Co-funded by the European Union

DesignSmart

MODULE 5

Decision-making using Artificial Intelligence and Data Analytics in Sustainable Fashion



Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

CONTENTS

Lesson Plan 3
Pre-evaluation 8
Use of AI in fashion and sustainability 8
Data collection, management, and interpretation for sustainable decision-making 10
Data-driven design and environmental metrics 12
AI tools in the fashion industry: pattern generation, forecasting, traceability 13
Ethical considerations in using AI (bias, data privacy, intellectual property) 14
Case Study 16
Best Practice 19
Practical Activity 1 21
Practical Activity 2 22
Assessment Tools 24
References and Trainer Preparation 26
Annexes 27
1 - Dataset: Material Comparison 27
2 - Lifecycle Mapping Template 27

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

Lesson Plan

Module purpose: This module equips VET providers and trainers to deliver practical learning on how accessible AI and data tools can support sustainable fashion decisions. Trainers will guide learners to compare material options, assess sustainability data, review AI-generated outputs, document evidence, and keep final decisions subject to human judgement.

- **Relevant topics:** AI in fashion; sustainability data; material comparison; traceability; eco-design; ethical and responsible AI
- **EQF Level**: 5
- **Estimated Learning Time**: 5 hours guided learning + 1-hour optional individual application

Learning Outcomes

Knowledge:

After the completion of this module, learners will:

- Possess comprehensive, specialised knowledge of AI applications in the fashion sector, specifically for pattern generation, trend forecasting, material analysis, and supply chain traceability.
- Understand methodologies for data collection, structuring, and interpretation aimed at improving environmental metrics and sustainable decision-making.
- Comprehend the capabilities and limitations of AI, including the technical logic of prompting techniques, verification processes, and the risks associated with AI-generated outputs.
- Maintain a deep awareness of ethical considerations, including algorithmic bias, data privacy, intellectual property rights, and the nuances of responsible data governance.

Skills:

After the completion of this module, learners will be able to:

- Collect, manage, and interpret sustainability data related to materials, production processes, and environmental impacts to generate actionable insights.
- Utilise AI tools and platforms for practical tasks such as drafting product briefs, comparing material options, and generating design patterns.
- Translate complex sustainability metrics and data-driven insights into strategic design, sourcing, and production decisions.
- Verify AI-supported recommendations for accuracy and appropriateness, ensuring that automated outputs align with real-world sustainability goals.
- Implement data-driven approaches for material lifecycle tracking and environmental impact monitoring across the supply chain.

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

Responsibilities & Autonomy:

After the completion of this module, learners will be capable of:

- Exercising management and supervision over projects involving AI implementation and data-driven decision-making processes.
- Taking responsibility for the ethical use of AI, ensuring data governance and privacy standards are upheld within the organisational context.
- Integrating AI-derived insights into professional practices while critically evaluating the validity of AI-supported recommendations.
- Guiding and mentoring teams in the responsible adoption of AI tools, fostering a culture of transparency and bias-awareness in digital design.
- Leading data mapping initiatives for material tracking, ensuring that technological adoption serves the overarching goal of eco-design and traceability.



Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

Topics and Sub-topics/Learning activities	Duration	Training methods used	Materials used	Suggestions for implementation
Ice-breaking activity **What would you trust AI to decide?** Learners position themselves from "human only" to "AI can assist" for design, material selection, and sustainability claims.	10 min	Peer Learning & Discussion	Three decision cards: room line or online poll	Ask learners to justify one position. Record risks and opportunities for later comparison.
Pre evaluation Five questions assessing familiarity with AI, sustainability data, traceability, and responsible use.	10 min	Diagnostic/true-false quiz/ Multiple choice	Mentimeter, form or printed quiz	Do not grade. Use responses to adapt examples and clarify key concepts.
Instructions for Module 5 Purpose, learning outcomes, assessment methods, and the principle that AI supports decisions but does not prove sustainability.	10 min	Interactive lecture and Q&A	Slides; learner handout	Connect the module to design, sourcing, production, and sustainability decisions faced by SMEs and fashion entrepreneurs.
Topic 1: Use of AI in Fashion and Sustainability Overview of AI applications such as material comparison, demand forecasting, traceability review, sustainability communication, and design support.	25 min	Demonstration-based learning	Presentation slides; AI use-case examples; trainer notes	Present AI as a decision-support tool. Differentiate between generative AI, analytics, forecasting, and traceability tools.
Topic 2: Data Collection, Management, and Interpretation for Sustainable Decision-Making Material composition, supplier evidence, production data, durability, repairability, environmental indicators, and uncertainty.	35 min	Case-Based Learning & Guided Discussion	Sustainability Data Management Workflow; sample sustainability; dataset; presentation slides	Learners classify information as verified, estimated, or missing before using AI tools.

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

Topics and Sub-topics/Learning activities	Duration	Training methods used	Materials used	Suggestions for implementation
Topic 3: Data-Driven Design and Environmental Metrics Use of environmental metrics, product data, hotspot analysis, comparability, and trade-offs to support design and sourcing decisions.	25 min	Interactive Lecture & Guided Analysis	Environmental metrics examples; sustainability data examples; presentation slides	Emphasise how data helps compare options and justify design decisions.
Topic 4: Practical AI Tools in the Fashion Industry: Pattern Generation, Forecasting, Traceability Practical AI applications for pattern generation, material comparison, demand forecasting, trend forecasting, inventory optimisation, traceability, and Digital Product Passports.	30 min	Demonstration-Based Learning & Guided Discussion	AI applications visual/table; practical examples of pattern generation, forecasting and traceability; presentation slides	Show how AI tools support practical business needs across the fashion value chain.
Topic 5: Ethical Considerations in Using AI (Bias, Data Privacy, Intellectual Property) Bias, inaccurate outputs, confidential data, design ownership, transparency, accountability, and misleading environmental claims.	25 min	Problem-Based Learning	Responsible-Use Checklist; Prompt Template; Decision Record Template; presentation slides	Use realistic scenarios such as invented certifications, unsupported sustainability claims, uploaded supplier data, or AI-generated designs.
Case Study: H&M – Using AI and Data Analytics to Support Demand Forecasting and Supply Chain Decision-Making Learners analyse how AI supports forecasting, planning, and resource management decisions.	20 min	Case-Based Learning	Case study sheet; page 9	Discuss how SMEs could apply forecasting principles using smaller datasets and simpler tools.

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

Topics and Sub-topics/Learning activities	Duration	Training methods used	Materials used	Suggestions for implementation
Best Practice: Another Tomorrow – Digital Traceability and Product Transparency Learners explore how digital product identities and traceability systems support transparency and sustainability communication.	15 min	Best Practice Analysis & Discussion	Best practice sheet; page 10	Encourage learners to identify what information their own business would need to collect to improve traceability.
Practical Activity 1: AI-Assisted Material Selection and Decision Brief	25 min	Project-Based Learning	Fictional dataset; AI tool; page 11	Learners compare material options, verify AI outputs, identify missing information, and prepare a short recommendation.
Practical Activity 2: Material Lifecycle Data Mapping for Traceability and DPP Readiness	25 min	Collaborative Learning & Guided Practice	Lifecycle mapping template; sticky notes or spreadsheet; page 12	Learners identify key data fields, evidence sources, and traceability gaps across the product lifecycle.
Debrief/ Reflection/ Key Takeaways Reflection on Module 5.	15 min	Reflection & Discussion	Learning log; action card	Each learner identifies one principle they will apply when using AI to support future decisions.
Assessment: Quiz, AI-Assisted Decision Brief and Scenario-Based Review	15 min	Quiz & Task Evaluation	Quiz; rubric; scenario worksheet; page 13	Assess critical thinking, evidence evaluation, verification practices, and decision-making rather than technical AI expertise.

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

Pre-evaluation

Pre-evaluation quiz: 5 questions

No.	Question	Expected answer
1	***Have you ever used an AI tool (e.g. ChatGPT, Copilot, Gemini) for work, study, or personal projects?*** Yes / No	Any response accepted (diagnostic only)
2	***How confident are you in identifying the information needed to support a sustainability-related decision in fashion?*** Not confident / Somewhat confident / Very confident	Any response accepted (diagnostic only)
3	***True or False: AI-generated information should always be verified before being used for business decisions.*** True / False	True
4	***How familiar are you with concepts such as product traceability, supply chain transparency, or Digital Product Passports (DPPs)?*** Not familiar / Somewhat familiar / Very familiar	Any response accepted (diagnostic only)
5	***Which of the following do you consider a potential risk when using AI?*** a) Bias or inaccurate outputs b) Data privacy concerns c) Intellectual property issues d) All of the above	d) All of the above

Use of AI in fashion and sustainability

As AI adoption grows across the sector, AI literacy is becoming an important professional competence. In accordance with the EU AI Act (Regulation EU 2024/1689), organisations are increasingly expected to understand the capabilities, limitations, risks, and appropriate use of AI systems before relying on them in professional contexts.

AI in sustainable fashion is a cluster of diverse technological applications, each addressing different parts of the value chain. According to Russ (2025), in *Impact of data-driven insights in the fashion industry*, the sector is undergoing a significant transformation driven by technology and the imperative for sustainability; yet approximately 40% of fashion retail organisations still operate with fragmented, person-centric processes, and only 10% use data science platforms for cross-functional decision-making, compared to 28% in digital technology sectors.

AI applications can be grouped into several categories, including predictive analytics, computer vision, natural language processing (NLP), and generative AI. Each category supports different decision-making needs and carries different limitations and risks.

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

The five AI tool families:



AI Use Cases in Sustainable Fashion — Decision Table

Application	Potential value	Human verification requirement
Eco-design and product briefs	Generate alternative design requirements, repair features or low-waste construction from a defined brief	Designer reviews feasibility, originality, fibre compatibility, and durability
Material comparison	Structure supplied data and summarise trade-offs between material options	Compare only verified or clearly labelled estimated data; request missing evidence before selection
Demand and production planning	Analyse historical sales and inventory patterns to assist planning and reduce avoidable overproduction	Forecasts may reproduce past bias or fail under changing trends; record assumptions
Traceability review	Flag missing fields, inconsistent records or unclear supplier documentation	AI cannot establish provenance without reliable records and verification
Sustainability claim drafting	Generate initial language for product descriptions or impact comparisons	Every claim must be checked against defined criteria and source evidence

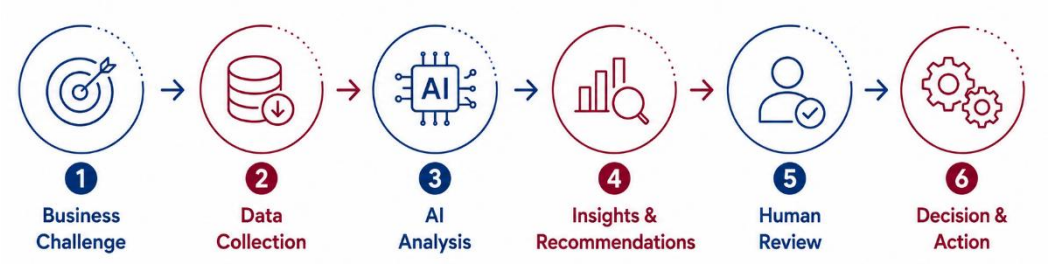
In practice, organisations do not use AI in isolation. AI works best when combined with reliable data, clear objectives, professional expertise, and appropriate verification processes. Whether comparing materials, forecasting demand, reviewing traceability records, or drafting sustainability communications, AI outputs should be used to inform decisions, not to make decisions automatically.

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

For this reason, it is useful to understand AI not only as a collection of technologies, but also as part of a broader decision-support process. The following workflow illustrates how organisations can use AI responsibly to transform data into insights while maintaining human oversight and accountability.

AI Decision-Support Workflow



Key distinction for learners

Term	Meaning in this module
AI output	A draft, summary, prediction, comparison or flagged issue.
Evidence	Source documents, test certificates, supplier declarations, measured data or traceability records.
Decision	A human-approved choice with criteria, rationale, uncertainty and next action recorded.

Key Takeaway

View AI as a decision-support tool that helps professionals make better-informed decisions. Responsibility for final decisions remains with people.

Data collection, management, and interpretation for sustainable decision-making

AI systems and sustainability decisions depend on data quality. Poor, incomplete, or inconsistent data can lead to inaccurate conclusions and ineffective actions. Data-Driven Decision-Making (DDDM) uses validated data, such as environmental metrics like carbon footprint, water use, and fibre lifecycle data, to inform design, sourcing, and production decisions (Provost & Fawcett, 2013). This approach shifts fashion from intuition-based to evidence-based decisions, replacing uncertainty with verifiable insights.

To enable DDDM, professionals need data literacy, i.e. the ability to collect, manage, analyse, interpret, critique, and communicate data effectively. According to the DALI Data Literacy Framework for Adults (Dalicitizens.eu), this includes understanding, acting on, and engaging with data, all within an ethics and privacy context. This aligns with the EQF Level 5 requirement for autonomous, self-directed practice.

Five-stage workflow - Sustainability Data Management

Effective sustainability decisions depend on reliable and well-managed data.

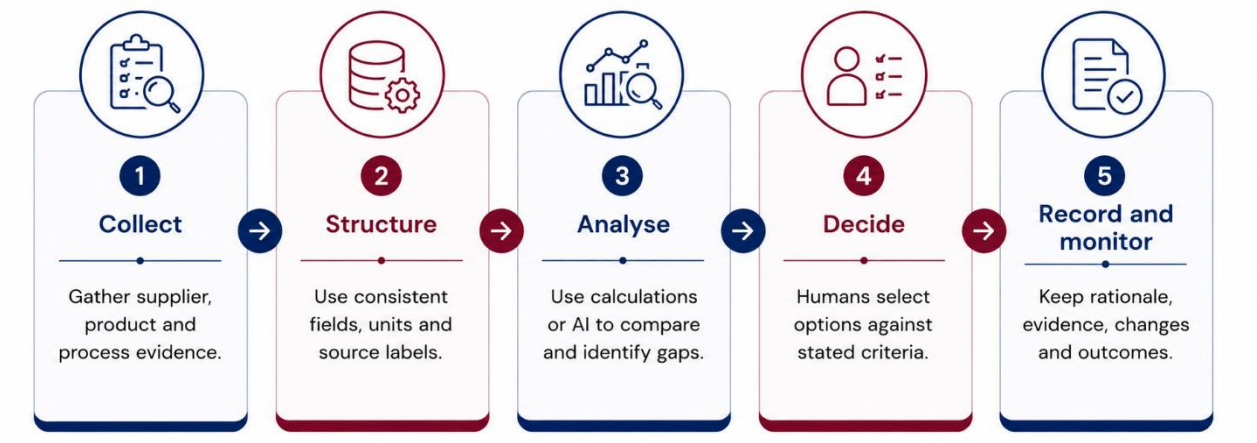
Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

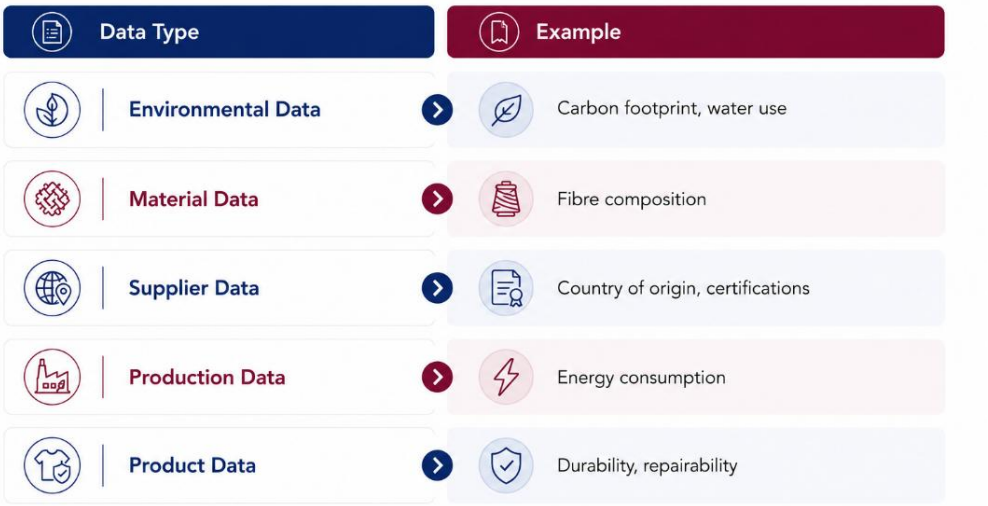
The following workflow outlines the key stages for collecting, organising, analysing, and applying sustainability information within fashion organisations.

The workflow is adapted from established data governance practice (DAMA International, DMBOK2, 2017).

The question that this workflow answers is "*How do we manage sustainability data properly?*"



Key Sustainability Data Types



The GHG Protocol distinguishes between organisational indicators for sustainability reporting and product-level indicators for design and sourcing, helping professionals use the right data.

Minimum decision data for a garment or accessory

Data category	Fields to capture	Possible evidence
Product identity	Product code, product type, design version and intended use.	Internal specification sheet
Material composition	Fibre or material percentages, trims, coatings and blended components.	Supplier specification/test record

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

Data category	Fields to capture	Possible evidence
Source and traceability	Supplier, manufacturing steps, origin information and evidence status.	Purchase order, certificates, traceability record
Environmental indicators	Selected indicator values, calculation method, data period and uncertainty.	Verified calculation or cited dataset
Circular design factors	Limitations on durability, repairability, and recyclability, and care information.	Design review and technical assessment
Decision record	Criteria, selected option, excluded alternatives, human approver and review date.	Decision sheet and sign-off

Accuracy rule

If evidence is missing, label the field as missing or estimated. Do not ask AI to invent missing values or convert uncertainty into a sustainability claim.

Data-driven design and environmental metrics

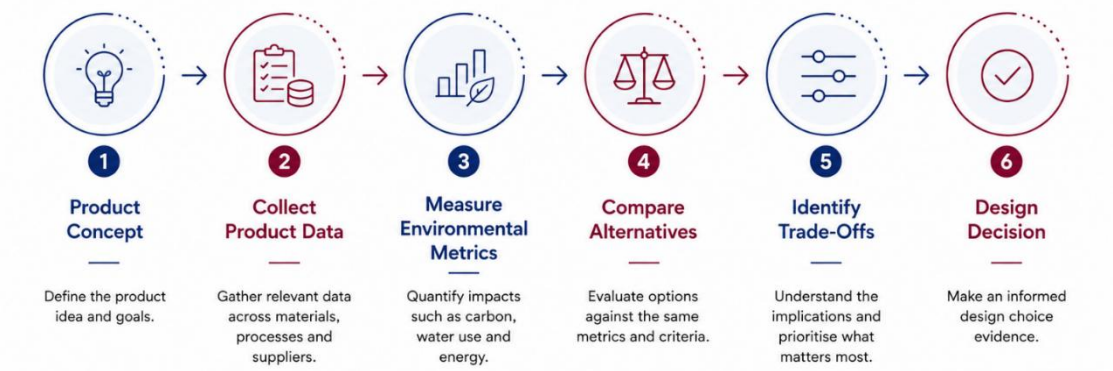
Research shows that many **sustainability impacts are determined during the design stage**. Designers need reliable data to compare options, assess impacts, and justify decisions.

Data-driven design uses **measurable information**, such as environmental metrics and product data, to guide decisions and identify improvements.

Environmental metrics, such as carbon emissions, water use, waste, durability, and recycled content, help measure and compare environmental performance. They also support **hotspot analysis**, pinpointing the stages or materials with the greatest environmental impact for targeted improvements.

Since sustainability decisions often involve **trade-offs** among environmental, technical, economic, and functional factors, professionals must weigh competing priorities to find the best balance.

Evidence-Based Design Workflow



This workflow answers the question: "*How do designers use environmental data to improve a product?*"

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

Practical AI tools in the fashion industry: pattern generation, forecasting, traceability

Artificial Intelligence is increasingly used across product design, material selection, demand forecasting, and supply chain management. According to the World Economic Forum (2024), AI can help fashion businesses analyse data, identify patterns, compare alternatives, and support planning decisions.

For sustainable fashion businesses, AI can support decisions related to product development, material sourcing, production planning, traceability, and sustainability communication. The quality of recommendations depends on the quality of the available data and evidence.

AI-Supported Decisions Across the Fashion Value Chain

AI can support a wide range of decisions across the fashion value chain. The examples below illustrate how AI can help analyse information, compare alternatives, and support decision-making in sustainable fashion.

Business Need	AI Application	Example
Develop design alternatives	Pattern generation	Generate alternative garment concepts based on design requirements
Select suitable materials	Material comparison and analysis	Compare material performance, environmental impacts, and supplier information
Predict future demand	Demand forecasting	Forecast seasonal sales and expected product demand

Business Need	AI Application	Example
Identify emerging trends	Trend forecasting	Analyse market signals and consumer preferences
Reduce overproduction	Inventory optimisation	Align production and inventory levels with forecasted demand
Improve supply-chain transparency	Traceability systems	Track materials and suppliers throughout the product lifecycle
Support sustainability reporting and compliance	Digital Product Passports (DPPs)	Maintain and communicate product sustainability information

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

Ethical considerations in using AI (bias, data privacy, intellectual property)

As AI tools become increasingly integrated into design, sourcing, forecasting, traceability, and sustainability reporting, organisations must ensure that AI-supported decisions are reliable, transparent, and ethically responsible.

Although AI can analyse information and generate recommendations quickly, it can also produce inaccurate, biased, incomplete, or misleading outputs. In addition, organisations must consider issues related to data privacy, intellectual property, confidentiality, and responsible use of automated systems.

According to the OECD AI Principles, the European Commission's Ethics Guidelines for Trustworthy AI, and the EU AI Act (Regulation EU 2024/1689), human oversight, transparency, accountability, and responsible data governance are fundamental principles for professional use of AI.

Ethical AI use ensures decisions remain evidence-based, accountable, and aligned with organisational values and sustainability objectives. Responsible use requires critical thinking, verification, transparency, and human oversight.

The RACE Prompt Framework

The quality of AI outputs depends significantly on the quality of instructions provided to the system. A well-structured prompt leads to clearer, more relevant and actionable AI responses.

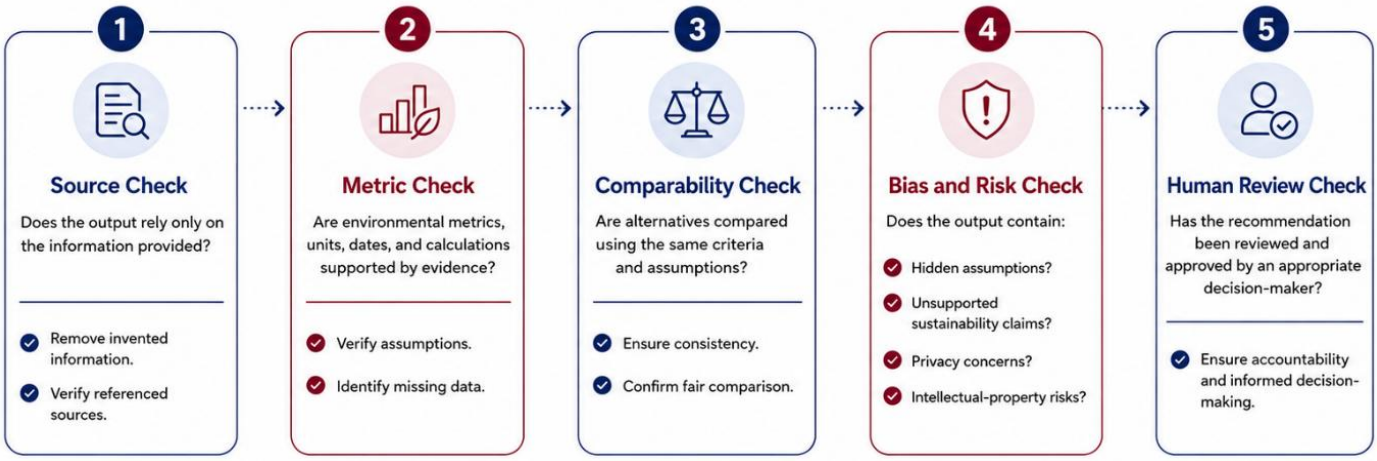


Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

Five-Step Verification Process

Before using any AI-generated recommendation, professionals should complete the following check:



Reminder

AI outputs should always be treated as **draft recommendations** rather than final decisions.

Responsible AI Risks in Sustainable Fashion

Risk	Fashion example	Responsible action
Unsupported sustainability claim	AI states that one material is "sustainable" without evidence or defined criteria.	Require cited inputs, defined criteria and qualified wording; reject absolute claims.
Biased recommendation	Past trend or sales data overrepresents one customer group, style or market.	Review dataset scope and consider alternative perspectives and user groups.
Confidential or personal data	A professional uploads supplier contracts, customer records or staff data to a public AI tool.	Use fictional or anonymised data; follow organisational data protection rules.
Intellectual property	AI is asked to reproduce a protected print, logo or competitor's design language.	Use original briefs; verify ownership and licensing before commercial use.
Lack of accountability	No record exists of prompts, evidence, changes or final approval.	Maintain decision records, verification notes, source lists, and human approval.

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

Decision Record Template

Maintaining a clear record of how AI was used, what evidence was reviewed, and how decisions were reached helps strengthen transparency, accountability, and responsible decision-making. The following template can be used to document AI-supported decisions and demonstrate appropriate human oversight throughout the process.



Responsible-use checklist

- State the purpose of the AI task and decision criteria before generating an output.
- Use only data that may be lawfully and appropriately processed in the selected tool.
- Ask the AI to identify missing data, assumptions and limitations.
- Check outputs against source evidence and professional judgement.
- Record the human decision, reason and follow-up action.

Policy context

The EU AI Act (Regulation EU 2024/1689) promotes transparency, accountability, and human oversight in the use of AI systems. In parallel, the Ecodesign for Sustainable Products Regulation (ESPR) introduces Digital Product Passports to improve product transparency and traceability. For sustainable fashion professionals, this means that evidence quality, documentation, verification, and human review are becoming increasingly important professional practices.

Case Study

Case Study Title: H&M: Using AI and Data Analytics to Support Demand Forecasting and Supply Chain Decision-Making

Country: Sweden / Global operations

Link:

- https://hmgroup.com

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

- BUILDERS Podcast: H&M VP of AI & Machine Learning
- Vogue Business interviews with H&M leadership

Background:

H&M Group is one of the world's largest fashion retailers, operating thousands of stores and digital channels across multiple markets. The company manages a highly complex global supply chain involving product design, sourcing, manufacturing, logistics, inventory management, and customer sales.

As consumer demand becomes increasingly dynamic and sustainability expectations continue to grow, H&M has invested in data analytics and AI capabilities to support faster, more informed business decisions. AI is now used across supply chain management, logistics, marketing, sales, and customer experience.

The Challenge

Fashion retailers must constantly decide what products to buy, produce, allocate, and sell. These decisions are difficult because demand changes quickly, products are seasonal, and new items often have limited historical data.

Poor forecasting can lead to overproduction, excess inventory, markdowns, waste, and inefficient use of resources.

Actions Taken

Step 1: Building Data Foundations

H&M invested in data infrastructure and governance systems capable of managing large volumes of information from multiple sources.

These include:

- Sales data.
- Product information.
- Inventory records.
- Customer behaviour data.
- Supply chain information.
- Market and demand signals.

According to H&M's VP of AI and Machine Learning, data governance and accessibility are critical prerequisites for successful AI implementation.

Step 2: Applying AI to Forecasting and Planning

H&M uses AI and machine learning to support forecasting and planning activities across its operations.

Applications include:

- Demand forecasting.
- Inventory planning.
- Product allocation.

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

- Supply chain optimisation.
- Customer personalisation.
- Merchandising support.

AI systems analyse large volumes of data to identify patterns and generate forecasts that support business decisions. Rather than replacing human decision-makers, these systems provide insights that help teams decide what products to manufacture, where to distribute them, and how to manage inventory.

Tools / Methods Used

- Artificial Intelligence (AI)
- Machine Learning
- Forecasting Models
- Data Lakes and Data Governance Systems
- Customer Behaviour Analytics
- Supply Chain Analytics
- Cross-Functional AI Teams
- Human-in-the-Loop Decision-Making

Results:

Environmental Impact

H&M reports that AI supports its efforts to produce closer to actual demand by helping teams plan how many products are made, where they are sold, and when they are distributed. In principle, better forecasting can help reduce excess inventory, avoidable markdowns, and unnecessary resource use. However, learners should also consider the limits of forecasting within high-volume fashion models and distinguish operational efficiency from full sustainability transformation.

Business Impact

The company has strengthened its ability to:

- Understand customer demand.
- Improve inventory planning.
- Support supply-chain responsiveness.
- Enhance operational efficiency.
- Improve decision-making across multiple business functions.

AI-supported forecasting has become a core component of H&M's approach to managing retail complexity at scale.

Lessons Learned

- Data quality and governance are essential for successful AI implementation.
- AI creates value only when its outputs influence decisions and actions.
- Forecasting is one of the most impactful AI applications in retail.
- Human oversight remains necessary because forecasts are predictions rather than guarantees.

Co-funded by the European Union
Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

- Sustainability improvements can be achieved through better planning and resource allocation, beyond material innovation.

Key Takeaways

- **Start with the data you already have.** Sales records, customer feedback, website analytics, and inventory data can provide valuable insights for planning and forecasting.
- **Use AI to support decisions, not to make decisions for you.** AI can identify patterns and generate forecasts, but final decisions should always consider business goals, market conditions, and professional judgement.
- **Focus on reducing uncertainty.** Even simple forecasting approaches can help businesses make better decisions about production quantities, stock levels, and product launches.
- **Review and update forecasts regularly.** Customer preferences and market trends change quickly, so forecasts should be monitored and adjusted as new information becomes available.
- **Connect forecasting to sustainability goals.** Producing closer to actual demand can help reduce excess inventory, unnecessary resource use, markdowns, and waste.

Discussion Questions

- What would you do differently if you were responsible for production and inventory planning?
- Can the forecasting approach used by H&M be adapted to your organisation or business context?
- What barriers might arise when collecting and using data for forecasting and decision-making?
- What are the limits of using a large fast-fashion retailer as an example for sustainable decision-making, and what can smaller SMEs adapt without copying the full business model?

Practical Exercise:

Imagine you are managing a small sustainable fashion brand preparing a new seasonal collection.

Using the worksheet provided:

1. Identify one forecasting or planning decision your business must make.
2. List the data currently available.
3. Identify missing information that could improve decision-making.
4. Describe how AI could assist with analysing the data.
5. Explain what human review would still be required before making a final decision.

Expected Outcome

Learners understand how AI and data analytics can support forecasting and planning decisions while recognising the importance of data quality, verification, and human oversight.

Best Practice

Title: Another Tomorrow – Digital Traceability and Product Transparency

Source: Another Tomorrow Transparency Platform

Type:

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

✓ **Business practice** ✓ **Technological solution** ☐ **Educational approach** ☐ **Policy**

Content: Another Tomorrow is a sustainable fashion company founded in the United States by Vanessa Barboni Hallik. The company has implemented a digital traceability system that allows customers to access information about a product's materials, suppliers, manufacturing journey, and environmental credentials. Through digital product identities and supply-chain mapping, the company aims to increase transparency and strengthen trust between brands and consumers. This approach is considered a best practice because it combines sustainability, technology, and responsible business practices while helping prepare for future transparency and traceability requirements such as Digital Product Passports.

The Challenge Addressed

Many fashion brands find it difficult to provide clear information about where products come from, how they are made, and what environmental or social standards are followed throughout the supply chain.

Customers increasingly want to know more about the products they buy, while businesses need reliable information to support their claims for sustainability and meet growing transparency requirements.

Without accurate product and supplier information, businesses may struggle to build trust, communicate sustainability efforts, and prepare for future regulations such as Digital Product Passports.

Innovation & Added Value

Another Tomorrow uses digital product identities to connect each product with information about its materials, suppliers, manufacturing processes, and sustainability attributes. Customers can access this information through a QR code or digital product profile linked to the garment.

For example, when viewing a product, a customer can see where key materials were sourced, which suppliers participated in production, and information related to environmental or social standards associated with the product. This provides greater visibility into the product journey and helps customers make more informed purchasing decisions.

For the company, collecting and organising product and supply-chain information in one place improves visibility across the value chain. Teams can more easily access information about materials, suppliers, and production processes, supporting sustainability reporting, product development, sourcing decisions, and compliance with future requirements such as Digital Product Passports.

The practice also demonstrates the importance of structured and reliable data. Once information is collected and organised consistently, businesses can use it for traceability, performance monitoring, sustainability reporting, and future applications of data analytics and AI-supported decision-making.

Tools / Technologies Used

- Digital Product Identities
- QR Codes
- Product Traceability Systems
- Supply Chain Mapping
- Digital Transparency Platforms
- Sustainability Data Management Tools

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

Practical Activity 1

Activity Title: AI-Assisted Material Selection and Decision Brief

Type: ☐ Hands-on ✓ AI-based ✓ Analysis ✓ Design ☐ Simulation ☐ Other

Activity Objective: The aim of this activity is to help learners use an AI tool to compare material options for a fashion product, based on provided sustainability and traceability information.

Learners will practise using clear prompts, reviewing AI-generated outputs, verifying evidence, and making an informed material selection.

After the completion of this activity, learners will be able to:

- use AI to organise and compare information on material options
- evaluate materials using sustainability, durability, traceability, and evidence-based criteria
- identify missing data, unsupported claims, and verification needs
- prepare a short material recommendation supported by evidence and professional judgement.

Activity outline / Description of the activity

Scenario

A fashion company is developing a new casual t-shirt collection and must select one material option. The company aims to balance sustainability, durability, product quality, and supplier transparency while making an informed sourcing decision.

The trainer provides learners with a short fictional dataset containing three material options (Annex 1). The dataset may include information such as:

- material composition
- supplier information
- durability or repairability considerations
- environmental information
- certifications
- missing or incomplete data

Step 1: AI-Assisted Material Comparison (10 – 12 minutes)

Working individually or in pairs, learners:

1. Review the material options provided.
2. Compare the options using the criteria of *sustainability*, *durability*, *traceability* and *evidence quality*, based only on the information provided.
3. Use an accessible AI tool (e.g. ChatGPT, Copilot, Gemini or another approved platform) to analyse the options.
4. Ask the AI tool to identify:

- advantages and limitations of each option;
- missing information;
- verification needs;

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

- key trade-offs between alternatives.

Important: Learners must not upload confidential, personal, or real business data into the AI tool.

Step 2: Verification and Decision Reflection (5–10 minutes)

Learners review the AI-generated output and complete the following verification checklist:

- Did the AI use only the information provided?
- Did the AI identify missing information?
- Did the AI avoid unsupported sustainability claims?
- Did the AI present realistic advantages, limitations, and trade-offs?

Each learner or pair then prepares a short Decision Brief with the following information:
Selected material: _____
Reason for selection: _____
Missing information to verify: _____
Final recommendation: _____

The trainer concludes the activity with a short discussion on how evidence quality influences sustainable sourcing decisions.

Alternative delivery option: If learners cannot access an AI tool, the trainer may provide a pre-generated AI response. Learners then evaluate the response, identify unsupported claims, and rewrite the recommendation using the verification checklist.

Total time: 15–20 minutes

Practical Activity 2

Activity Title: Material Lifecycle Data Mapping for Traceability and DPP Readiness
Type: ✓ Hands-on ☐ AI-based ✓ Analysis ☐ Design ✓ Simulation ☐ Other

Activity Objective: The aim of this activity is to help learners map the key information needed to track a fashion product throughout its lifecycle, from material sourcing to end-of-life. Learners will identify available information, evidence sources, and data gaps that may affect traceability, sustainability reporting, and future AI-supported decision-making.

After the completion of this activity, learners will be able to:

- prepare a simple lifecycle data map for a fashion product
- identify evidence requirements and data gaps across the product lifecycle
- explain how reliable and complete data supports traceability, sustainability reporting, and AI-assisted decision-making
- propose practical actions to improve product transparency and traceability.

Activity Outline / Description of the Activity

Scenario

Co-funded by the European Union
Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

A fashion company wants to improve product traceability and prepare for future transparency requirements, such as Digital Product Passports (DPPs). To achieve this, the company needs to understand what information is available about a product and what information is missing across its lifecycle.

The trainer assigns learners a product, such as a cotton shirt, a recycled polyester jacket, denim jeans or a leather accessory. Learners receive a blank lifecycle mapping template (Annex 2).

Step 1: Lifecycle Data Mapping (10 – 12 minutes)

Working individually or in pairs, learners complete the lifecycle map using the following stages:

1. Material sourcing
2. Manufacturing and processing
3. Distribution and retail
4. Use, care and repair
5. Reuse, recycling or disposal

For each stage, learners identify:

- one key data field that should be collected
- the source of evidence
- whether the information is verified, estimated, or missing

Examples of data fields may include material composition, supplier location, certifications, production process, care instructions, repair guidance or recycling limitations.

Examples of sources of evidence may include a supplier declaration, certificate, production record or product specification.

Tools used: Printed lifecycle mapping worksheet, spreadsheet template or an online collaborative tool such as Google Sheets or Miro.

Step 2: Data Gap Review and Reflection (5–8 minutes)

Learners exchange their completed maps with another learner or pair. They review the map and identify:

- one missing piece of information that should be collected
- one risk caused by incomplete or unreliable data
- one action the business could take to improve its product traceability

Learners then discuss:

- Which lifecycle stage contains the largest information gap?
- How could missing information affect sustainability claims or reporting?
- How could AI help organise, monitor, or identify missing information?

Traceability Improvement Recommendation

Each learner or pair prepares a short recommendation:

Most important missing data: _____

Risk created by this gap: _____

Recommended improvement: _____

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

The trainer concludes the activity with a discussion on the importance of reliable data for product traceability, transparency, and future Digital Product Passport requirements.
Total time: 15–20 minutes

Assessment Tools

Post-evaluation quiz: 5 questions

No.	Question	Expected answer
1	True or False: An AI-generated comparison is evidence that a material is sustainable.	False. AI outputs must be checked against evidence and defined criteria.
2	Why is reliable data important when using AI for sustainability decisions?	AI recommendations depend on the **quality** and **completeness** of **available data**.
3	Which of the following is a privacy or confidentiality risk when using a public AI tool? a) Using publicly available sustainability reports b) Uploading personal data or confidential supplier information c) Comparing material options using a fictional dataset d) Reviewing product specifications	b. Uploading personal data or confidential supplier information
4	What should you do before accepting an AI-generated recommendation? a) Use it immediately if it sounds reasonable b) Share it with customers first c) Review the evidence, check for missing information, and verify important claims d) Ask the AI tool to confirm it is correct	c. Review the evidence, check for missing information, and verify important claims
5	Which of the following is an ethical consideration when using AI in sustainable fashion? a) Bias and data privacy b) Intellectual property and accountability c) Transparency in decision-making d) All of the above	d. All of the above

Task-based evaluation rubric: AI-assisted brief

Criterion	Weight	What the trainer checks
Data use and completeness	25%	Uses supplied information accurately and identifies missing or uncertain data.
Prompt quality	15%	Defines task, criteria, format, and instructs the AI not to invent information.

Co-funded by the European Union
Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

Criterion	Weight	What the trainer checks
Verification and critical review	25%	Identifies unsupported claims, limitations, and verification needs.
Decision reasoning	25%	Explains trade-offs and provides a justified recommendation.
Responsible-use practice	10%	Demonstrates awareness of privacy, transparency, evidence quality, or accountability considerations.

Scenario-based assignment

Learners receive the following AI-generated statement:
"Option B is 100% sustainable, has the lowest environmental impact, and is the best choice for all situations."
Learners must:

1. Identify unsupported or misleading claims.
2. Explain what evidence is missing.
3. Rewrite the recommendation using more accurate and evidence-based language.
4. List two questions that should be verified before making a final decision.

Learner Tools: Prompt and Decision Record

These tools help learners apply responsible AI practices when comparing options, evaluating evidence, and documenting decisions in sustainable fashion projects.

Prompt template for responsible AI assistance

Copy-and-adapt prompt

You are assisting with a sustainable fashion decision. Use only the information provided below. Do not invent environmental data, certifications, supplier information, or assumptions.
Compare the available options using the following criteria:
[Insert criteria]
For each option:

- Summarise the available information
- Identify advantages and limitations
- Highlight missing information
- List any points that require verification

End with a draft recommendation for human review.

Decision record template

Record field	Learner completion guidance
Decision question	Which material option should be recommended and why?
Options considered	A / B / C or learner-selected alternatives
Decision criteria	Evidence quality; durability/repairability; circularity/end-of-life; other
Sources checked	Dataset fields, supplier evidence, standards/certificates or other records

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

Record field	Learner completion guidance
AI tool and purpose	Tool used only to organise, compare or draft; record the task performed
Verification findings	Unsupported claims corrected; missing evidence listed; assumptions labelled
Final recommendation	Chosen option, rationale, conditions and follow-up evidence required
Human approval	Name/role and date

References and Trainer Preparation

- **OECD AI Principles overview** https://oecd.ai/en/ai-principles
- **Ethics guidelines for trustworthy AI** https://digital-strategy.ec.europa.eu/en/library/ethics-guidelines-trustworthy-ai
- **European Commission. EU Strategy for Sustainable and Circular Textiles. 2022.** https://environment.ec.europa.eu/strategy/textiles-strategy_en
- **European Environment Agency.** Textiles and the environment: the role of design in Europe's circular economy. 2022. https://www.eea.europa.eu/en/analysis/publications/textiles-and-the-environment-the-role-of-design-in-europes-circular-economy-1
- **European Union. Regulation (EU) 2024/1781** establishing ecodesign requirements for sustainable products (ESPR), including the Digital Product Passport framework. https://eur-lex.europa.eu/eli/reg/2024/1781/oj
- **European Union. Regulation (EU) 2024/1689 laying down harmonised rules on artificial intelligence (Artificial Intelligence Act).** https://eur-lex.europa.eu/eli/reg/2024/1689/oj
- **European Data Protection Board. Opinion 28/2024** on data protection aspects related to processing personal data in the context of AI models. 2024. https://www.edpb.europa.eu/our-work-tools/our-documents/opinion-board-art-64/opinion-282024-certain-data-protection-aspects_en
- **European Union Intellectual Property Office**. Development of Generative Artificial Intelligence from a Copyright Perspective. 2025. https://www.euipo.europa.eu/en/publications/genai-from-a-copyright-perspective-2025
- **World Economic Forum (WEF)** https://intelligence.weforum.org/topics/a1Gb0000000pTDREA2
- **The DAMA Guide to the Data Management Body of Knowledge (DAMA-DMBOK2)** https://www.dama-dk.org/onewebmedia/DAMA%20DMBOK2_PDF.pdf
- **DALI Data Literacy Framework for Adults** https://dalicitizens.eu
- **H&M Group Sustainability** https://hmgroup.com/sustainability/
- **How AI is transforming retail at H&M** https://www.youtube.com/watch?v=jTVBT7k8NeY
- **Another Tomorrow Transparency Platform** https://anothertomorrow.co/en-eu/pages/transparency

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027

Annexes

1 - Dataset: Material Comparison

Information Category	Option A	Option B	Option C
Material	Conventional Cotton	Organic Cotton	Recycled Polyester
Supplier Location	Country A	Country B	Country C
Sustainability Evidence	Supplier declaration only	Organic certification available	Recycled content certificate available
Traceability Information	Limited supplier information	Supplier and processing facilities identified	Supplier identified; processing information partially available
Durability	Medium	Medium	High
Repairability	High	High	Medium
Recyclability	Medium	Medium	High
End-of-Life Information	Not available	General guidance available	Recycling guidance available
Estimated Cost	Low	Medium	Medium-High
Additional Notes	No verified environmental data provided	Certification available but water consumption data not provided	Recycled content verified but fibre origin not fully documented

2 - Lifecycle Mapping Template

Lifecycle Stage	Data Required	Evidence Source	Status
Material Sourcing			Verified / Estimated / Missing
Manufacturing & Processing			Verified / Estimated / Missing
Distribution & Retail			Verified / Estimated / Missing
Use, Care & Repair			Verified / Estimated / Missing
Reuse, Recycling or Disposal			Verified / Estimated / Missing

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.
Project Number: 2025-ES01-KA220-VET-000358027