction and Feedback:

During the activity, participants were invited to identify areas within their own businesses where they could apply AI solutions. This allowed participants to share concrete examples of recycling in their companies.

The open questions and proposed scenarios generated a rich discussion, in which participants shared ideas, concerns and solutions. Both technical aspects and social dilemmas were addressed, such as the role of AI in healthcare, equity in access to technology and the limits of sustainable growth.

Several attendees emphasised that circularity cannot depend on one company alone, but must be addressed collectively throughout the entire value chain. It was also highlighted that young people, particularly in sectors such as tourism, are demanding more sustainable practices, which could become a driver for change.

Conclusions:

Several key ideas and useful recommendations for other small businesses emerged from the discussion:

- **AI can act as a diagnostic and optimisation tool**, whether to control waste, improve designs, anticipate failures or reduce dependence on polluting materials.
- **The biggest challenge is systemic integration**: if suppliers or customers do not apply circular principles, it is difficult to achieve full circularity. However, this does not exempt anyone from responsibility: acting locally can create pressure and inspiring examples.
- **Responsible use of AI also involves assessing its energy footprint**, especially when information is stored or transmitted in the cloud. SMEs need to be aware of the environmental impact of their digital decisions.
- **Collaboration between SMEs is essential**: it was suggested that the impetus for sharing AI-based solutions should come from the public sector or from common platforms that reduce costs and technical barriers.

Activity 4: Ethical and social implications of AI

- **Online event**: 21 May 2025, 10:00 AM
- **Organising countries**: Cyprus, Malta
- **Participating companies from**: Cyprus, Malta

Objective:

This session aimed to encourage reflection on the ethical and social implications of using artificial intelligence (AI) in the daily operations of green small and medium-sized enterprises.

Through the analysis of a hypothetical scenario, challenges such as fairness, data privacy, social inclusion, potential job displacement, and the need to ensure collective benefits, especially for traditionally disadvantaged groups, were explored.

Topics covered:

The discussion revolved around a case study: a green SME implements an AI system to optimise energy consumption in local homes and businesses. Although the system promises efficiency and sustainability, it raises concerns about data privacy, opaque automated decisions and negative effects on employment.

Based on this scenario, four key areas were addressed:

1. **Equity and inclusion:** The importance of including vulnerable groups (low-income households, rural communities, minorities) from the initial stages of system design was highlighted to prevent AI from exacerbating existing inequalities.
2. **Privacy and data protection:** It was suggested that diverse and contextualised databases (based on energy consumption patterns and social characteristics) be used and that audit systems be established to prevent bias or misuse of information.
3. **Job displacement:** The impact that automation may have on traditional jobs in the energy sector was discussed. It was proposed to promote the upskilling of workers and other key actors to manage the transition fairly.

4. **Social responsibility:** It was recommended that accountability mechanisms be established, such as regular audits and the publication of public reports on the functioning of the AI system, both at the technical and social levels.

Participants:

The activity was moderated by Jasmine Cassar from the Malta Business Bureau. All participants shared their perspectives from the different sectors in which they work, such as the hotel sector, the cultural sector, and the technology sector.

Registration list:

- Efi Georgiou, Cyprus
- Antonis Christodoulou, Cyprus
- Begum Chakmak, Cyprus
- Jasmine Cassar, Malta
- Niki Nikolaidou, Cyprus
- Anna Hadjiloizou, Cyprus

Interaction and Feedback:

Attendees contributed practical and conceptual ideas that helped deepen the discussion on the challenges of implementing technological solutions in real-world environments. Notable contributions included:

- The idea of adding explicit ethical and social criteria to the prompts used to train and use AI, including terms such as diversity, equity, and accessibility.
- The need to include the voice of affected communities from the design stage of the system in order to anticipate barriers to access or potential harm.
- The observation that, in the absence of clear regulation, it may be useful to establish sectoral consensus or good practices promoted by actors committed to social impact.
- The difficulties of finding a balance between technological efficiency and social justice were also mentioned, but it was agreed that this type of reflection should be an integral part of any AI-based strategy.

Conclusions:

Several key recommendations for SMEs seeking to incorporate AI into their operations with sustainability criteria emerged from this session:

- **Involve all affected stakeholders from the outset**, especially the most vulnerable, to design accessible and socially just solutions.
- **Establish transparency mechanisms**, such as bias audits and publication of results, to build trust in the use of AI.
- **Encourage cross-sector collaboration** with ethics experts, local communities and public actors to build more balanced solutions.
- **Do not underestimate the indirect effects of AI**, such as possible digital exclusion or the automation of sensitive decisions, and develop strategies to mitigate them from a preventive perspective.

Activity 5: Data for AI in the circular economy

- **Online event**: 20 May 2025, 10:00 AM
- **Organising countries**: Malta, Spain
- **Participating companies from**: Malta, Cyprus, Spain

Objective:

This activity explored the fundamental role of data in the successful implementation of AI projects within the context of the circular economy. The focus was on how to manage data to optimise resource efficiency and reduce waste.

Topics covered:

The session was structured around a realistic scenario: a green SME wants to develop an AI tool to manage waste in manufacturing industries. However, the available data is fragmented, incomplete and non-standardised.

Participants were asked to address this challenge while respecting the FAIR principles (Findable, Accessible, Interoperable, Reusable), i.e. ensuring that data is locatable, accessible, interoperable and reusable.

Based on this case, the following key issues were discussed:

- **Priority data sources:** Participants agreed that each company should identify key material flows within its own life cycle, including inputs, processes, outputs and waste. The difficulty of collecting data not only internally but also throughout the supply chain was highlighted. Some emphasised the need to progressively scale up data systems as the company grows.
- **FAIR principles and data governance:** The importance of complying with national and international data protection regulations (such as the GDPR) was discussed. The challenge of achieving interoperability between different systems and the need to design AI in a way that minimises human error and increases consistency in the use of information were also addressed. It was emphasised that ethical responsibility also lies with those who design the algorithms.
- **AI tools for incomplete data:** Techniques such as predictive analytics, machine learning models and neural networks were mentioned, which can identify patterns

in incomplete data and help optimise resource use and reduce waste. Examples were given of how AI can automatically adjust prices according to the market value of raw materials (such as gold in jewellery) or improve product design to reduce material losses from the prototyping stage.

- **Common challenges in data management in SMEs:** Several participants agreed that many SMEs still do not know what data to collect or how to extract value from it. In addition, it was noted that data collection requires investment, whether in hardware or human capital, which represents a significant initial barrier. It was suggested that public funding programmes could help overcome this obstacle.

Participants:

Michele Agius from the Malta Business Bureau moderated the session, with support from Stephen Bezzina. Attendees shared their experiences in data management to optimise business processes.

Registration list:

- Stephen Bezzina, Malta
- Stephanie Miguel, Spain
- Kimonas Angeli, Cyprus
- Michele Agius, Malta
- Mario Arribas, Spain
- David Pérez, Spain

Interaction and Feedback:

In an interactive exercise, participants analysed what types of data were essential for their companies and how they could be effectively implemented to support the transition to a circular economy.

Participants shared concrete experiences of partial AI implementation in their companies (especially in marketing, design and materials control), as well as the difficulties in connecting existing data with the requirements of an intelligent system. Cases illustrating ethical risks were also discussed, such as the use of customer data without consent for marketing campaigns, which led to reflection on regulatory compliance and transparency.

David Pérez highlighted the need for robust data infrastructure to ensure that AI systems can operate effectively. It was agreed that many SMEs face challenges due to a lack of adequate technological infrastructure.

The representative from Kimonas Jewellery shared that his company is beginning to use IoT sensors to collect real-time data on process efficiency, enabling continuous improvement.

Conclusions:

Several key recommendations emerged from the presentations:

- **Start by identifying the most relevant data flows** within the company, without trying to cover everything from the outset.
- **Adopt a phased strategy**, periodically reviewing whether AI remains aligned with the growth and complexity of the company.
- **Promote interoperability between tools**, especially when moving towards industrial symbiosis or networked circular economy models.
- **Seek training and technical assistance** to understand which data is relevant from a sustainability perspective.
- **Evaluate public funding options** to acquire the necessary infrastructure and reduce the digital divide.

It was emphasised that AI, when properly implemented, can democratise access to analysis and sustainability tools that were previously only available to large companies.

Participants agreed that proper data management is key to the success of AI projects in the circular economy. It was suggested that companies should start investing in the data infrastructure needed to collect and manage data effectively, ensuring that it is accessible, interoperable and reusable.

Regarding the project's online course, several participants noted that, although some modules were demanding, they offered an appropriate balance between theory and practice.

Activity 6: AI-driven product design and innovation

- **Online event**: 5 June 2025, 10:00 AM
- **Organising countries**: Greece, Spain
- **Participating companies from**: Greece, Spain

Objective:

The session aimed to discuss the incorporation of artificial intelligence tools in the design and innovation of sustainable products, aligned with the principles of the circular economy. The aim was to promote a practical, collaborative and case-based approach that demonstrated how AI can contribute to both the creative and operational phases of product development.

Topics covered:

During the session, various aspects of AI-assisted product design were addressed:

- **Introduction to AI tools for design and validation:** The evolution of tools such as ChatGPT, Gemini, Claude and DeepSeek was presented, along with their ability to generate ideas, conduct regulatory research, analyse images and even assist in complex processes such as material selection, regulatory compliance and eco-friendly design.
- **Innovation guided by circular economy principles:** Ways to integrate criteria such as waste elimination, nature regeneration and material recirculation from the conceptual phase of the product were explored. Current AI can help evaluate sustainable materials, simulate environmental impact scenarios, or identify suppliers that meet ecological standards.
- **AI-assisted interdisciplinary collaboration:** Discussions focused on how AI tools can facilitate coordination between different profiles (engineers, designers, salespeople) through automatic transcription of meetings, organisation of ideas, and generation of action plans from unstructured documents.
- **Predictive analysis and impact assessment:** Cases were presented in which AI makes it possible to anticipate the environmental impact of products and services, helping companies to make better-informed strategic decisions. In particular, it

was explained how models can be trained with previous actions and their results to assign automated impact scores.

- **Product-as-a-service (PaaS) models:** The implications of circular business models in which the product is not sold but rented or shared were discussed. AI can help calculate costs, penalties for damage, useful life estimates, and maintenance or reuse decisions.
- **Potential of multimodal AI:** The emerging ability of models to work with visual or audio inputs in addition to text was highlighted, such as analysing videos of industrial processes to detect improvements or errors, or even generating personalised podcasts from corporate presentations.

Participants:

Anastasis Stamatis and Jordi Linares Pellicer participated in this activity, introducing case studies on the use of AI in sustainable product design. The diversity of profiles facilitated a rich discussion of practical experiences, training concerns, and realistic expectations for application.

Registration list:

- Jordi Linares Pellicer, Spain
- Elena Arenas, Spain
- George Fragkos, Greece
- Anastasis Stamatis, Greece
- Nieves Verdejo, Spain
- Kalliopi Bezadakou, Greece
- Aspasia Kotsouli, Greece

Interaction and Feedback:

Educational, business and personal experiences were shared on how AI has been used to design products, optimise packaging, carry out research tasks and improve collaborative processes. Notable cases included the use of AI to develop an educational app, calculate the chemical composition of cosmetic products and investigate sustainable packaging solutions.

One of the most recurring themes was the need to provide the right context to the AI model in order to obtain relevant answers. The importance of asking for justifications, reasoning decisions and delegating to the model the ability to identify what information it needs to help was highlighted. This approach empowers non-expert users to use advanced tools effectively.

Maria Cano presented a case study from her company where they are using AI to optimise textile product design, minimising waste and maximising material reuse.

Anastasis Stamatis highlighted the use of generative AI as a valuable tool for creating innovative solutions that are not only economically efficient but also sustainable and adaptable to circular models.

Conclusions:

It was highlighted that AI offers great potential for innovation in sustainable product design, but that companies must be willing to adopt new working methodologies to integrate circularity from the earliest stages of the design process. Several key recommendations emerged from the presentations:

- **Explore AI through small use cases:** it is not about transforming the company overnight, but about experimenting with specific challenges (design, marketing, maintenance, material selection).
- **Build curious teams:** surrounding yourself with people who are willing to explore new tools, even if they are not technical, can be more valuable than having only highly specialised profiles.
- **Take advantage of the SME advantage:** flexibility and less structural rigidity allow small businesses to adapt more quickly to technological changes.
- **Don't stick with ChatGPT:** there are alternatives such as DeepSeek, Gemini or NotebookLM that may be more suitable for certain tasks (such as video analysis, reasoning, application generation).
- **Ask AI for explanations:** beyond obtaining answers, asking it to explain its reasoning improves the validation of results and team learning.

It was emphasised that the potential of AI lies not only in the final product, but also in the processes that lead to it, and that this approach should be gradually integrated into the corporate culture.

Activity 7: Circular business models and market opportunities

- **Online event**: 27 May 2025, 10:00 AM
- **Organising countries**: Spain, Cyprus
- **Participating companies from**: Spain, Cyprus

Objective:

This activity focused on exploring how small and medium-sized enterprises can leverage circular business models to generate value through sustainability and innovation. Different approaches and tools based on artificial intelligence (AI) that can facilitate the transition to circular models were discussed.

Topics covered:

The dynamics focused on a scenario in which a furniture company with local and ecological production policies wishes to move towards deeper circularity. Based on this case, the debate was structured into three blocks:

- **Design for circularity.** The discussion explored how AI can:
    - Facilitate modular, repairable and durable design.
    - Optimise material selection from an environmental and end-of-life perspective.
    - Identify opportunities to introduce models such as "furniture as a service".

    Tools such as the following were mentioned:

    - **Generative AI** to reduce waste in design processes.
    - AI-assisted **life cycle assessment (LCA)**.
    - **Internet of Things (IoT)** for traceability.
    - Platforms such as **ChatGPT** and **Napkin** to generate ideas or visualise business models.

- **Extending product life cycles.** This section addressed the use of AI in:
    - Damage diagnosis through visual recognition.
    - Intelligent assistance to guide customers through repairs.

- Identification and recommendation of compatible spare parts.
- Use of **blockchain** to track components and materials.

Participants emphasised that initial design is key to ensuring durability and reusability, and that understanding consumer usage patterns is essential to guide predictive maintenance and customised repairs.

- **End of life and systemic collaboration.** Reflections were made on:
  - The role of AI in reverse logistics and material recovery platforms.
  - Use of spectrometry and AI to identify valuable materials in obsolete products.
  - Designing smart marketplaces to facilitate the reuse or redistribution of parts or products, both new and second-hand.
  - Possibilities for collaboration between sectors through AI to manage material flows between industries (e.g. construction and art).

The concept of **cascading use** was addressed with examples of creative and AI-assisted reuse to connect sectors that do not traditionally cooperate.

Participants:

Moderated by Rosa Esteban, participants shared their experiences of how their companies are beginning to adopt circular economy principles.

Registration list:

- Efi Hadjigeorgiou, Cyprus
- Anthi Gavriel, Cyprus
- Rosa Esteban, Spain
- Esther Illueca, Spain
- Constantinos Philippides, Cyprus
- Maria Cano, Spain
- Mayra LaCruz, Spain

Interaction and Feedback:

The session was highly participatory and supported by the collaborative tool **Miro** to gather ideas and systematise the dialogue. Discussions in breakout rooms alternated with sharing in the main group, allowing contributions from all attendees to be collected.

Among the most notable contributions were:

- Interest in tools that offer **visual or automatic recommendations** based on usage data.
- The need to advance knowledge of platforms beyond ChatGPT.
- The value of design as a key phase in ensuring circularity.
- The role of **AI as a mediator between sectors** to facilitate reuse and industrial symbiosis.

Esther Illueca discussed how her cooking school has begun to integrate the circular economy into its training projects, focusing on reducing food waste and optimising the use of resources within the facilities.

Mayra La Cruz presented how Texlimca is implementing textile recycling through a circular model and highlighted the importance of innovative technologies to process recycled materials more efficiently.

Conclusions:

It was concluded that, although SMEs may face initial challenges when implementing circular models, there are numerous opportunities for innovation and long-term efficiency. Continued education on how to apply these models, supported by AI tools, is crucial to overcoming barriers and maximising both economic and environmental benefits. Several key recommendations emerged from the presentations:

- **Incorporating AI from the design phase** allows for the anticipation of impacts and increased product durability.
- **Combining AI and IoT** facilitates product usage tracking and anticipation of repair or upgrade needs.
- **SMEs can lead collaborative ecosystems** by adopting reverse logistics or shared reuse platforms.
- **Exploring** AI-supported **models such as "product as a service"** (leasing, return, repair) can open up new sources of revenue.
- Artificial intelligence can act as **a bridge between sectors**, enabling the reuse of materials between different industries and facilitating new market opportunities.

Activity 8: Regulatory and policy considerations

- **Online event**: 21 May 2025, 10:00 AM
- **Organising countries**: Bulgaria, Spain
- **Participating companies from**: Bulgaria, Spain

Objective:

The purpose of this session was to provide participating SMEs with a clear understanding of the most relevant European regulatory frameworks in the areas of artificial intelligence, sustainability and the circular economy. Through a presentation and a practical reflection activity, the aim was for companies to assess their level of compliance and prepare their data systems for future legal obligations and technological opportunities.

Topics covered:

- **European regulatory landscape and levels of enforceability:** A classification of the different types of legislative documents in the European Union was presented, ranging from non-binding (communications, recommendations, opinions, resolutions) to binding (decisions, directives and regulations). The importance of distinguishing between these categories was emphasised in order to anticipate legal implications and adapt business strategies.

- **Key regulations for SMEs using AI and working on sustainability:** Several legislative texts and their potential impact were discussed:

    - **AI Act (Artificial Intelligence Regulation, in force since June 2024):** Introduces a risk-based approach. AI systems with unacceptable risk (such as those used for social scoring or manipulation) are prohibited, while those with high risk are subject to strict obligations.
    - **Digital Services Act (DSA):** Promotes a safe and ethical digital environment, combating illegal content and disinformation. It applies in particular to platforms and services that use AI to disseminate information.
    - **General Data Protection Regulation (GDPR):** Of particular relevance when integrating AI into operations that use personal or sensitive data, imposing obligations on transparency, security and consent.

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- **Key environmental policies:** The European Climate Law, the Fit for 55 package, the REACH framework on chemicals, and the new Ecodesign Regulation and Digital Product Passports were discussed. The role of **EFRAG** in standardising sustainability reporting, including future guidelines for SMEs, was highlighted.

- **Digital product passports and traceability:** The emerging concept of **digital product passports** was presented as a tool to improve the circularity, repair and dismantling of goods. This passport will include data on origin, composition, recycling options and repair methods.

Participants:

The session was facilitated by Ekaterina Nikolova, representative of Vratsa CCI.
Registration list:

- Albena Angelova, Bulgaria
- Karolina Georgieva, Bulgaria
- Ekaterina Nikolova, Bulgaria
- Arayik Grigoryan, Spain
- Jose Carlos Ferrer, Spain
- Emili Ilieva, Bulgaria
- Rafael Miranda, Spain

Interaction and Feedback:

Following the presentation, a practical reflection activity was proposed on the current data management in each company, especially those linked to automatic operations and AI systems. Participants were asked to assess:

- What data they collect.
- Its level of sensitivity.
- What protection measures they use.
- Whether it is currently integrated into AI systems.

Participants shared diverse realities:

Rafael Miranda mentioned that his clients are increasingly interested in certifying GDPR compliance through standards such as ISO/IEC 27701.

Jose Carlos Ferrer acknowledged that he does not currently use AI, but sees potential in automating the reading of regulatory texts and news to save time.

Emili Ilieva, from a small business, described the use of basic data for inventory management and customer service, without great sensitivity, but with an awareness of the value of protecting it.

It was concluded that many SMEs still lack specific protection systems, delegating this responsibility to third-party platforms. However, there was interest in improving data governance practices with a view to incorporating AI.

Conclusions:

- Understanding the levels of regulatory requirements helps prioritise what to adapt now and what to monitor for the future.
- Preparing for the AI Act involves understanding whether your AI system would be considered high risk and what measures would be necessary (registration, documentation, audits).
- Assess the use of sensitive data, not only by customers, but also by suppliers or indirect users.
- Adopting voluntary best practices now can make it easier to adapt when certain rules become mandatory.
- Leveraging AI tools for regulatory analysis, especially in sustainability and corporate reporting, can reduce costs and time for small consultancies or in-house technicians.

Activity 9: Building the AI4CE roadmap

- **Online event**: 6 June 2025, 10:00 AM
- **Organising countries**: Greece, Malta
- **Participating companies from**: Spain, Malta, Greece

Objective:

The purpose of this activity was to help participants build a strategic roadmap for integrating AI into their circular business models. This activity aimed to translate the knowledge acquired throughout the course into a customisable, practical action plan tailored to each company's level of digital and circular maturity.

Topics covered:

The meeting focused on breaking down the five fundamental steps that make up the AI4CE Roadmap:

- **Initial diagnosis**: Assessment of the company's digital and circular maturity, mapping of internal processes and workflows to identify bottlenecks or inefficiencies.
- **Identification of opportunities**: Detection of processes where AI can add value, especially in combination with circular actions such as reducing emissions or improving eco-design.
- **Problem definition and technological capabilities**: Precise definition of the challenge to be solved and appropriate selection of technological tools, including AI if relevant.
- **Implementation planning**: Formulation of SMART (specific, measurable, achievable, relevant and time-bound) goals linked to the company's strategic vision.
- **Execution, monitoring and continuous improvement**: Phased implementation, assignment of responsibilities, monitoring of both financial and non-financial KPIs (customer and employee satisfaction), evaluation of results and review of the plan.

Real-life examples of the use of AI in the circular economy were also presented, such as:

- Intelligent waste sorting with computer vision.
- Predictive maintenance.
- Circular product design with generative design tools.

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- Energy consumption optimisation through smart management systems.
- Predictive models to prevent food or material waste.

Participants:

Moderated by Gabriel Cassar and Fotis Papastarguiou, the activity featured entrepreneurs who shared their views on how to structure the transition to circularity.

Registration list:

- Gabriel Cassar, Malta
- Owen Bell, Malta
- Chris Bonello, Malta
- George Fragkos, Greece
- Fotis Papastergiou, Greece
- Esther Illueca, Spain
- Anton Cassar, Malta
- Ralph Grima, Malta
- Lisa Urpani, Malta
- Eliza Panagiotidou, Greece

Interaction and Feedback:

The interaction was dynamic and rich in practical contributions. Chris Bonallo's participation stood out, as he shared findings from his master's research on barriers to the implementation of sustainable technologies in the hotel sector. Obstacles such as the following were discussed:

- The disproportionate weight given to return on investment (ROI) when it comes to sustainability.
- Resistance to change on the part of staff, especially in seasonal structures.
- Lack of knowledge or difficulty in accessing subsidies.

The role of collaborative platforms, innovation hubs and training as a way to overcome these barriers was highlighted.

Fotis stressed the importance of starting AI projects with internal training sessions to promote alignment and identify opportunities. Good practices were also shared, such as before/after impact studies with IoT sensors to demonstrate the effectiveness of sustainable solutions.

Lisa Urbani stressed that integrating AI into her company would require a clear strategy for training and continuing education.

Conclusions:

It was concluded that SMEs should build their roadmap step by step, ensuring that each phase is aligned with business objectives and sustainability standards. Commitment from business leaders and ongoing training were identified as key factors for a successful transition. Other recommendations that emerged from the interventions were:

- **Start small**: Prioritise pilot projects to reduce risks and build internal confidence.
- **Involve employees**: Solutions that prioritise improving working conditions (e.g. by eliminating tedious tasks) are more successful than those focused solely on cutting costs.
- **Design the roadmap as a living document**: Adapt it as new developments in AI emerge or internal opportunities are identified.
- **Collaborate with hubs and networks**: European Digital Innovation Hubs offer technical support and, in some cases, cover the costs of pilots without excessive bureaucracy.
- **Monitor results beyond the financial**: Consider environmental and human impact as indicators of success.
- **Seek support from initiatives such as the Enterprise Europe Network**, which offer free advice on European grants and funding opportunities.

Activity 10: Evaluation of AI4Green projects

- **Online event**: 20 May 2025, 10:00 AM
- **Organising countries**: Malta, Bulgaria
- **Participating companies from**: Malta, Bulgaria

Objective

The purpose of this session was to provide participants with a practical framework for evaluating artificial intelligence initiatives applied to sustainability and the circular economy, focusing on their environmental, social, economic and ethical impact. The activity was designed as a training space with a direct application approach.

Topics covered:

The session revolved around the analysis of AI projects from a comprehensive sustainability perspective, addressing the following key aspects:

- **Evaluation dimensions.** A framework with four main dimensions was established to evaluate an AI4Green project:
    - o **Environmental:** emissions reduction, resource savings, energy efficiency, waste diversion.
    - o **Economic:** return on investment (ROI), net present value (NPV), payback period.
    - o **Social:** job creation, local training, inclusion of communities in transition to green economies.
    - o **Governance:** transparency, fairness, traceability of algorithmic decisions.
- **Alignment with global standards.** The importance of integrating metrics that are aligned with the following was highlighted:
    - o **SDGs (Sustainable Development Goals).**
    - o **ISO 14001 (environmental management).**
    - o **Other sustainability** benchmarking frameworks.
- **Technical evaluation methodology.** It was proposed to evaluate the performance of the AI system through:
    - o Accuracy and speed in data processing.
    - o System energy consumption.

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- o Balance between technical performance and sustainability (use of efficient algorithms, green computing).
- **Real impact and scalability.** Evaluation also in terms of:
  - o Tangible results in the real world (e.g. new jobs in AI maintenance, reduction in municipal costs).
  - o Scalability of the model to new environments.
  - o Ability to generate transparent reports that reinforce the trust of the community and stakeholders.

Participants:

The moderator was Svetlana Borisova, who was accompanied by Gabriel Cassar from the Malta Business Bureau.

Registration list:

- Amber Keurntjes, Malta
- Petya Tosheva, Bulgaria
- Svetlana Borisova, Bulgaria
- Gabriel Cassar, Malta
- Milen Genchev, Bulgaria
- Gloria Gocheva, Bulgaria
- Arianne Cutajar, Malta
- Cynthia McCormick, Malta

Interaction and Feedback:

Although the session was mainly informative, participants were encouraged to share their experiences, ask questions, and reflect on their own level of progress in using AI.

Svetlana and Gabriel expressly encouraged participants not to limit themselves to Module 10, but to explore all the lessons in the course, which are available free of charge online.

The training was presented as a practical and modular tool that can generate strategic and operational value in any SME committed to the green and digital transition. It was emphasised that the course offers applicable knowledge that can be translated into real competitive advantages.

Conclusions:

The importance of evaluating AI projects using a multidimensional approach that considers both the benefits and costs associated with AI implementation was highlighted to ensure that projects are not only technologically viable but also socially and environmentally responsible. Specifically, the following was recommended:

- **Applying a multidimensional evaluation approach:** not limiting oneself to technical or economic indicators, but integrating social and governance criteria.
- **Use recognised benchmarking frameworks:** such as the SDGs or ISO standards, to ensure the comparability and validity of the project's impact.
- **Prioritise transparency:** ensuring that AI models explain their decisions and that the data used is traceable and ethically managed.
- **Start with pilot assessment scenarios:** to validate hypotheses, identify improvements and scale up progressively.
- **Adopt impact analysis tools before scaling up**: such as real-time environmental and social KPI monitoring systems.

Final conclusions

The collaborative activities of AI4GreenSMEs provided a comprehensive approach to how artificial intelligence can be a key tool for driving the circular economy within small and medium-sized enterprises. The following main conclusions were drawn from the participants' contributions:

1. Artificial intelligence is a key enabler for the circular economy

Throughout the sessions, it became clear that AI can play a strategic role in multiple areas: from sustainable product design, maintenance prediction, material analysis, flow traceability and the development of circular business models, to regulatory compliance and cross-sector collaboration. AI does not replace circular strategy, but rather enhances it when applied with purpose and judgement.

2. SMEs can adopt AI, but they need support

Although many SMEs expressed interest and some familiarity with AI and circularity concepts, common barriers remain: limited internal training, scarce resources, difficulty in identifying opportunities and lack of confidence. The activities showed that even companies without specialised technical staff can get started if they are offered accessible guidance, practical training and applicable examples.

3. The ethical and social dimension is as important as the technical dimension

The project integrated constant reflection on equity, inclusion, data protection, algorithmic transparency and the impact on employment. It was concluded that an effective AI4Green strategy cannot focus solely on efficiency, but must also consider the effects on people, communities and territories.

4. The course and activities provided a practical, structured and adaptable framework

Participants appreciated the applied approach of the course and activities, organised in progressive levels: literacy, case exploration, regulatory framework, roadmap design, and impact assessment. This sequence facilitated knowledge appropriation by diverse profiles and enabled progress towards action, not just theoretical understanding.

5. Cross-sector and transnational collaboration adds great value

The European and multidisciplinary nature of the project brought together experiences from sectors such as tourism, culture, construction, education, fashion and technology. This enriched the discussions, inspired unexpected connections and showed that the circular economy and AI are not the exclusive domain of highly technified industries.

Recommendations for the future:

The collaborative activities provided a valuable platform for SMEs to understand the potential of artificial intelligence to move towards a more circular and sustainable economy. With the right tools and ongoing commitment, small and medium-sized enterprises can be key players in the transformation towards a greener and more efficient future.

Their future in this regard depends largely on their ability to adapt quickly to technological and sustainability advances. For SMEs to achieve an effective transition to more circular and digital models, it is crucial to follow certain recommendations that will enable them to maximise opportunities and overcome the challenges associated with integrating these technologies. Below are specific and detailed proposals that will guide SMEs on their path towards a more sustainable and digitally advanced future, and which also represent areas where SMEs will require support and services:

1. Invest in continuous training and technological updating

The rapid evolution of technology and the constant improvement of AI-based tools and the circular economy make continuous training an essential aspect of SME development.

Updating will enable business managers to keep abreast of the latest developments, ensuring that their businesses can take advantage of new opportunities without being left behind.

Proposals:

- *Periodically review and update AI and circular economy training content, incorporating the latest technological innovations, regulations and best practices in the sector.*
- *Offer regular micro-courses and webinars to enable SMEs to keep up to date with emerging technologies, such as explainable AI or the latest trends in waste management.*
- *Encourage the creation of personalised learning programmes, where SMEs can choose which skills or technologies they need to improve according to their specific needs.*

2. Foster a culture of open innovation and collaboration

SMEs will benefit greatly from collaboration with other companies, academic institutions and subject matter experts.

Open innovation is key to accelerating the adoption of AI in the circular economy, as it allows ideas and resources to be shared and complex problems to be solved jointly.

Proposals:

- *Create collaboration networks between companies from different sectors and regions, facilitating the exchange of experiences and the joint development of innovative solutions.*
- *Promote the co-creation of projects between SMEs and large technology companies for the development of specific solutions that favour the circular economy in specific sectors.*
- *Establish collaborative platforms where SMEs can connect with experts in AI and the circular economy and receive guidance on how to apply best technological practices in their operations.*

3. Start with pilot projects and scale them up progressively

It is recommended that SMEs start with small pilot projects to assess the feasibility of AI in their operations.

These projects should be designed to be scalable, so that companies can gradually increase their use of these technologies as they gain experience.

Proposals:

- *Implement AI pilot projects that address specific areas of the circular economy, such as waste management, supply chain optimisation or modular product design.*
- *Develop a scalability plan that allows companies to expand their AI projects once the initial results are positive, ensuring a gradual and risk-free transition.*

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- *Create incubation and acceleration programmes to support SMEs in the initial phase of AI adoption, providing technical and financial resources.*

4. Improve data infrastructure and information gathering

Data management is crucial to the effectiveness of AI, as the quality of the data used directly influences the ability of AI systems to optimise processes.

SMEs should work to improve their data infrastructure to ensure they are able to collect, manage and use data efficiently.

Proposals:

- *Develop robust data infrastructures that enable real-time collection of information on resource use, emissions, waste generated, etc.*
- *Implement open data management systems that enable data interoperability between different platforms and sectors, facilitating collaboration and large-scale data analysis.*
- *Ensure that data is aligned with FAIR principles (Findable, Accessible, Interoperable, Reusable) to guarantee its efficient use in AI and circular economy projects.*

5. Ensure the active participation of employees in the digital transition

The adoption of AI must be accompanied by an organisational culture that promotes the active participation of all levels of the company.

Employees must be well trained in new technologies and understand how they can benefit from their implementation.

Proposals:

- *Involve employees in the AI implementation process, ensuring that they understand the benefits and purpose of the technologies being adopted.*
- *Train employees in the skills needed to manage AI tools, such as data analysis or the development of AI solutions in the context of the circular economy.*

- *Foster a work environment where employees can propose innovative ideas and play an active role in optimising processes through AI.*

6. Measure the environmental and social impact of AI solutions

It is essential that SMEs continuously assess the social and environmental impact of the AI solutions they implement, ensuring that they contribute positively to sustainability and the circular economy.

Proposals:

- *Implement an impact assessment system to measure the environmental benefits of AI, such as waste reduction, energy optimisation and CO2 emissions reduction.*
- *Develop social metrics to measure the impact on the community, including job creation and improved working conditions through the implementation of more efficient technologies.*
- *Align impact metrics with global standards such as the Sustainable Development Goals (SDGs) to ensure that SMEs are not only competitive but also socially responsible.*

7. Promote access to financing for the green transition

Financing remains one of the biggest obstacles for many SMEs when trying to adopt new technologies such as AI. Accessible financing policies must be implemented to enable companies to invest in digitalisation and sustainability without taking on excessive financial risks.

Proposals:

- *Facilitate access to European funds or local grants that support SMEs in adopting green and digital technologies.*

- *Promote the creation of specific investment funds for sustainable innovation, financing AI projects aimed at optimising resources and reducing environmental impact.*
- *Establish public-private partnerships to financially support SMEs in their transition to circular and digital models.*

In conclusion, the future of SMEs in the circular economy and artificial intelligence will be marked by their ability to adapt quickly to technological advances, integrate new tools in a gradual and scalable manner, and foster a culture of collaboration and innovation.

Continuous training, access to finance and the development of adequate infrastructure will be key factors in ensuring that SMEs can maximise the opportunities offered by AI and achieve a successful transition to a more sustainable and digitally advanced business model.