AI Skills Strategy for Europe

STRATEGIC PLANNING FOR DEVELOPING AI SKILLS IN EUROPE

30 September 2023

Executive Summary

1. Executive Summary

1.1. Introduction

The AI skills landscape in Europe is characterized by a dynamic blend of academic excellence, burgeoning start-up ecosystems, and sustained governmental initiatives. European universities are at the forefront of AI research, producing a pool of highly skilled AI professionals. However, Europe still faces challenges in retaining talent and having enough diversified AI-related profiles. In order to address this skills gap and foster a digital-ready workforce, Europe must shape a comprehensive AI Skills Strategy.

The AI Skills Strategy for Europe is built on the findings from the Needs Analysis (ARISA, 2023), in which the current and future needs for AI skills in Europe were investigated, as well as an analysis of relevant best practices & initiatives (ARISA 2023a) and insights from stakeholder needs and suggestions (ARISA 2023b).

This strategy is a living document, subject to annual revisions to ensure alignment with evolving market trends and AI skill demands. Together, we can shape a resilient AI skills foundation for Europe's future.

1.2. Vision and mission

The AI Skills Alliance vision:

Strive for Europe to have a resilient AI-skills foundation for a wide range of AI-professionals, policy and decision-makers.

The overall mission:

Enable re- and upskilling of AI professionals and building a resilient European AI-skills foundation by addressing and monitoring possible AI-skills mismatches in a long-term AI Skills Alliance of European key players in the field.

1.3. Objectives

The main goal of the AI Skills Strategy is to lead to systemic and structural impact on reducing skills shortages, gaps, and mismatches, as well as ensure appropriate quality and levels of skills to a broad range of stakeholders. This strategy serves as a stepping stone for developing AI educational and training activities in Europe, in an innovative, inclusive and ethical way. The strategy should cater to AI professionals, decision-makers, and policymakers, addressing their diverse educational needs. The demand for AI-related roles, including machine learning engineers and prompt engineers, is escalating. An agile, modular approach to education and training, accommodating rapid technological changes, is essential. Policymakers and decision-makers require a basic understanding of AI's moral, ethical, and legal dimensions. Moreover, a societal approach to AI skills development is imperative, promoting diversity and inclusion within the AI sector. As AI technologies proliferate, organisations must foster welcoming environments and prioritize reskilling programs for workers in lower wage, shrinking occupations.

Despite current initiatives, a gap persists in matching education supply with demand. Collaboration between academia and the labour market, rapid reskilling programs, and enhanced access to existing initiatives are necessary steps. Additionally, sectors heavily reliant on AI technology must actively support AI skills development.

Overall, the AI Skills Strategy for Europe aims to achieve:

- A long-term alliance of European key players in the field of AI that includes strategic cooperation among education, industry, and policy actors on AI skills development.
- An adaptive approach in providing innovative educational and training instruments that are updated regularly as a response to ongoing AI advancements.

1.4. Methodological approach

The AI Skills Strategy for Europe is a collaborative deliverable of the ARISA consortium. The systematic approach followed to define the AI Skills Strategy is based on the validated strategic planning and strategic-management models, it involves 3 steps (see Figure 1): strategy formulation, strategy implementation, and strategy evaluation and iteration.
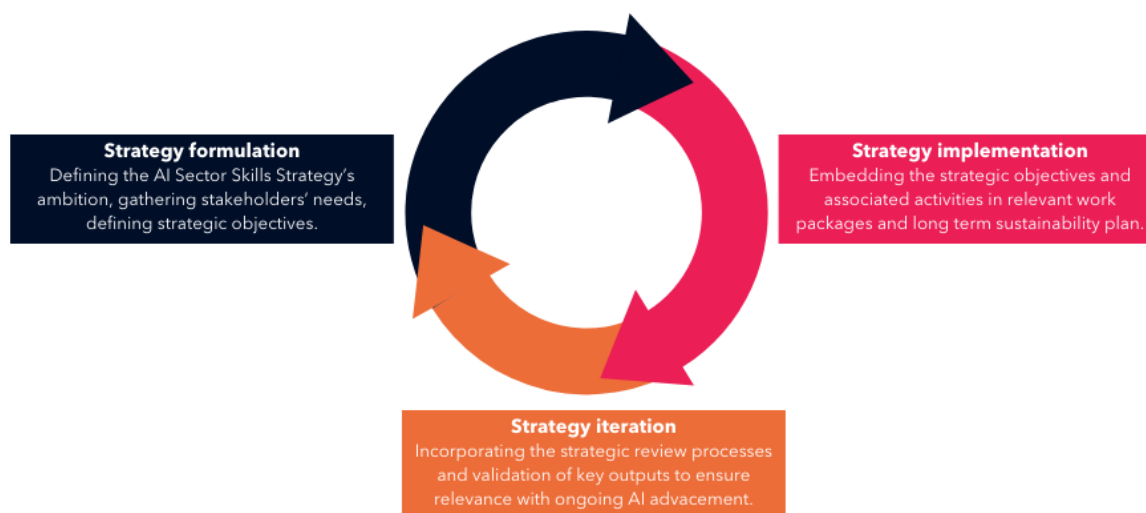

Figure 1. Systematic approach followed to define the AI Skills Strategy

1.4.1. Strategy formulation

Step 1 - Definition of mission and strategic objectives

The strategy began with a comprehensive assessment of the current AI skills landscape in Europe. This analysis encompassed an evaluation of present and future AI skill demand and supply, offering insights into mismatches and trends. Simultaneously, an Advisory Board was established, comprising experts from diverse sectors, to guide the strategy's development. Based on data and input from the group of selected experts in the field, the mission, vision, and overarching strategic goals of the AI Skills Alliance were defined.

Step 2 - Stakeholder engagement

Recognizing the importance of multiple perspectives, a public consultation was initiated. This involved an online questionnaire and focus groups to gather views from a wide range of stakeholders. The objective was to validate the mission statement and strategic objectives and ensure alignment with industry, policy, and civil society stakeholders in the AI field.

Step 3 - Defining activities

With the strategic objectives in place, specific activities were outlined for each objective. Action plans and roadmaps were created, breaking down initiatives into actionable steps with assigned responsibilities and deadlines. This granular approach ensures focus, direction, and measurable progress towards building a robust AI skills foundation in Europe.

1.4.2. Strategy implementation

The implementation of the AI Skills Strategy is underpinned by the concrete and actionable nature of the strategic objectives. Each objective has a detailed overview of specific short-term and long-term activities.

1.4.3. Strategy evaluation and iteration

Given the dynamic nature of AI development, continuous evaluation and iteration are paramount. This process involves two complementary cycles:

1. *Shorter and Rapid Cycle:* Advisory Board meetings are held every six months to review progress, discuss short-term iterations, and ensure the strategy remains adaptable.
2. *Longer and Thorough Cycle:* An annual evaluation process considers skills needs, profiles, and feedback from training providers and key stakeholders. This thorough review ensures the strategy's sustainability and relevance.

1.5. Scope of the Strategy

The AI Skills Strategy for Europe outlines a clear and focused approach to AI skills development. It identifies specific role profiles and AI-related skills, with a particular emphasis on creating innovative educational programs tailored to match these role profiles. The strategy acknowledges the diverse needs of various stakeholders within the AI ecosystem. It primarily targets four domains of professional roles: AI practitioners, AI management and support, organizational decision-makers, and policymakers, recognizing that the skills required for AI professionals differ from those needed by non-AI professionals.

For AI professionals, such as data scientists, machine learning engineers, and AI strategists, the strategy highlights the importance of specific technical knowledge and skills that align with their roles. This includes knowledge of data science, machine learning, and prompt engineering, as well as soft skills like problem-solving, critical thinking, and communication. Additionally, it emphasizes the need for proficiency in transversal topics like accessibility, ethics, privacy, security, and understanding business processes.

Non-AI professionals, including organizational decision-makers and policymakers, are also addressed. Decision-makers need basic AI knowledge and skills to comprehend AI proposals and their impact on business processes. Policymakers are divided into two groups: those requiring basic AI knowledge and skills, like elected officials and directors-general, and those needing more advanced AI knowledge and skills, such as AI advisors and national Chief Information Officers (CIOs). The strategy recognizes that decision-makers and policymakers need expertise in understanding both the technical and business aspects of AI, along with ethical and legal considerations.

Overall, the strategy underscores the importance of aligning skills development with the field of AI, focusing on skills directly relevant to AI-related decision-making, and emphasizing the urgency of these skills to keep pace with global developments in AI.

1.6. Strategic Objectives and Activities

The AI Skills Strategy is composed of seven main strategic objectives. Each strategic objective has a set of activities, milestones and KPIs involving the Alliance partners and other stakeholders.

In the table and figure below an overview is given of the strategic objectives, activities and timeline. The formulation of the strategic objectives underscores a comprehensive and dynamic approach to address the evolving landscape of AI skills and knowledge within the European Union. These

objectives reflect a systemic perspective, acknowledging that AI skills development is not static but continually subject to change and innovation. The strategic objectives (SOs) are as follows:

1. SO1: identifying potential skills mismatches, recognizing the need for a constant evaluation of the AI talent pool.
2. SO2: defining the most sought-after AI-related roles and skills requirements, responding to the fluid demands of the market.
3. SO3: the creation of educational profiles, certification frameworks, and accreditation processes, embodying a commitment to adapting educational offerings to align with industry needs.
4. SO4: the development of modular AI skills learning programs, a nod to the need for flexible and responsive training due to the dynamics of the AI sector.
5. SO5: Promoting collaborative learning and information sharing in an AI skills community, as the foundation and enabler to keep the strategy always up to date.
6. SO6: Sustainably promoting AI awareness, advocating for diversity in the AI workforce, and fostering dialogue on ethical, inclusive, and human-centred AI principles and challenges with decision-makers and policymakers
7. SO7: fast-track AI upskilling and reskilling initiatives at various levels, while advancing the discourse on these programs with national and local governments, actively identifying and advocating for funding opportunities, and providing capacity building to engage key stakeholders within national and local communities.

Together, these objectives illustrate a strategy designed not just for the present but one that evolves alongside the AI landscape, ensuring Europe remains at the forefront of AI expertise.

Table on the Overview of AI Skills Strategic Objectives and Associated Activities

Strategic Objectives	SO1: Outline the potential AI skills mismatches at the EU level	SO2: Define in-demand AI-related roles and skills requirements	SO3: Design of educational profiles, certification framework and accreditation process	SO4: Design modular AI skills learning offerings	SO5: Establish and nurture an active community of stakeholders for AI skills development	SO6: Promote and increase overall understanding of AI	S07: Accelerate AI upskilling and reskilling at different levels
Activities	1.1. Analyse AI skills requirements in the EU 1.2. Analyse the AI skills learning offerings in the EU	2.1. Define an AI role profile structure 2.2. Update the AI Role Profile Structure 2.3. Align AI roles and skills with existing European ICT roles and skills frameworks and standards	3.1. Define key educational profiles (programmes and unit learning outcomes) 3.2. Design the European AI skills certification framework 3.3. Design accreditation procedures	4.1. Deliver fit-for-purpose core curricula for AI skills across the EU 4.2. Widen access to AI skills learning offerings 4.3. Foster diversity and inclusion within AI skills training 4.4. Develop the trainer-the-trainer programmes	5.1. Develop a value proposition to engage and support companies, learning providers, and public organisations. 5.2. Grow a sustainable AI Sector Skills Alliance 5.3. Develop new collaboration avenues between industry, academia, NGOs and governments	6.1. Raise awareness about AI principles, opportunities and challenges 6.2. Ensure diversity in the working field of AI 6.3. Support the narrative of ethical, inclusive, human-centred AI with decision and policy makers	7.1. Advance the narrative on AI upskilling and reskilling with national governments 7.2. Map and promote funding opportunities for AI skills development 7.3. Capacity building to key stakeholders to engage the national and local communities

Figure on the Strategic roadmap: AI Skills Strategy

Strategic Objective	Action	2022	2023	2024	2025	2026	2027	2028+
SO1: Outline the potential AI skills mismatches at the EU level	1.1. Analyse AI skills requirements in the EU	Initial analysis			Yearly update	Yearly update	Yearly update	Yearly update
	1.2. Analyse the AI skills learning offerings in the EU	Initial analysis			Biennial update		Biennial update	Biennial update
SO2: Define in-demand AI-related roles and skills requirements	2.1. Define the AI role profile structure			Initial structure proposed		Biennial update		Biennial update
	2.2. Update the AI role profile structure				Yearly update	Yearly update	Yearly update	Yearly update
	2.3. Align AI roles and skills with existing European ICT roles and skills frameworks and standards				Align with with ESCO and e-CF	Maintain active engagement with eco-system		
SO3: Design of educational profiles, certification framework and accreditation process	3.1. Define key educational profiles (programmes and unit learning outcomes)			Design educational profiles		Update educational profiles based on market developments	Yearly update	Yearly update
	3.2. Design the European AI skills certification framework			Design an AI skills certification framework			Ensure the continued relevance and effectiveness of the AI certification framework	
	3.3. Design accreditation procedures			Design accreditation procedures			Uphold a robust accreditation procedure designed to guarantee long-term quality management of AI learning offerings in Europe	
SO4: Design modular AI skills learning offerings	4.1. Deliver fit-for-purpose core curricula for AI skills across the EU			Design of the core curriculum	8 national pilots of AI courses finalised	Roll-out of programmes (continuously evolving)		
	4.2. Widen access to AI skills learning offerings			A web-based version of the curriculum - self-paced MOOC		Flexible and accessible pathways in the AI skills learning offerings	Ongoing update	
	4.3. Foster diversity and inclusion within AI skills training			Diversity focused review process				
	4.4. Develop the trainer-the-trainer programmes				Implementation of a train-the-trainer program	Ongoing update and results tracking		
SO5: Establish and nurture an active community of stakeholders for AI skills development	5.1. Develop a value proposition to engage and support companies, learning providers, and public organisations	Proposal formulation					Report results	Yearly update
	5.2. Grow a sustainable AI Sector Skills Alliance	MoU	MoU and continued recruitment of associate and strategic partners					
	5.3. Develop new collaboration avenues between industry, academia, NGOs and governments	MoU	On-going engagement activities					
SO6: Promote and increase overall understanding of AI	6.1. Raise awareness about AI principles, opportunities and challenges				Use-cases collected and communicated	Educational materials available	Workshop implementation	
	6.2. Ensure diversity in the working field of AI				Pilot courses - including content related to diversity	Map potential cross-collaboration with initiatives promoting diversity	Ongoing initiatives with partners	
	6.3. Support the narrative of ethical, inclusive, human-centred AI with decision and policy makers		Pilots for AI advisory course	Engagement strategy for the involvement of national policymakers		Results report on engagement of national policymakers	Ongoing initiatives with partners	
SO7: Accelerate AI upskilling and reskilling at different levels	7.1. Advance the narrative on AI upskilling and reskilling with national governments	Initial analysis		Mapping of opportunities		Establish active partnerships with at least 5 national and local governments		
	7.2. Map and promote funding opportunities for AI skills development					Database of funding opportunities for AI skills development across the EU		
	7.3 Capacity building to key stakeholders to engage the national and local communities	Initial analysis		Pilots on urgent upskilling programmes		Biennial update		Biennial update

1.7. Conclusions

The AI Skills Alliance has developed a comprehensive AI Skills Strategy for Europe, encompassing seven key Strategic Objectives, designed to address the increasing demand for AI professionals and to bridge the AI skills gap. This strategy aims to identify skills gaps, define in-demand roles and skills, and also promote inclusivity in AI sector. It's a valuable resource for policymakers, emphasizing the importance of aligning policies and initiatives with the dynamic and evolving AI landscape. For organizations and educational institutions, it serves as inspiration to build a strong AI-skilled workforce in Europe. The Alliance invites collaboration between academia and industry to address AI skills challenges and updates the strategy annually to stay current with market trends. Together, they aim to create a resilient AI skills foundation for Europe.

2. References

ARISA (2023). AI Skills Needs Analysis, https://aiskills.eu/wp-content/uploads/2023/06/ARISA_AI-Skills-Needs-Analysis_V1.pdf

ARISA (2023a). Analysis of relevant practices and initiatives. Artificial Intelligence Skills Alliance.

ARISA (2023b). AI upskilling and reskilling: Key priorities and enablers. Artificial Intelligence Skills Alliance.

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