Artificial Intelligence Education Studies
Volume 1, Issue 3, 2025, Page 28-42
https://doi.org/10.6914/aiese.010303

Artificial Intelligence Education Studies

Architecting a National AI Talent Ecosystem: A Systematic Scoping Review of Strategies for Education, Innovation, and Governance

Yanlin CHEN
Hong Kong Integration Research Institute

Abstract

This paper addresses the critical need for a holistic, evidence-based national strategy to cultivate a world-class artificial intelligence (AI) talent pool. As AI reshapes global economies, labor markets, and the geopolitical landscape, national competitiveness hinges on the ability to develop, attract, and retain AI expertise. Employing a systematic scoping review methodology, this study synthesizes evidence from academic literature, government policy documents, and industry white papers to construct an integrated strategic blueprint. The analysis deconstructs the core components of a comprehensive talent development policy, proposing a multi-pillar framework that integrates a lifelong learning continuum, a differentiated talent pipeline architecture, synergistic public-private enablers, and modernized evaluation paradigms. Through a comparative analysis of divergent national strategies—including the market-driven model of the United States, the governance-first approach of the European Union, and the state-directed models of India, Singapore, the United Arab Emirates, and Canada—this paper illuminates the trade-offs between different philosophical and tactical choices. Key findings reveal the heterogeneous nature of AI's impact on labor, the centrality of public trust as a prerequisite for adoption, and a necessary paradigm shift from credential-based to competency-based talent evaluation. The proposed blueprint, which introduces a novel "Builder-Bridger" talent model, offers a comprehensive, actionable guide for policymakers and academic leaders aiming to build a sustainable and globally competitive national AI talent base capable of navigating the complexities of the AI era.

Keywords competency-based education (CBE); human AI orchestration; adaptive-autonomy curve (self-regulated learning);situated performance-based assessment; governance & interoperability protocols (shared student model)

1 Introduction: The Evolving Landscape of AI and the Imperative for a Strategic Response

The cultivation of a robust and innovative artificial intelligence (AI) talent pool has transcended the realm of educational policy to become a cornerstone of 21st-century national strategy. Breakthroughs in AI hold the potential to reshape the global balance of power, catalyze the emergence of entirely new industries, and fundamentally revolutionize the nature of work and society. Consequently, a nation's capacity to lead in AI development and deployment is inextricably linked to its long-term economic growth, productivity, and security. The economic stakes are immense, with generative AI alone projected to create trillions of dollars in value across industries. However, this transformative potential is accompanied by profound disruption, creating a dual mandate for national governments: they must aggressively seize the economic opportunities presented by AI while simultaneously building the societal resilience to navigate its far-reaching impacts.

 Article History Received: May 16, 2025; Accpted: July 4, 2025; Published: September 30, 2025. ***Artificial Intelligence Education Studies***, ISSN 3079-8086 (print), ISSN 3079-8094 (online), a Quarterly, founded on 2025, published by Creative Publishing Co., Limited. Email: wtocom@gmail.com, https://ai-es.org, https://cpcl.hk.

1.1 The Dual Mandate: Economic Opportunity and Labor Market Disruption

The imperative for a national AI talent strategy is rooted in a complex and often contradictory set of economic and social forces. On one hand, the economic promise of AI is unprecedented. Projections from leading economic analyses suggest that AI could add up to $15.7 trillion to the global economy by 2030, generated through productivity gains from process automation, the augmentation of the existing labor force with AI tools, and the creation of new AI-driven products and services. This positions AI not as a niche technology but as a fundamental economic engine with near-universal application, similar in scope to electricity or the internet. On the other hand, this wave of innovation is creating significant friction within global labor markets. The impact is not a monolithic process of job replacement but a complex, heterogeneous phenomenon of task augmentation, substitution, and transformation. A study of the European labor market, for instance, found no clear correlation between AI use and overall employment matching efficiency, though it did find sector-specific negative impacts on job vacancies in fields like information and communication. This nuanced reality demands a sophisticated policy response that moves beyond a simplistic narrative of automation-driven job loss.

Recent data reveals a particularly troubling trend where AI adoption disproportionately displaces entry-level workers in AI-exposed fields, automating the routine tasks that have historically served as the first rungs on the professional ladder. A study from Stanford University found that AI is having a "significant and disproportionate impact" on entry-level workers in the United States, raising serious questions about how the next generation will gain a foothold in the evolving economy. This phenomenon creates a "pipeline paradox": the very mechanisms for developing future senior talent are being eroded, threatening to create a generational skills gap that could stifle long-term innovation and exacerbate inequality. The scale of this transition is substantial; a McKinsey analysis projects that by 2030, the U.S. labor market may require as many as 12 million occupational transitions, a rate of change far faster than previously anticipated. This juxtaposition of a massive shortage of senior AI talent against the systematic erosion of entry-level training grounds reveals a critical structural flaw in the talent pipeline. A national strategy focused only on high-level experts without creating new career entry points is addressing a symptom while ignoring the root cause, and is therefore structurally unsound.

Furthermore, the economic disruption is accompanied by significant socio-psychological consequences. The narrative from corporate boardrooms often focuses on value creation, but an equally important aspect is the rising anxiety among workers who feel their livelihoods are directly threatened by an inexorable technological force. Research indicates a direct correlation between the fear of unemployment and adverse outcomes such as psychological distress, occupational stress, and even negative physical health impacts. This anxiety transforms the AI transition from a purely economic challenge into a complex socio-technical problem. A successful national strategy must therefore look beyond economic indicators and proactively address these psychological and social impacts through transparent communication, human-centered job design, and robust systems for reskilling that foster a culture of adaptation rather than competition with machines.

1.2 The Policy Chasm: Public Trust, Ethics, and the Digital Divide

The successful integration of AI into the fabric of society depends not only on its technical capabilities but also on the bedrock of public trust and the existence of fair and equitable governance frameworks. A significant "policy chasm" has emerged where technological advancement has outpaced the development of the social and ethical guardrails necessary to ensure its responsible deployment.

Evidence indicates that public concern over data privacy and ethics constitutes a formidable barrier to AI adoption, particularly in sensitive domains like education. Polling reveals that nearly seven in ten parents oppose granting AI software access to their children's personal or academic information. This skepticism is rooted in a deeper and more widespread apprehension about how both corporations and governments use personal data, with a 2023 Pew Research Center survey finding that 71% of U.S. adults are concerned about government data use, an increase from 64% in 2019. This erosion of trust is not an irrational fear but a rational response to a perceived accountability vacuum in governance; the public sees the technology's power but does not see robust, transparent systems for its control. A conceptual framework analyzing parental attitudes toward AI identifies a three-pillar structure composed of trust, cultural values, and digital literacy, suggesting that trust can be cultivated through transparency and meaningful human oversight. This implies that a successful national strategy cannot rely on technological optimism alone; it must include a robust public communication component designed to build **earned trust** through transparent governance.

Moreover, the rapid proliferation of AI threatens to exacerbate existing social and regional inequalities. While

digitalization holds the potential to bridge the urban-rural divide, it can also deepen the digital divide if not managed equitably. For example, in regions with aging populations, the digitization of essential services may further marginalize those who are less technologically proficient. This highlights the context-dependent nature of AI's impact, which is shaped by local economic conditions and institutional frameworks. Recognizing this risk, policymakers have been urged to "over-invest and incentivize" training programs specifically targeted at communities of color and other groups historically excluded from the benefits of technological revolutions. This underscores a critical point: successful AI integration is not merely a matter of technological deployment but requires the intentional design of policies that ensure its benefits are distributed fairly, preventing the amplification of existing societal fissures.

1.3 An Ecosystem Approach and Methodological Rigor: A Systematic Scoping Review

The complexity of the "pipeline paradox" and the "policy chasm" makes piecemeal initiatives insufficient. This paper formally proposes the need for a holistic "ecosystem" approach, architecting education, research, industry, and policy as a self-reinforcing system. To build this framework on an empirical foundation, this paper employs a **Systematic Scoping Review** as its core methodology. This approach is particularly well-suited for broad, policy-oriented topics where the goal is to map the existing landscape of knowledge and practice from diverse sources. Unlike a traditional systematic review, which seeks to answer a narrow question about the efficacy of a specific intervention, a scoping review is designed to "comb the evidence and describe its findings," providing a comprehensive overview of a field. This allows for the synthesis of evidence from a wide array of sources, including peer-reviewed academic articles, government reports, industry white papers, and expert analyses, which is essential for understanding the multifaceted nature of AI talent strategy.

The research design follows the established protocol for systematic scoping reviews to ensure transparency and rigor. The central research questions were structured using the Population, Concept, Context (PCC) framework recommended by the Joanna Briggs Institute (JBI). The **Population** includes policymakers, educators, industry leaders, and the public. The **Concept** encompasses AI talent strategies, skills development, educational frameworks, and governance models. The **Context** is policy formulation and implementation at national and regional levels. A structured data charting process was used to systematically extract key information from the collected sources, including the core policy pillars of each national strategy, specific programmatic initiatives, governance models, and the types of evidence cited. This systematic approach ensures that the analysis and the resulting blueprint are grounded in a solid, verifiable, and empirically-driven foundation of global policy and practice. This paper's main contributions, derived from this methodology, are: (1) an evidence-based AI talent ecosystem framework; (2) a comparative analysis of international strategies; and (3) the innovative "Builder Bridger" dual-track talent model.

2 Cultivating Lifelong AI Literacy: A Foundational Continuum

Achieving widespread AI proficiency and building a resilient, adaptable talent pool cannot be confined to a single educational stage or a narrow segment of the population. It demands a continuous, integrated framework that spans from primary school through an individual's entire professional career. This lifelong learning continuum is essential for building both the foundational literacy necessary for informed citizenship and the advanced, adaptable expertise required for economic competitiveness.

2.1 Foundations in K-12: From Coding to Conceptual and Critical Thinking

The integration of AI into K-12 education represents the foundational step in preparing future generations to thrive in an AI-pervaded world. A successful approach requires a strategic shift away from a narrow focus on teaching basic coding toward the cultivation of a deeper, more conceptual understanding of AI's core principles and societal implications. A robust model for this is the curriculum framework built around the "Five Big Ideas in AI," developed by the Association for the Advancement of Artificial Intelligence (AAAI) and the Computer Science Teachers Association (CSTA). These core concepts—Perception, Representation & Reasoning, Learning, Natural Interaction, and Societal Impact—provide a coherent structure for introducing AI across different grade bands, prioritizing critical thinking over rote technical skills. The University of Florida's K-12 AI Education Program serves as a leading example of how these "Big Ideas" can be effectively translated into a scalable curriculum.

However, successful implementation demands a guiding philosophy for responsible integration. The "Framework for Responsible AI Integration in PreK-20 Education," developed at the University of Kansas, provides such a

philosophy through its four pillars: establishing a human-centered foundation, implementing future-focused strategic planning, ensuring equitable access, and conducting ongoing evaluation. This framework serves as a critical guardrail, ensuring that technology serves pedagogical goals and human values, rather than exacerbating existing inequities. The translation of these frameworks into policy is visible in initiatives like the U.S. National Science Foundation's (NSF) funding for K-12 AI education resources and California's establishment of a statewide AI in Education Workgroup. Despite these efforts, the previously noted "policy chasm" remains a significant barrier; the lack of public trust requires that any implementation strategy must include robust public communication and transparent data governance to build earned trust within the community.

2.2 Advanced Cultivation in Higher Education: The "Builder" and "Bridger" Archetypes

As AI's influence permeates every professional domain, higher education must evolve beyond treating AI as a discipline confined to computer science departments. Analysis of leading universities reveals the emergence of two distinct but complementary models for this integration, which are effectively creating two critical archetypes of AI professionals needed for a mature talent ecosystem: the "Builder" and the "Bridger".

The first archetype, the "**Builder**," comprises the deep technical experts—computer scientists and engineers—who can design, analyze, and implement the next generation of foundational AI models and algorithms from the ground up. These professionals are cultivated in technically rigorous programs such as Carnegie Mellon University's (CMU) Bachelor of Science in AI. While deeply focused on computer science, mathematics, and machine learning, this curriculum also mandates courses in ethics and cognitive studies and offers concentrations that apply AI across diverse fields, embedding technical knowledge within a broader, human-centered context.

The second archetype is the "**Bridger**," a domain expert—such as a doctor, lawyer, or manager—who possesses both deep field-specific knowledge and high AI fluency. These individuals serve as the essential translators between technical teams and real-world needs, ensuring that AI tools are developed and deployed in a manner that is contextually appropriate, safe, and impactful. They are often described as "T-shaped professionals," possessing deep expertise in one field (the vertical bar of the T) and the ability to collaborate across disciplines (the horizontal bar). This archetype is cultivated through innovative interdisciplinary programs, exemplified by Florida Atlantic University's (FAU) combined degree programs that explicitly connect a professional field to AI, such as a "Bachelor of Science in Nursing to Master of Science in Artificial Intelligence".

A comprehensive national talent strategy must recognize that a thriving AI economy requires both of these archetypes. Builders are necessary to push the technological frontier, but without Bridgers, these innovations risk remaining isolated in labs, failing to solve meaningful problems. The distinction between these two pathways provides a powerful analytical tool for policymakers to diagnose and address imbalances in their national talent pipeline. A nation might discover it has an abundance of Builders but a shortage of Bridgers, leading to technically brilliant AI solutions that fail to address the nuanced realities of sectors like healthcare or law. Therefore, national policy must adopt a dual-pronged approach: funding core computer science to produce world-class Builders while simultaneously incentivizing the integration of AI education across all other disciplines to create a versatile workforce of Bridgers.

2.3 AI for All: Public Literacy and Workforce Reskilling as Economic Infrastructure

A truly comprehensive AI talent strategy must extend beyond the formal education system to encompass the entire populace and the active workforce. For public literacy, Finland's "Elements of AI" course provides a global benchmark for success. Developed as a public-private partnership, this free online course was designed to demystify AI for the general public. Its initial goal of educating 1% of the Finnish population was vastly exceeded, ultimately reaching over 1.7 million students across 170 countries and notably attracting a high percentage of women (40%) and individuals over 45. This initiative proves that elevating national AI literacy is an achievable and strategically valuable goal.

For the active workforce, the rapid evolution of AI makes skills obsolescence a critical economic threat, necessitating a culture of lifelong learning. The paradigm of "continual learning" in AI systems—where models incrementally adapt to new data without catastrophically forgetting prior knowledge—serves as a powerful metaphor for the modern worker. The "AI-Ready Workforce" framework from Jobs for the Future (JFF) offers a blueprint for this systemic adaptation, calling for integrated action at three levels: **Preparing Humans** through universal AI literacy, **Preparing Institutions** by fostering adaptive cultures, and **Preparing Ecosystems** through strategic workforce planning and public-private investment.

These initiatives suggest that national AI literacy should be viewed not merely as an educational expense but as a strategic investment in a new form of critical economic infrastructure. Traditional infrastructure like highways and broadband internet lowers the cost of doing business by reducing physical and digital friction. Similarly, a population with a high baseline of AI literacy creates a more fertile ground for innovation and adoption. It produces more discerning consumers, a more adaptable workforce, and entrepreneurs who can more readily identify opportunities for AI application. This widespread literacy reduces economic friction by lowering the cost of corporate training, accelerating the adoption of new AI tools, and fostering a more informed public discourse around AI policy. Reframing public AI literacy as "economic infrastructure" fundamentally alters the policy rationale from a recurring budget expense to a long-term capital investment in national competitiveness, justified by its broad, economy-wide positive externalities.

3 Architecting a Differentiated Talent Pipeline: From Novice to Pioneer

A successful national strategy requires differentiated pathways and tailored support to cultivate talent across the full spectrum of expertise. This involves not only training a broad base of AI-literate workers but also developing elite experts, fostering pioneering researchers, and empowering the educators who form the foundational pillar of the entire system.

3.1 The Multiplier Effect: Empowering Educators as a National Security Imperative

The entire AI talent pipeline is contingent on the quality and capacity of educators. They are simultaneously the system's most critical bottleneck and its most powerful multiplier. Professional development for educators is therefore a paramount investment, representing the highest-leverage point for systemic change. Effective training models already exist and can be scaled, ranging from university-led partnerships, such as the coaching provided by the University of Florida's K-12 program, to accessible, industry-led initiatives like Grow with Google's "Generative AI for Educators" course and similar programs from Microsoft.

However, this training must extend far beyond the technical "how-to" of using AI tools. It must equip educators to lead nuanced, critical discussions in the classroom about the complex ethical and societal dimensions of AI, including algorithmic bias, data privacy, and the potential for AI to be used for manipulation or to spread misinformation. This pedagogical preparation is essential for addressing the valid concerns of students and parents and for cultivating responsible, critically-minded digital citizens.

In this context, teacher training assumes an importance that transcends educational policy and becomes a matter of national security. Adversarial actors are increasingly leveraging AI-driven tools to generate and disseminate sophisticated disinformation at an unprecedented scale, aiming to sow social division and undermine democratic institutions. The first and most sustainable line of defense against such threats is not technological, but human: a resilient populace capable of critical thinking and media literacy. The foundation for this resilience is laid in K-12 classrooms, and teachers are the agents who build it. If educators are not equipped to teach students how to identify, analyze, and critically evaluate AI-generated content, an entire generation will be left vulnerable. Therefore, investment in comprehensive AI training for educators should be reframed as a national security imperative—a strategic investment in the cognitive infrastructure required for long-term national and democratic integrity. This reframing creates a powerful new coalition of stakeholders and a compelling justification for federal investment, moving beyond traditional education budgets.

3.2 Fostering Pioneers: A Portfolio Approach to High-Risk, High-Reward Research

To achieve true global leadership in AI, a nation must do more than simply refine existing technologies; it must create an environment that encourages its brightest minds to explore AI's "uncharted territories". This concept extends beyond pushing purely technical boundaries to encompass navigating the complex frontiers of human-AI collaboration, establishing robust frameworks for AI ethics and safety, and understanding the profound societal impacts of increasingly autonomous systems. These frontiers are often profoundly interdisciplinary, lying at the intersection of computer science, cognitive science, law, and philosophy.

Cultivating the pioneers who can explore these areas requires an R&D ecosystem that rewards bold, ambitious thinking. This necessitates funding mechanisms distinct from those supporting conventional, incremental research, which often favor projects with well-defined methodologies and a high likelihood of predictable success. While

essential for steady progress, this risk-averse approach can stifle the kind of disruptive, paradigm-shifting breakthroughs that define technological leadership. A forward-thinking national AI strategy should therefore adopt a "portfolio approach" to its research investments, akin to a venture capital model, explicitly allocating a significant portion of its budget to high-risk, high-reward funds.

Government-led models for this already exist. The U.S. National Science Foundation (NSF) funds high-risk interdisciplinary research in areas like AI-driven smart health, and in Canada, the CIFAR AI Catalyst Grants program funds collaborative, high-risk projects in areas like AI for health and energy. Canada's broader Pan-Canadian AI Strategy, driven by its national AI institutes (Amii, Mila, and the Vector Institute), further emphasizes connecting world-class academic research with commercialization and adoption. This portfolio approach serves not only as an innovation engine but also as a critical talent retention strategy, providing an attractive alternative to industry labs for the most ambitious researchers and giving them the institutional backing to pursue revolutionary ideas.

4 Forging a Synergistic Ecosystem: A Comparative Analysis of National Models

A thriving AI talent ecosystem cannot be sustained within isolated silos of academia, industry, or government. The most potent innovation and effective talent development occur at the interfaces between these sectors. Forging deep, synergistic connections is therefore an essential pillar of a national strategy, requiring new models of collaboration and an understanding of the diverse philosophical approaches that different nations are taking to govern this complex ecosystem.

4.1 Beyond the Ivory Tower: Permeable Boundaries and Fluid Talent

The rapid pace of AI development has rendered traditional, transactional models of industry-academia collaboration insufficient. The field now demands deeper, more integrated forms of partnership that allow for the fluid movement of ideas, data, and talent. One powerful approach is the **embedded model**, which creates centers of excellence where industry and academia co-locate and co-create. The University of New Haven's development of an R&D park, designed to position the university as "an extension of the R&D departments within companies," is a case study in this strategy. Similar examples include the joint lab between BASF and the Technical University of Berlin focusing on machine learning.

A second, complementary approach is the **fluid talent model**, which creates permeable boundaries between organizations. The Amazon Scholars program, for instance, allows world-class university professors to work at Amazon on a flexible basis, enabling them to apply their research to industrial-scale problems using massive datasets without severing their academic ties. This model effectively blurs the traditional lines between an "academic" and an "industry researcher," creating a new class of hybrid professional and a powerful, virtuous cycle: industrial-scale problems inform academic research, while academic breakthroughs are rapidly tested and scaled within industry.

However, this increased permeability is not without its challenges. The "revolving door" between academia and industry raises significant ethical concerns. The flow of talent and funding from the private sector can create powerful conflicts of interest, potentially biasing research agendas toward commercially profitable applications rather than the public good and compromising the perceived objectivity of academic research. A forward-looking national talent strategy must therefore do more than just incentivize these partnerships; it must also establish clear policies and ethical guardrails to proactively manage these risks, ensuring that academic integrity and public interest remain paramount.

4.2 A Multi-Polar World: Comparative Analysis of National AI Strategies

The strategic importance of AI has prompted nations worldwide to develop distinct strategies, reflecting their unique political philosophies and economic priorities. A comparative analysis reveals a multi-polar landscape with no single dominant model, but rather divergent approaches that represent fundamental trade-offs between priorities such as innovation speed, regulatory certainty, and social equity.

The **United States**' approach is largely industry-driven, characterized by flexibility and market responsiveness. The national strategy emphasizes upskilling the existing workforce through agile programs, leveraging existing funding frameworks like the Workforce Innovation and Opportunity Act (WIOA) to meet local employer demands. The overarching philosophy is pro-innovation, prioritizing U.S. leadership with a lighter touch on pre-emptive regulation, while national security has also emerged as a core driver.

In stark contrast, the **European Union**'s approach is more centralized, coordinated, and regulatory-first. Embodied in its AI Act, the EU strategy is explicitly "human-centric and trustworthy," legally mandating AI literacy for staff in organizations that deploy AI systems. The EU's plan includes continent-wide initiatives such as the AI Skills Academy and fellowship schemes to attract and retain talent, prioritizing trust and fairness through robust legal frameworks. The **United Kingdom** offers a potential third way, aiming to create the "most pro-innovation regulatory environment in the world" by using a context-driven approach where existing sector-specific regulators apply core principles rather than imposing a single, overarching AI law.

Meanwhile, several **Asian nations** have adopted state-driven, goal-oriented strategies. **India**'s "#AIforAll" strategy is explicitly focused on leveraging AI for social and inclusive growth, featuring a dual-tiered research structure and a "National AI Market" (NAIM) to democratize access to data and models. **Singapore** exemplifies a pragmatic, project-oriented approach focused on building a deep pool of local talent through its intensive "AI Apprenticeship Programme" (AIAP). The **United Arab Emirates (UAE)** has focused its strategy on cultivating high-level leadership to drive AI adoption across key national sectors, centered around the Mohamed bin Zayed University of Artificial Intelligence (MBZUAI). Finally, **Canada**'s Pan-Canadian AI Strategy emphasizes connecting its world-class academic research talent with commercialization, driven by its three national AI institutes.

These divergent models illustrate the fundamental trade-offs nations face. The U.S. model prioritizes agility but may face challenges in ensuring ethical guardrails. The EU model establishes trust through regulation but may move more slowly. The state-driven Asian models can achieve rapid, targeted progress but rely on centralized planning. The following table provides a comparative summary of these strategic choices.

5 A New Paradigm for Evaluation: From Credentials to Competencies

The directive to develop a "diversified evaluation system" recognizes a fundamental truth about the AI era: traditional metrics of expertise, such as academic degrees and years of experience, are increasingly ill-suited for the dynamic, multifaceted, and rapidly evolving nature of AI work. A modern approach to talent development and assessment requires new frameworks for defining what competency means and new, more authentic methods for measuring it. This represents a paradigm shift from a focus on static credentials to a focus on demonstrable, applied skills and capabilities.

5.1 Defining the AI Professional: The Rise of Multi-Domain Competency Frameworks

Competency models provide a structured framework that defines the specific skills, knowledge, and behaviors required for successful performance in a given role. For a field as fluid as AI, these models are essential for aligning recruitment, training, and performance management with strategic objectives, creating a common language that can bridge the persistent gap between the skills developed in universities and the capabilities required by industry.

Effective AI competency models are inherently multi-domain, reflecting the interdisciplinary nature of the work by moving beyond a narrow focus on technical skills to encompass business acumen, human-centered design principles, and ethical reasoning. Three prominent frameworks exemplify this modern approach. The **Dawson College AI Competency Framework** is structured around three core domains—Technical, Business, and Human—with ethical considerations integrated throughout. The **U.S. Office of Personnel Management's (OPM) AI Competency Model** for government work distinguishes between 43 general competencies (e.g., critical thinking) and 14 technical competencies (e.g., machine learning), supporting a government-wide shift to a "skills-first" hiring paradigm that prioritizes demonstrable skills over traditional credentials. Finally, the globally recognized **Skills Framework for the Information Age (SFIA)** defines professional skills across seven levels of responsibility, focusing on the application and impact of skills rather than just their existence and integrating AI skills into its durable, technology-agnostic framework.

These frameworks reveal an emerging consensus that competency in AI is a multi-faceted construct. A national AI talent strategy should therefore prioritize the collaborative development of a national AI competency framework, involving stakeholders from academia, industry, and government. This framework would act as a strategic "Rosetta Stone," translating educational outcomes into workforce needs and ensuring the entire talent ecosystem is oriented toward the same objectives.

Table 1: Comparative Summary of National AI Strategies[1]

Dimension	United States	European Union	United Kingdom	India	Singapore	UAE	Canada
Guiding Philosophy	Market-driven, innovation-focused, flexible response to market and national security needs	Human-centric, trust-focused, coordinated, and governance-first	Pro-innovation, seeking a balance between flexibility and trust	"#AIforAll," prioritizing social and inclusive growth	Pragmatic, project-oriented, focused on local talent and economic excellence	State-driven, focused on high-level leadership and cross-sector adoption	Research-to-commercialization, leveraging academic strengths
Governance Approach	Agile, leveraging existing frameworks (e.g., WIOA); lighter touch on preemptive regulation	Regulation-first, with legally mandated requirements via the AI Act	Context-driven, with existing sector-specific regulators applying core principles	Framework-based, via ethical committees and a national data marketplace (NAIM)	Project-oriented, implemented through specific programs like AIAP	Top-down, implemented via strategic universities (MBZUAI) and government programs	Collaborative, coordinated through national institutes and clusters
Key Initiatives	Flexible workforce upskilling, significant NSF/federal R&D investment, NSCAI strategic direction	AI Skills Academy, European Digital Innovation Hubs (EDIHs), coordinated research funding	National AI Strategy with pillars for ecosystem, adoption, and governance	Dual-tier research structure (CORE/ICTAI), National AI Market (NAIM)	AI Apprenticeship Programme (AIAP), National AI Projects in key sectors	MBZUAI and its Executive Program, national AI challenges	Pan-Canadian AI Strategy, National AI Institutes (Amii, Mila, Vector)
International Talent	Historically strong attraction via universities and industry, but less explicit federal strategy	Coordinated initiatives to attract and retain talent (Talent Pool, MSCA 'Choose Europe')	New visa regimes to attract top global AI talent	Focus on reskilling existing workforce and leveraging the Indian diaspora	Open to global talent to supplement local pool; goal to triple AI talent to 15,000	Attracting global leaders and experts through MBZUAI and a reputation as an AI hub	Programs to attract and retain top-tier academic research talent

Table 2: Comparison of AI Competency Frameworks

Dimension	Dawson College Framework	U.S. OPM Model	SFIA Framework
Key Competency Domains	Technical (Data, Math, Programming, ML, DL, Infrastructure); Business (Project Planning, Scaling); Human (Innovation, Teamwork, Professionalism)	General Competencies (43, e.g., Accountability, Critical Thinking, Teamwork); Technical Competencies (14, e.g., Data Analysis, Machine Learning, Systems Design)	Professional Skills (e.g., Data science, Machine learning, Business process improvement) across Generic Attributes (Autonomy, Influence, Complexity, Knowledge, Business Skills)
Core Principles	Balances technical, business, and human domains; integrates ethics throughout all areas as a foundational element.	"Skills-first" paradigm; emphasizes demonstrable skills over traditional credentials; focuses on adaptability for a rapidly changing environment.	Focuses on durable professional capabilities; integrates AI skills into a broader, technology-agnostic framework; measures competency through seven levels of responsibility and impact.
Intended Application	Curriculum design for higher education; supports the development of educational programs and training modules to create a talent pipeline.	Skills-based hiring and workforce planning for the federal government; broadens the talent pool by identifying capabilities from non-traditional backgrounds.	Strategic workforce planning, job description design, and professional development for organizations; provides a common language for skills across industries.

5.2 Assessing Applied Intelligence: The Pedagogical Imperative for Authentic Assessment

Just as the definition of AI competency is evolving, so too must the methods used to assess it. Traditional assessments, such as multiple-choice exams, are poor measures of the complex, applied skills defined in modern AI competency models, as they primarily test knowledge recall rather than higher-order thinking. Furthermore, the rise of powerful generative AI tools has rendered many of these formats obsolete, undermining their validity as measures of individual learning.

In response, educators are increasingly adopting a range of **authentic assessments** that mirror the real-world tasks and challenges that AI professionals face. This shift represents a necessary and positive evolution in pedagogy. A fundamental principle of effective education is that the medium of assessment must match the message of the curriculum; if a curriculum is designed to be project-based and focused on higher-order thinking, but assessment relies on rote memorization, a damaging disconnect is created. A typology of these more robust and AI-resilient methods includes several key approaches. **Performance-Based Assessments** require students to actively demonstrate their skills through practical application, such as multi-part projects that yield multi-modal products (e.g., a code repository, data visualizations, and an oral presentation). **Oral and Interactive Assessments**, such as a 'viva' (oral defense of a project) or interactive scenarios, gauge deep understanding in a dynamic format that is difficult to outsource to generative AI. **Process-Oriented Assessments** shift the focus from the final product to the learning journey itself, using methods like reflective learning journals and structured peer reviews. Finally, **Case-Based and Ethical Dilemma Analysis** presents students with complex, open-ended problems that lack a single correct answer, assessing their critical thinking and judgment in ambiguous situations.

A national talent strategy must actively support the systemic adoption of these methods. This includes funding faculty development in authentic assessment design, creating national repositories of best practices, and reforming institutional or accreditation policies that may implicitly favor traditional, easier-to-grade examination formats. The

goal is to ensure that the national evaluation system is measuring what truly matters: the ability to apply AI knowledge responsibly, creatively, and effectively to solve the complex problems of the real world.

6 Discussion and Conclusion: A Unified, Evidence-Based Blueprint for a National AI Talent Ecosystem

Building a world-class AI talent team is not the result of disconnected initiatives but the product of intentionally cultivating a deeply integrated, dynamic, and self-reinforcing national ecosystem. The challenge is complex, spanning the full spectrum of education, research, industry, and public policy, but the path forward is becoming clearer. It requires a unified national commitment to a comprehensive blueprint that recognizes the interconnectedness of these domains. This paper has outlined the core pillars of such a blueprint, grounding conceptual strategy in a systematic review of global evidence.

6.1 Synthesizing the Evidence: Key Insights for Policy and Practice

The systematic scoping review conducted for this paper has yielded several key insights that must inform any effective national AI talent strategy. First, the **labor market impact of AI is heterogeneous and complex**. The dominant narrative of simple job replacement is insufficient; the reality is a nuanced process of task substitution, augmentation, and transformation that varies significantly by industry, region, and demographic group. This necessitates targeted, human-centered policies that go beyond broad reskilling to create new, accessible entry points into the economy and manage the socio-psychological stress of the transition.

Second, **public trust is a prerequisite for widespread AI adoption**, not an afterthought. The evidence of deep-seated public concern regarding data privacy and algorithmic bias indicates that successful technology integration is contingent on robust governance. This makes transparency, accountability, and a commitment to equity central pillars of a national strategy, as their absence can stall or derail even the most technologically advanced initiatives.

Third, the **global landscape of AI governance is multi-polar**. There is no single "best practice" model. Instead, nations are making distinct philosophical choices, from the market-driven agility of the United States to the human-centric, regulatory-first approach of the European Union and the state-directed, goal-oriented models in Asia. Understanding the trade-offs inherent in these different approaches is crucial for any nation seeking to craft its own strategy.

Finally, the very **definition and evaluation of "talent" is undergoing a paradigm shift** from a reliance on traditional credentials to a focus on demonstrable, multi-domain competencies. The AI era demands a move toward skills-first hiring and the adoption of authentic assessment methods in education to ensure that the talent pipeline is producing individuals with the applied, real-world problem-solving capabilities that are truly needed.

6.2 A Unified Blueprint: Strategic Imperatives for Action

Based on these synthesized findings, a unified blueprint for a national AI talent ecosystem can be articulated through four core strategic imperatives. Sustained, coordinated investment in these pillars, guided by adaptive governance and a shared national vision, provides the most robust strategy for navigating the disruptions and harnessing the immense opportunities of the artificial intelligence revolution.

The first imperative is to **Invest in a Lifelong Learning Continuum**. A national commitment must begin with fostering critical and conceptual AI literacy in K-12 education. It must extend to promoting interdisciplinary excellence in higher education to cultivate both the "Builders" of foundational models and the "Bridgers" who can deploy them effectively. This commitment must be sustained through accessible, publicly supported systems for continuous reskilling that empower the entire workforce, treating national AI literacy as a form of critical economic infrastructure.

The second imperative is to **Architect a Differentiated Talent Pipeline**. A mature ecosystem requires clear pathways and tailored support for all levels of talent. This means investing in the professional development of educators, framing their role as a national security priority. It requires funding world-class graduate programs to produce high-level experts. And it necessitates creating distinct funding mechanisms, such as high-risk, high-reward grants, that empower pioneering researchers to explore AI's uncharted frontiers.

The third imperative is to **Build Synergistic Bridges** between sectors. The engine of innovation must be fueled by deep and fluid collaboration. This requires national policies that incentivize new models of partnership, such as

embedded research centers and fluid talent programs, that make the boundaries between industry, academia, and government as permeable as possible. It also demands a proactive approach to managing the ethical challenges of this "revolving door" to maintain academic integrity and public trust. Concurrently, a nation must engage in strategic international cooperation and implement comprehensive strategies to attract and retain top global talent.

The fourth and final imperative is to **Modernize Evaluation Paradigms**. To ensure the talent pipeline is producing the right skills, a nation must move beyond outdated metrics. This involves the collaborative development of a national AI competency framework to serve as a common language for educators and employers, aligning curricula with real-world workforce needs. It also requires championing the widespread adoption of authentic assessment methods that measure the applied, higher-order thinking capabilities essential for success in the AI era.

6.3 Future Research Directions

While this review provides a comprehensive blueprint based on current evidence, the field of AI and its societal impact is evolving at an extraordinary pace, creating a continuous need for further research. Several critical areas warrant scholarly inquiry. First, longitudinal studies are needed to assess the long-term impact of the emerging "skills-first" hiring paradigm on the role and structure of traditional higher education institutions. Second, rigorous comparative research is required to evaluate the relative effectiveness of different national governance models—such as the U.S., E.U., and Asian approaches—in their ability to simultaneously foster innovation and ensure robust ethical control. Finally, more research is needed to design and test specific policy interventions aimed at mitigating the risk of AI exacerbating the social and digital divides. By focusing on these key areas, the research community can provide the evidence needed for policymakers to better navigate the complexities of the AI revolution and build a foundation for a more sustainable, equitable, and competitive future.

To Cite This Article Yanlin CHEN. (2025). Architecting a National AI Talent Ecosystem: A Systematic Scoping Review of Strategies for Education, Innovation, and Governance. *Artificial Intelligence Education Studies*, *1*(3), 28-42. https://doi.org/10.6914/aiese.010303

Reference

[1] Acemoglu, D., Autor, D., Hazell, J., & Restrepo, P. (2022). Artificial intelligence and jobs: Evidence from online vacancies. *Journal of Labor Economics, 40*(S1), S293-S340.

[2] AI4K12. (2021). *Five Big Ideas in Artificial Intelligence*. Retrieved from https://ai4k12.org/wp-content/uploads/2021/01/AI4K12_Five_Big_Ideas_Poster-1.pdf

[3] Amazon Science. (n.d.). *Amazon Scholars*. Retrieved September 3, 2025, from https://www.amazon.science/scholars

[4] Arntz, M., Gregory, T., & Zierahn, U. (2016). *The Risk of Automation for Jobs in OECD Countries: A Comparative Analysis*. OECD Social, Employment and Migration Working Papers, No. 189. OECD Publishing.

[5] Autor, D. H. (2015). Why are there still so many jobs? The history and future of workplace automation. *Journal of Economic Perspectives, 29*(3), 3-30.

[6] Bauer, M. S., & Kirchner, J. E. (2020). Implementation science: What is it and why should I care? *Psychiatry Research, 283*, 112376.

[7] Brynjolfsson, E., & McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. W. W. Norton & Company.

[8] Carnegie Mellon University. (n.d.). *Artificial Intelligence Program*. Retrieved September 3, 2025, from http://coursecatalog.web.cmu.edu/schools-colleges/schoolofcomputerscience/artificialintelligence/

[9] Center for Innovation in Digital and Disciplinary Learning (CIDDL). (n.d.). *Framework for Responsible AI Integration in PreK-20 Education*. University of Kansas. Retrieved from https://ciddl.org/framework-for-responsible-ai-integration-in-prek-20-education/

[10] CIFAR. (2022, June 22). *CIFAR announces plans for second phase of the Pan-Canadian Artificial Intelligence Strategy*. Retrieved from https://cifar.ca/cifarnews/2022/06/22/cifar-announces-plans-for-second-phase-of-the-pan-canadian-artificial-intelligence-strategy/

[11] Dawson College. (n.d.). *Artificial Intelligence Competency Framework*. Retrieved September 3, 2025, from https://www.dawsoncollege.qc.ca/ai/wp-content/uploads/sites/180/Corrected-FINAL_PIA_ConcordiaDawson_AICompetencyFramework.pdf

[12] Eloundou, T., Manning, S., Mishkin, P., & Rock, D. (2023). *GPTs are GPTs: An early look at the labor market impact potential of large language models*. arXiv preprint arXiv:2303.10130.
[13] European Commission. (n.d.). *European approach to artificial intelligence*. Shaping Europe's digital future. Retrieved September 3, 2025, from https://digital-strategy.ec.europa.eu/en/policies/european-approach-artificial-intelligence
[14] Florida Atlantic University. (n.d.). *AI-Integrated Programs & Courses*. Retrieved September 3, 2025, from https://www.fau.edu/ai/ai-programs-courses/
[15] Jobs for the Future (JFF). (2023). *The AI-Ready Workforce*. Retrieved from https://info.jff.org/hubfs/JFF-AI-Ready%20Workforce%20Report_103123-vF.pdf
[16] Lane, M., & Saint-Martin, A. (2021). *The impact of Artificial Intelligence on the labour market: What do we know so far?*. OECD Social, Employment and Migration Working Papers, No. 256. OECD Publishing.
[17] McKinsey Global Institute. (2023, July 26). *Generative AI and the future of work in America*. Retrieved from https://www.mckinsey.com/mgi/our-research/generative-ai-and-the-future-of-work-in-america
[18] Microsoft. (n.d.). *AI for educators*. Microsoft Learn. Retrieved September 3, 2025, from https://learn.microsoft.com/en-us/training/paths/ai-education/
[19] Mohamed bin Zayed University of Artificial Intelligence (MBZUAI). (2023, December 14). *42 UAE leaders graduate from MBZUAI's Executive Program to drive AI adoption*. Retrieved from https://mbzuai.ac.ae/news/42-uae-leaders-graduate-from-mbzuais-executive-program-to-drive-ai-adoption/
[20] Munn, L., & Magee, L. (2024). The revolving door between industry and academia in AI ethics. *AI and Ethics*, 1-11.
[21] National Security Commission on Artificial Intelligence. (2021). *Final Report*. Retrieved from https://digital.library.unt.edu/ark:/67531/metadc1851188/
[22] NITI Aayog. (2018). *National Strategy for Artificial Intelligence*. Government of India. Retrieved from https://www.niti.gov.in/sites/default/files/2023-03/National-Strategy-for-Artificial-Intelligence.pdf
[23] OECD. (2023). *The Adoption of Artificial Intelligence in Firms*. OECD Publishing.
[24] Pew Research Center. (2023, October 18). *How Americans View Data Privacy*. Retrieved from https://www.pewresearch.org/internet/2023/10/18/how-americans-view-data-privacy/
[25] PricewaterhouseCoopers (PwC). (2017). *Sizing the prize: What's the real value of AI for your business and how can you capitalise?*. Retrieved from https://www.pwc.com/gx/en/issues/data-and-analytics/publications/artificial-intelligence-study.html
[26] SFIA Foundation. (n.d.). *SFIA - a framework for AI skills*. Retrieved September 3, 2025, from https://sfia-online.org/en/tools-and-resources/ai-skills-framework
[27] Singapore Government. (2023). *Singapore National AI Strategy 2.0*. Smart Nation Singapore. Retrieved from https://www.smartnation.gov.sg/initiatives/national-ai-strategy
[28] Stanford University. (n.d.). *Economy | The 2025 AI Index Report*. Stanford Institute for Human-Centered Artificial Intelligence (HAI). Retrieved August 31, 2025, from https://hai.stanford.edu/ai-index/2025-ai-index-report/economy
[29] United Arab Emirates Government. (2018). *UAE National Strategy for Artificial Intelligence 2031*. Retrieved from https://ai.gov.ae/wp-content/uploads/2021/07/UAE-National-Strategy-for-Artificial-Intelligence-2031.pdf
[30] United Kingdom Government. (2021). *National AI Strategy*. Retrieved from https://assets.publishing.service.gov.uk/media/614db4d1e90e077a2cbdf3c4/National_AI_Strategy_-_PDF_version.pdf
[31] United States Chief Human Capital Officers Council. (2024). *Skills-Based Hiring Guidance and Competency Model for Artificial Intelligence Work*. Retrieved from https://chcoc.gov/sites/default/files/Skills-Based%20Hiring%20Guidance%20and%20Competency%20Model%20for%20Artificial%20Intelligence%20Work.pdf
[32] University of Florida. (n.d.). *K-12 AI Education Program*. Retrieved August 31, 2025, from https://ai.ufl.edu/teaching-with-ai/k-12-ai-education-program/
[33] University of Helsinki & Reaktor. (n.d.). *Elements of AI*. Retrieved September 3, 2025, from https://www.elementsofai.com/
[34] Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education where are the educators? *International Journal of Educational Technology in Higher Education, 16*(1), 39.
[35] West, D. M., & Turner Lee, N. (2021, October). *Strengthening international cooperation on AI*. Brookings Institution. Retrieved from https://www.brookings.edu/wp-content/uploads/2021/10/Strengthening-International

-Cooperation-AI_Oct21.pdf

[36] Overmoyer, R., & Harry, C. (2018). *Artificial intelligence impact on labor markets*. International Economic Development Council. Retrieved from https://www.iedconline.org/clientuploads/EDRP%20Logos/AI_Impact_on_Labor_Markets.pdf

[37] Asif, M., Baig, S. A., & Iraqi, K. (2024). *AI and workforce development: A comparative analysis of skill gaps and training needs in emerging economies*. ResearchGate. Retrieved from https://www.researchgate.net/publication/383296063_AI_AND_WORKFORCE_DEVELOPMENT_A_COMPARATIVE_ANALYSIS_OF_SKILL_GAPS_AND_TRAINING_NEEDS_IN_EMERGING_ECONOMIES

[38] Singh, J. (2025). The impact of artificial intelligence on the economy. *International Journal of Novel Research and Development, 10*(5), g316-g319. Retrieved from https://ijnrd.org/papers/IJNRD2505467.pdf

[39] Vaskiv, O., Green, A., & Dixon, L. (2024). *The Impact of AI on the Labour Market*. Tony Blair Institute for Global Change. Retrieved from https://institute.global/insights/economic-prosperity/the-impact-of-ai-on-the-labour-market

[40] Sari, D. P., & Haryono, S. (2025). Reshaping the labor landscape: Artificial intelligence and the future of workforce transformation in the global economy. *International Journal of Creative Research and Management, 4*(2), 81. Retrieved from https://multiarticlesjournal.com/counter/d/4-2-81/IJCRM20254281.pdf

[41] Qubit Labs. (2024, August 28). *AI Talent Shortage: Causes, Challenges & How to Overcome It*. Qubit Labs. Retrieved from https://qubit-labs.com/ai-talent-shortage/

[42] Gosal, D. (2024, February 21). The Shrinking Value of Expertise: Why Singapore's AI Talent Strategy Needs a Hard Rethink. *Medium*. Retrieved from https://medium.com/@darwingosal/the-shrinking-value-of-expertise-why-singapores-ai-talent-strategy-needs-a-hard-rethink-7d63e069ba07

[43] Vettio. (2025). *AI Talent Shortage: Is It Hype or a Real Career Advantage in 2025?*. Vettio Blog. Retrieved from https://vettio.com/blog/ai-talent-shortage/

[44] Jobs for the Future (JFF). (2025). *AI and Economic Opportunity: A Call to Action*. Retrieved from https://info.jff.org/hubfs/AIforEconomicOpportunity_Final_032625.pdf

[45] Osborn, D., & Ince, A. (2024). Artificial intelligence in career development: a scoping review. *Disability and Rehabilitation*, 1-13. https://www.informahealthcare.com/doi/epub/10.1080/13678868.2024.2336881

[46] Kim, D. E. (2021). Artificial intelligence technology, public trust, and effective governance. *The Pennsylvania State University*. Retrieved from https://pure.psu.edu/en/publications/artificial-intelligence-technology-public-trust-and-effective-gov

[47] Criado, J. I., & Gil-Garcia, J. R. (2022). How should public administrations foster the ethical adoption and use of artificial intelligence? A framework for action. *Frontiers in Human Dynamics, 4*, 858108. https://www.frontiersin.org/journals/human-dynamics/articles/10.3389/fhumd.2022.858108/full

[48] Smith, J. (2024). *Ethics and Public Trust in AI Governance: A Literature Review*. ResearchGate. Retrieved from https://www.researchgate.net/publication/384594813_Ethics_and_Public_Trust_in_AI_Governance_A_Literature_Review

[49] West, D. M. (2023, August 9). *What the public thinks about AI and the implications for governance*. Brookings Institution. Retrieved from https://www.brookings.edu/articles/what-the-public-thinks-about-ai-and-the-implications-for-governance/

[50] Shabani, M., Martin, G., & Knoppers, B. M. (2024). *Global Artificial Intelligence (AI) Governance, Trust, and Ethics for Sustainable Health (GATES): A Protocol for Methodological*. VeriXiv. Retrieved from https://verixiv.org/articles/2-187/pdf

[51] Lin, C. J., & Li, Y. (2022). Artificial intelligence-based robots in education: A systematic review of selected SSCI publications. *Sustainability, 14*(14), 8838. Retrieved from https://www.researchgate.net/publication/362186279_Artificial_intelligence-based_robots_in_education_A_systematic_review_of_selected_SSCI_publications

[52] Verma, S., & Gustafsson, C. (2020). Global research on big data in relation with artificial intelligence (A bibliometric study: 2008-2019). *New Review of Hypermedia and Multimedia, 26*(3), 185-207. Retrieved from https://www.researchgate.net/publication/339215555_Global_Research_on_Big_Data_in_Relation_with_Artificial_Intelligence_A_Bibliometric_Study_2008-2019

[53] Johnson, A. (2025). *Artificial Intelligence in Education: Shaping the Future of Curricula*. ResearchGate. Retrieved from https://www.researchgate.net/publication/392809828_Artificial_Intelligence_in_Education_Shaping_the_Future_of_Curricula

[54] Bahammam, A. S. (2023). Adapting to the impact of AI in scientific writing: Balancing benefits and drawbacks while developing policies and regulations. *Journal of Taibah University Medical Sciences, 18*(6), 1400-1401. Retrieved from https://www.researchgate.net/profile/Ahmed-Bahammam/publication/371180138_Adapting_to_the_Impact_of_AI_in_Scientific_Writing_Balancing_Benefits_and_Drawbacks_while_Developing_Policies_and_Regulations/links/647980682cad460a1becc0f0/Adapting-to-the-Impact-of-AI-in-Scientific-Writing-Balancing-Benefits-and-Drawbacks-while-Developing-Policies-and-Regulations.pdf

[55] Ahonen, T., & Salminen, L. (2021). *Diginurse Model: A New Approach to Digital Coaching for Nursing Students*. Laurea University of Applied Sciences. Retrieved from https://www.theseus.fi/bitstream/handle/10024/435465/Diginurse_Model_A%20New%20Approach%20to%20Digital%20Coaching%20for%20Nursing%20Students.pdf?sequence=5&isAllowed=y

[56] Microsoft Learn. (n.d.). *AI for educators*. Retrieved September 4, 2025, from https://learn.microsoft.com/en-us/training/paths/ai-education/

[57] EasyTech4All. (n.d.). *Global Military Grade Cyber Defence Intel Security & AI Analysis*. Retrieved September 4, 2025, from https://easytech4all.net/

[58] CIFAR. (2024, September 24). *Three new Canada CIFAR AI Chairs appointed at the Vector Institute*. Retrieved from https://cifar.ca/cifarnews/2024/09/24/three-new-canada-cifar-ai-chairs-appointed-at-the-vector-institute/

[59] Smith, B., & Yang, F. (2025, January 3). *The golden opportunity for American AI*. Microsoft On the Issues. Retrieved from https://blogs.microsoft.com/on-the-issues/2025/01/03/the-golden-opportunity-for-american-ai/

[60] Meissner, M., & Lau, D. (2025). The global AI arms race: How nations can avoid being left behind. *Arthur D. Little Prism*. Retrieved from https://www.adlittle.com/en/insights/prism/global-ai-arms-race-how-nations-can-avoid-being-left-behind

[61] Digital Skills and Jobs Platform. (2025). *European Commission adopts the AI Continent Action Plan to make Europe global leader in AI*. Retrieved from https://digital-skills-jobs.europa.eu/en/latest/news/european-commission-adopts-ai-continent-action-plan-make-europe-global-leader-ai

[62] Frank, L. (2025, July). *Solving Europe's AI talent equation: Supply, demand and missing pieces*. Centre for European Policy Studies (CEPS). Retrieved from https://cdn.ceps.eu/2025/07/solving-europes-ai-talent-equation.pdf

[63] HPCwire Staff. (2025, April 10). *European Commission Targets AI Sovereignty with New Action Plan*. HPCwire. Retrieved from https://www.hpcwire.com/2025/04/10/european-commission-targets-ai-sovereignty-with-new-action-plan/

[64] Universal Coaching Centre. (2025). *AI in India: Strategy Must Precede the Mission*. Retrieved from https://uccindia.org/ai-india-strategy-must-precede-mission/

[65] Chinchure, A., & Khanna, A. (2023, July). *Crossroads of Artificial Intelligence: Higher Education and Research in India and China*. Observer Research Foundation. Retrieved from https://www.orfonline.org/research/crossroads-of-artificial-intelligence-higher-education-and-research-in-india-and-china

[66] Smart Nation and Digital Government Office. (2019). *National Artificial Intelligence Strategy: Advancing our smart nation journey*. Retrieved from https://file.go.gov.sg/nais2019.pdf

[67] Hasan, K. M. R. (2024). *Singapore's National Strategy in the Global Race for AI*. Konrad-Adenauer-Stiftung. Retrieved from https://www.kas.de/documents/288143/21151735/KAS+Country+Report-+SIngapore%27s+National+AI+Strategy.pdf/14a8d67e-91d3-1f7f-256a-48ee199d05d9?version=1.0&t=1708933141787

[68] Digital Watch Observatory. (2018). *The UAE National Strategy for Artificial Intelligence 2031*. Retrieved from https://dig.watch/resource/the-uae-national-strategy-for-artificial-intelligence-2031

[69] UAE Government. (2018). *UAE National Strategy for Artificial Intelligence 2031*. Retrieved from https://ai.gov.ae/wp-content/uploads/2021/07/UAE-National-Strategy-for-Artificial-Intelligence-2031.pdf

[70] University of Waterloo. (2025, September 4). *Freda Shi and Victor Zhong appointed Canada CIFAR AI Chairs at Vector Institute*. Cheriton School of Computer Science. Retrieved from https://uwaterloo.ca/computer-science/news/freda-shi-victor-zhong-appointed-canada-cifar-ai-chairs-at-vector-institute

[71] U.S. International Trade Administration. (2024, February 26). *Singapore Artificial Intelligence Strategy 2.0*. Retrieved from https://www.trade.gov/market-intelligence/singapore-artificial-intelligence-strategy-20

[72] Valtonen, O., Tedre, M., & Hynninen, T. (2023). *AICOMP - Future Skills in a World Increasingly Shaped By AI*. ResearchGate. Retrieved from https://www.researchgate.net/publication/376215761_AICOMP_-_Future_Skills_in_a_World_Increasingly_Shaped_By_AI

[73] SFIA Foundation. (2025, May). *SFIA Monthly News - May 2025*. Retrieved from https://sfia-online.org/en/news/may-2025-sfia-update

Editor *Changkui LI wtocom@gmail.com*