PreVEnT

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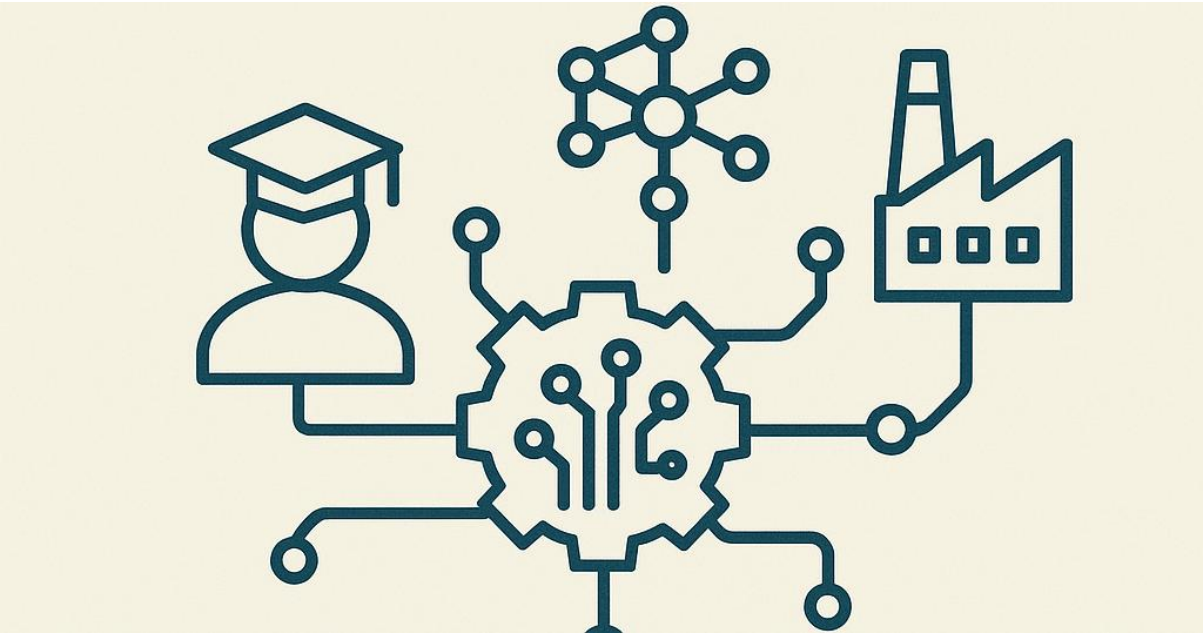
POLICY Recommendation:

Establishing a Pan-European Higher Education and Adult Learning Ecosystem for Deep-Tech Predictive Maintenance in Manufacturing (PreVEnT-Eco)



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1. Executive Summary

This proposal outlines the establishment of the **Pan-European Higher Education and Adult Learning Ecosystem for Deep-Tech Predictive Maintenance in Manufacturing (PreVEnT-Eco)**. This initiative directly addresses critical, intertwined challenges facing the European Union: a persistent digital skills gap, significant industrial productivity losses, and the urgent need to meet the environmental objectives of the European Green Deal.

EU manufacturing faces significant productivity challenges. Industry analysts estimate that unplanned industrial downtime costs the sector **tens of billions of euros annually**, representing a major drain on competitiveness (European Commission, 2023a; McKinsey, 2022). This productivity gap is exacerbated by a structural skills deficit. Recent analysis from Cedefop (2023) confirms that a **significant portion of the EU industrial workforce lacks the specialized digital skills** required for AI-driven predictive maintenance (PdM). This gap stifles the adoption of Industry 4.0 technologies that are essential for global competitiveness.

Concurrently, the European Environment Agency (2023) reports that **industrial energy and resource inefficiency** (which includes suboptimal maintenance and lifecycle management) accounts for a substantial portion of avoidable CO_2 emissions.

The PreVEnT-Eco proposal is not a theoretical exercise; it is the strategic scaling of a highly successful, validated proof-of-concept. The foundational **Erasmus+ project 'PreVEnT' (2022–2025)** has already demonstrated its impact. It has produced a robust, field-tested toolkit comprising:

- A network of **Teaching Factories** embedding learning directly onto the shop floor.
- A modular **Competence Framework** of four stackable Competence Units (CUs) in AI, cobotics, advanced materials, and lifecycle analysis.
- A novel **Life Cycle Assessment (LCA) tool** tailored for maintenance operations.
- An interoperable **micro-credential system** and a comprehensive **Open Educational Resources (OER) hub**.

This policy builds upon that success to create a permanent, scalable ecosystem. It leverages a multi-instrument funding approach (**€1.445 billion, 2028-2034**) across **Erasmus+, Digital Europe, ESF+, and Horizon Europe** to achieve ambitious, concrete targets by 2035:

1. **Scale Infrastructure:** Expand from 4 to 100 Teaching Factories across 15+ countries and enroll 1 million users on the Digital OER Hub.
2. **Upskill the Workforce:** Issue 300,000 micro-credentials annually, aiming for 50% of all EU maintenance technicians to hold at least one PreVEnT CU by 2030.
3. **Deliver Measurable Impact:** Achieve a measurable reduction in industrial downtime (target: -25%), create 150,000 new green-digital jobs, and save 5 million tonnes of CO_2 annually through LCA-optimized maintenance.

The ecosystem is built on four pillars: **Competence Framework** (adopting the 4 CUs as EQF/ESCO descriptors), **Delivery Infrastructure** (Teaching Factories, Digital Hub), **Inclusion & Regional Equity** (mandatory 30% quota for at-risk groups, 500 Rural Digital Hubs), and **Impact Measurement** (a real-time KPI Dashboard).

This proposal represents a strategic, evidence-based investment in the EU's 'twin transition', ensuring our industrial workforce is skilled, resilient, and sustainable.

2. Policy Context and Justification

2.1. Anchor to EU Strategic Priorities

The PreVEnT-Eco proposal is not a standalone initiative but a critical implementation mechanism for several of the EU's core strategies. It provides the "how-to" for the "what" defined by existing policy.

- **The European Skills Agenda (2020) & Pact for Skills:** This proposal directly executes on the Agenda's flagship actions. It provides a scalable, quality-assured framework for **micro-credentials** (Action 8), moving them from concept to large-scale reality. More importantly, it provides the curriculum and infrastructure to service the **Pact for Skills** (Action 1), specifically for the high-priority Automotive, Microelectronics, and Manufacturing industrial ecosystems that have pledged to upskill millions of workers.
- **The Digital Education Action Plan (2021–2027):** PreVEnT-Eco is a tangible application of the Action Plan's two strategic priorities. The **PreVEnT Digital Hub** (Pillar 2), with its OERs, VR simulators, and AI modules, creates the "high-performing digital education ecosystem" (Priority 1) and delivers the "high-quality content" needed to "enhance digital skills" (Priority 2) for a specific, critical vocational sector.
- **The European Green Deal & New Industrial Strategy:** This policy is the practical application of the 'twin transition'. It rejects the false choice between competitiveness and sustainability. By integrating Life Cycle Assessment (LCA) and advanced materials (CU3, CU4) directly into the technical training for AI and co-bots (CU1, CU2), PreVEnT-Eco ensures that the **'digital' transition directly serves the 'green' one**. It moves sustainability from a top-down corporate reporting exercise (e.g., CSRD) to a bottom-up core competency of the technical workforce, operationalizing the **Circular Economy Action Plan** on the factory floor.
- **Industry 5.0 Framework:** The proposal fully embraces the Industry 5.0 vision by moving beyond mere efficiency. It is **human-centric** (Pillar 3's inclusion quota, CU2's focus on safe HMI), **sustainable** (Pillar 1's CUs 3 & 4), and **resilient** (the entire proposal's goal of reducing downtime). It upskills technicians to work *with* AI and co-bots, not be replaced by them.

2.2. The Problem Statement: A Tripartite Crisis

The urgency for this €1.445 billion proposal is defined by a 'tripartite crisis' of productivity, skills, and sustainability, which, if left unaddressed, will undermine the EU's industrial leadership and strategic autonomy.

A. The Productivity Crisis: The Multi-Billion Euro Cost of Downtime Unplanned downtime is a critical drain on European competitiveness. While a single Eurostat figure is elusive, the aggregate picture is clear. Industrial firms, particularly the SMEs that form the backbone of the EU economy, suffer significant and disproportionate losses from machinery failure (European Commission, 2023a). Broader industry analysis confirms this, with studies showing that unplanned downtime can consume 5-20% of total manufacturing costs. This translates to **tens of billions of euros in lost productivity** across the EU bloc

annually (McKinsey, 2022). This figure does not just represent lost output; it includes cascading costs from supply chain disruptions, idle labor, and reputational damage.

B. The Skills Crisis: A Deep-Tech Competence Gap The technology to solve the productivity crisis (AI, IoT sensors) exists, but the human capital to implement it does not. The EU faces a broad digital skills gap, with only 54% of the population possessing basic digital skills, far from the 2030 Digital Decade target of 80% (European Commission, 2023b). This gap is a chasm in specialized industrial applications. As **Cedefop (2023) highlights, the green and digital transitions require a massive upskilling of the existing workforce**, particularly in technical fields like AI and data analysis, where skills shortages are most profound. Current VET and HEI curricula are often years behind the technological curve, and internal corporate training is siloed and non-transferable. This "skills trap" is the single greatest barrier to Industry 4.0 adoption.

C. The Sustainability Crisis: The Environmental Cost of Inefficiency The "run-to-fail" maintenance paradigm is not just costly; it is environmentally wasteful. The **European Environment Agency (2023) identifies the industrial sector as a primary source of emissions and resource consumption**. Suboptimal equipment performance, inefficient processes, and a linear (non-circular) approach to parts and maintenance contribute significantly to this environmental burden. This directly contravenes the **Ecodesign for Sustainable Products Regulation (ESPR)**, which demands products be durable, reliable, and maintainable. PreVEnT-Eco is the skills-based answer to this regulatory demand, training technicians to perform the lifecycle-optimized maintenance that ESPR envisions.

3. Policy Vision and Guiding Principles

3.1. Vision Statement

To create a **scalable, interoperable, and inclusive Pan-European Higher Education and Adult Learning Ecosystem** that permanently embeds deep-tech predictive maintenance and lifecycle management as a core competency within the European industrial workforce, ensuring the EU's global leadership in a human-centric, sustainable, and resilient industrial future.

3.2. Guiding Principles

- **Public-Private Partnership:** The ecosystem is not purely government-led. It is a "quadruple helix" model where industry provides the learning environment (Teaching Factories), academia provides the pedagogical rigor (CUs, QA), government provides the funding and legal framework (ESF+, EQF), and civil society ensures inclusion.
- **Human-Centricity (Industry 5.0):** The goal is not to automate the technician, but to augment them. The CUs are designed to empower workers with AI and cobotics as tools, enhancing their skills, safety (CU2), and decision-making autonomy.
- **Radical Inclusivity:** The 'twin transition' must be a just transition. This ecosystem is designed from the ground up (Pillar 3) to actively identify, recruit, and support at-risk groups (NEETs, 50+, migrants, rural populations) to ensure they are not left behind.

- **Scalability & Interoperability:** The ecosystem is built on a common language (Pillar 1 CUs) and common digital standards (OERs, blockchain micro-credentials) to allow for seamless scaling and portability of skills across all Member States, VET/HEI providers, and industries.

3.3. Target Beneficiaries

This proposal is designed to serve a diverse set of learners and stakeholders:

- **Primary Learners:**
  - **The VET Student (EQF 3-5):** Will gain access to advanced, ECTS-backed modules (e.g., CU2) that make them immediately employable.
  - **The Existing Technician (50+):** Will be upskilled via ESF+ vouchers, gaining CUs to secure their long-term employability.
  - **The HEI Engineer (EQF 6-7):** Will use the Teaching Factories and advanced CUs (e.g., CU1, CU4) for practical, work-based learning that bridges the gap between theory and shop-floor reality.
- **Secondary Beneficiaries:**
  - **SMEs:** Will gain access to a skilled workforce and free OER/LCA tools, enabling them to adopt PdM technologies they previously could not afford.
  - **Large Enterprises:** Will host Teaching Factories, reducing their own training costs and co-developing talent for their specific needs.
  - **National Education Systems:** Will receive a validated, ready-to-deploy, "deep-tech" curriculum update for their VET and HEI programs.

4. Legislative and Funding Instruments

4.1. A Blended, Multi-Instrument Approach

A system-level challenge requires a system-level funding solution. A single funding line is insufficient. We propose a blended financing model of **€1.445 billion (2028-2034)** leveraging four key EU instruments:

Instrument	Action / Justification	Budget Line
Erasmus+ KA2	**Network & Pedagogy:** Fund the establishment, staffing, and quality assurance of the 100 Teaching Factories, building on the successful KA2 PreVEnT pilot model. This is a classic 'cooperation partnership for innovation' at scale.	€120 m
Digital Europe Programme	**Digital Infrastructure:** Fund the creation and 10-year maintenance of the PreVEnT Digital Hub (OER, VR simulators) and the hardening and deployment of the PreVEnT LCA tool as an open-source, GDPR-compliant EU standard.	€45 m

ESF+	**Mass Upskilling & Inclusion:** Provide national-level funding via 'PreVEnT-Eco Vouchers' (see 4.2). This empowers 500,000 technicians, particularly from SMEs and at-risk groups, to "purchase" micro-credential courses from certified providers.	€1.2 bn
Horizon Europe Cluster 4	**Future-Proofing R&D:** Fund research integrating next-gen AI, quantum sensing, and advanced composite materials into the framework, feeding the pipeline for CUs 5, 6, and 7 to prevent curriculum obsolescence.	€80 m

4.2. Financial Governance and Justification

The **€1.2 billion ESF+** allocation is the core driver of mass adoption. This is not a "blank check" but a highly targeted voucher system managed by National Agencies.

- **Voucher Justification:** The funding provides an estimated **500,000 vouchers** over the 7-year period.
- **Average Cost:** Each voucher is redeemable for one micro-credential course (avg. €2,400 per learner), covering tuition, certification, and a stipend for "backfill" (compensating SMEs for the worker's time).
- **Fund Governance:** National Agencies will disburse funds to VET/HEI providers *only upon* the successful issuance of a validated PreVEnT micro-credential. All ESF+ funding will be contingent on the provider meeting the 30% inclusion quota (Pillar 3), creating a powerful financial incentive for equity.

The **€120 million Erasmus+** fund will be distributed as competitive grants to consortia of industry and education partners to establish and operate the Teaching Factories. The **€45 million Digital Europe** fund will be managed by DG EAC to build and maintain the central Digital Hub. The **€80 million Horizon Europe** fund will be ring-fenced for calls managed by the European Research Council (ERC) specifically focused on next-generation maintenance technologies for the PreVEnT curriculum.

5. Core Policy Pillars: A Detailed Exposition

5.1. Pillar 1: A Common Competence Framework

This pillar establishes a common, EU-wide language for deep-tech maintenance skills, based on the validated PreVEnT CUs. This is the pedagogical "gold standard" that underpins the entire ecosystem.

A. Detailed Competence Unit (CU) Descriptors: We propose the formal adoption of the 4 PreVEnT CUs as standardized EQF Level 5–7 descriptors.

- **CU1: AI & Machine Learning in PdM (EQF 6 / 5 ECTS):**
  - **Description:** Provides the skills to acquire, clean, and analyze industrial data to build, train, and deploy machine learning models for anomaly detection and remaining-useful-life (RUL) prediction.

        - **Key Learning Outcomes:** Learner can implement data acquisition strategies from IoT sensors (e.g., vibration, thermal).
        - Pre-process time-series data using Python (Pandas, NumPy).
        - Train and validate classification/regression models (e.g., Random Forests, LSTMs) using TensorFlow/Scikit-learn.
        - Interpret model outputs to make a justified maintenance recommendation.
- **CU2: Co-bots & Advanced HMI (EQF 5 / 5 ECTS):**
    - **Description:** Focuses on the safe and efficient human-robot collaboration for maintenance tasks.
    - **Key Learning Outcomes:** Learner can...
        - Program a collaborative robot (e.g., via UR Academy) for a typical maintenance task (e.g., inspection, part replacement).
        - Conduct a risk assessment for a cobot cell according to ISO/TS 15066.
        - Integrate AR/VR headsets (HMI) to provide remote expert assistance or overlay digital instructions.
- **CU3: Advanced Materials & Lifecycle Thinking (EQF 6 / 5 ECTS):**
    - **Description:** Covers the properties of new materials and their implications for maintenance, repair, and end-of-life.
    - **Key Learning Outcomes:** Learner can...
        - Identify the maintenance requirements of composites, alloys, and self-healing polymers.
        - Apply 'cradle-to-cradle' principles to maintenance part selection.
        - Ensure all maintenance actions and material handling comply with REACH and ESPR regulations.
- **CU4: LCA & Social Impact Tools (EQF 7 / 5 ECTS):**
    - **Description:** Provides senior technicians and engineers with the skills to conduct full Life Cycle Assessments (LCA) to quantify the environmental and social impact of different maintenance strategies.
    - **Key Learning Outcomes:** Learner can...
        - Define the system boundaries for a maintenance process (ISO 14040/14044).
        - Use the PreVEnT open-source tool to model and compare the carbon footprint (kg CO_2-eq) of a "run-to-fail" vs. a "predictive" strategy.
        - Conduct a Social-LCA (S-LCA) to evaluate impacts on worker well-being and community.

B. Formal Mapping and Recognition: To ensure interoperability, the Commission (DG EAC/EMPL) will partner with Cedefop and the ESCO Management Board to oversee the formal mapping of these 4 CUs to the **European Skills, Competences, Qualifications and Occupations (ESCO)** framework. This links the CUs to specific occupational profiles (e.g., "Industrial Maintenance Technician"), making them visible to employers and jobseekers via EURES. All micro-credentials issued will be **Europass Digital Credential** compliant.

5.2. Pillar 2: A Hybrid Delivery Infrastructure

This pillar defines the "how" and "where" of learning, moving beyond traditional classrooms to integrated, hybrid environments.

A. The Teaching Factory (TF) Model (The "Hubs"): The 100 TFs are the core of the ecosystem. They are not new buildings, but **1-month immersive bootcamps** held on active production lines in real industrial plants (hosted by large industry partners).

- **Pedagogy:** A "Challenge-Based Learning" approach. Learners (in mixed teams of VET students, HEI engineers, and existing workers) are given a real-world problem from the host factory (e.g., "This CNC machine has an 8% failure rate, fix it").
- **Instruction:** Co-taught by HEI/VET faculty (providing the academic theory of the CUs) and industry senior engineers (providing the "shop-floor" practical context).
- **Outcome:** A validated solution for the factory and a portfolio-based assessment for the learners' micro-credentials.

B. The PreVEnT Digital Hub (The "Ecosystem Platform"): This central open-source portal, funded by Digital Europe, provides access to all:

- **OER Repository:** All CU course materials (manuals, videos, datasets) under a Creative Commons license.
- **VR/AR 'Digital Twin' Sandbox:** Allows learners to practice dangerous (e.g., high-voltage) or expensive (e.g., cobot programming) tasks in a safe virtual environment before entering the TF.
- **LCA Tool Portal:** The open-source LCA tool (from CU4) will be hosted and maintained here for free use by any EU SME.
- **Micro-Credential Ledger:** A secure, blockchain-verified ledger of all issued micro-credentials, queryable by employers (with learner permission) and interoperable with Europass.

5.3. Pillar 3: Inclusion and Regional Equity

This pillar ensures the 'twin transition' is a just transition, with powerful financial and structural mechanisms to prevent a "skills divide."

A. Mandatory 30% Inclusion Quota: This is the pillar's most critical mechanism. All funding (ESF+ vouchers, Erasmus+ TF grants) is contingent on meeting a **mandatory 30% quota** for participation from demonstrably at-risk groups.

- **Target Groups:** NEETs (Not in Education, Employment, or Training), workers aged 50+, migrants (with a focus on recognition of prior learning), and persons with disabilities.
- **Enforcement:** The PreVEnT-Eco QA Board (see 6.1) will conduct annual audits. Providers who fail to meet the quota will face a 25% funding reduction in the following year. Providers who *exceed* the quota by 10% will receive a 10% bonus, creating a strong financial incentive.
- **Outreach:** A dedicated 5% of the ESF+ budget will be allocated to NGOs and Public Employment Services to act as "brokers" to run targeted outreach campaigns and provide wrap-around support (e.g., language, digital literacy) to these groups.

B. 500 Rural Digital Hubs (The "Spokes"): To combat the industrial and digital divide, 500 "Rural Digital Hubs" will be funded in existing libraries or municipal buildings in NUTS-3 regions with a GDP below 75% of the EU average. These hubs will be equipped with high-

speed 5G/broadband and 5-10 PreVEnT VR simulation kits. They will act as "spokes," allowing learners in remote areas to access the Digital Hub's VR Sandbox and participate in virtual Teaching Factory experiences.

5.4. Pillar 4: Data-Driven Impact Measurement

This pillar establishes a data-driven approach to governance, managed via a public-facing KPI Dashboard. This ensures accountability and allows for real-time policy adjustments.

A. Key Performance Indicator (KPI) Dashboard: Annual reporting on these KPIs will be mandatory for all National Agencies and TF operators.

Domain	Key Performance Indicator	Target (by 2035)
Productivity	Reduction in unplanned downtime in partner firms	-25%
Sustainability	CO_2 tonnes saved via LCA-optimized maintenance	5 Mt per year
Sustainability	% increase in material circularity (repair vs. replace)	+40%
Human Capital	Micro-credentials issued (total)	300,000 / year
Human Capital	Employment in green-digital industrial roles	+150,000 jobs
Human Capital	OER Hub unique users	1,000,000
Inclusion	Participation rate of at-risk groups	≥ 30%
Inclusion	% of vouchers redeemed by SME employees	≥ 50%
Inclusion	Number of Rural Digital Hubs operational	500

B. Reporting and Accountability: The QA Board will compile this data into an annual **"PreVEnT-Eco Impact Report"** delivered to the European Parliament and Commission. This report will form the basis for policy adjustments and the "go/no-go" decision for a potential "PreVEnT-Eco 2.0" post-2034.

6. Governance and Implementation

6.1. Governance Structure

A lean, effective governance structure is proposed, managed by a central board and implemented by existing national bodies.

- **PreVEnT-Eco QA Board (The "Head"):**
  - **Mandate:** A new, independent body co-chaired by IIS and IIW.
  - **Composition (15 members):** 4 from Commission (EAC, GROW, EMPL, CLIMA), 4 from Industry (e.g., EIT Manufacturing, Siemens, SUDOTIM, INTELIFORM), 4 from Education (e.g., ISIM, EU-VET, EUA, LOLA), 3 from Social Partners (e.g., ETUC).
  - **Responsibilities:**
    - Accredit all VET/HEI providers to issue PreVEnT micro-credentials.
    - Audit Teaching Factories for safety and quality.
    - Enforce the 30% inclusion quota and manage funding bonuses/penalties.
    - Maintain the Digital Hub and LCA tool.
    - Commission Horizon Europe R&D and integrate findings into new CUs.
- **National Agencies (The "Arms"):**
  - **Mandate:** Existing national agencies that already manage ESF+ and Erasmus+.
  - **Responsibilities:**
    - Manage the ESF+ "PreVEnT-Eco Voucher" scheme for their country.
    - Promote the ecosystem to local SMEs and learners.
    - Collect national data for the KPI Dashboard.

6.2. Detailed Implementation Roadmap (2026-2035)

Year(s)	Phase	Key Milestones
2026	**Phase 1: Foundation**	• Formal adoption of PreVEnT CUs into ESCO & EQF. • Establishment of the PreVEnT-Eco QA Board. • First Erasmus+ calls for 10 pilot Teaching Factories. • Digital Europe contract awarded for Digital Hub.
2027	**Phase 2: Digital Launch**	• PreVEnT Digital Hub v1.0 and OER Repository go live. • PreVEnT LCA tool made mandatory for all Erasmus+ industrial projects to drive adoption. • First 10 TFs become operational.

2028	**Phase 3: Scaling**	• ESF+ "PreVEnT-Eco Voucher" scheme goes live across all Member States. • First 100,000 micro-credentials issued. • First 100 Rural Digital Hubs operational. • Horizon Europe calls for "CUs 5 & 6" are launched.
2029-2031	**Phase 4: Expansion**	• Scale-up to 75 Teaching Factories. • Digital Hub user base crosses 500,000. • First annual Impact Report published, with quota enforcement beginning.
2032-2034	**Phase 5: Maturity**	• Full network of 100 TFs and 500 Rural Hubs operational. • CUs 5 & 6 (from Horizon R&D) are validated and rolled out. • Mid-term review and formal proposal for post-2035 funding.
2035	**Full Ecosystem**	• All targets met. 1M OER users. 300k credentials/year. • KPI targets for downtime reduction (-25%) and CO_2 savings (5Mt) are achieved.

6.3. Risk Matrix and Mitigation Strategies

ID	Risk Description	Likelihood	Impact	Mitigation Strategy
R-01	**Low SME Adoption:** SMEs lack time, capital, or awareness.	High	High	• **ESF+ Voucher:** Covers 100% of cost + stipend for "backfill." • **OER Hub / LCA Tool:** Provides free, asynchronous tools/modules. • **National Agencies:** Mandated to run SME-specific awareness campaigns.

R-02	**Shortage of Trainers:** VET/HEI teachers lack "deep-tech" industry experience.	High	High	• **"Train-the-Trainer" Program:** Funded by Erasmus+ KA2. • **TF Model:** Mandates co-teaching between VET faculty and industry experts, facilitating knowledge transfer.
R-03	**Data Privacy (GDPR):** The LCA tool and AI modules require sensitive operational data.	Medium	High	• **GDPR-by-Design:** The LCA tool is built to be open-source, federated, and require no proprietary data upload. All data remains on-premise. • **Clear Legal Framework:** Provide standardized data-sharing agreements for TFs.
R-04	**Curriculum Obsolescence:** Deep-tech (AI) evolves too fast.	High	Medium	• **Horizon Europe R&D Stream:** A dedicated €80m fund to feed next-gen R&D directly into the QA Board for curriculum updates every 24-36 months.
R-05	**Lack of Micro-Credential Recognition:** Employers ignore CUs.	Medium	High	• **Pact for Skills:** Leverage the Pact to get industry leaders (Siemens, Festo) to publicly commit to recognizing PreVEnT CUs in job descriptions. • **ESCO/EURES Integration:** Makes CUs visible in the official EU skills/job portal.
R-06	**Failure to Meet Inclusion Quotas:** Providers default to "easy" learners.	Medium	High	• **Funding Contingency:** All ESF+/Erasmus+ funding is made contingent on meeting the 30% quota (audited by QA Board), with financial bonuses/penalties.
R-07	**Uneven Digital Infrastructure:** Rural Hubs fail due to poor connectivity.	High (in some regions)	Medium	• **Coordination with Digital Decade:** Hub locations will be prioritized in regions already targeted for 5G/broadband rollout under the Connecting Europe Facility (CEF).

7. Conclusion

The PreVEnT-Eco proposal is more than an education policy; it is a core component of the EU's industrial and environmental strategy. It addresses the simultaneous, urgent needs for enhanced productivity, digital and green skills, and sustainable practices within our most critical economic sector.

By scaling the proven, successful PreVEnT model, this policy provides a concrete, multi-billion-euro "how-to" for achieving the 'twin transition'. It transforms industrial maintenance from a cost center into a strategic driver of value, efficiency, and sustainability. It equips the European workforce—from the VET apprentice to the senior engineer—with the deep-tech and green-tech skills needed to lead the world in Industry 5.0.

This proposal is ambitious but pragmatic. It is grounded in a successful pilot, funded by a smart blend of EU instruments, and designed for measurable, real-world impact. We are confident that this investment in our industrial human capital will secure the EU's strategic autonomy, competitiveness, and commitment to the European Green Deal for decades to come. We call upon the Council and the Parliament to give this flagship initiative their full support.

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