

Original Paper

AI and the MENA Workforce: Translating Digital Transformation into Human Transformation

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Abstract

The MENA region finds itself at a pivotal moment, strategically harnessing artificial intelligence and digital transformation to transition from oil-dependent economies to diversified, knowledge-driven powerhouses. This article delves into this significant change, contending that the true achievement of this digital revival depends on a corresponding evolution in humanity. This analysis aims to deliver a thorough, data-informed perspective on the macroeconomic factors influencing AI adoption in MENA, its dual effects on the workforce, and the strategic approaches needed to foster inclusive and sustainable growth. The article brings together insights on rising investments, bold national aspirations, and the anticipated multibillion-dollar impact of AI on the regional economy. A central paradox emerges: AI holds the potential for remarkable productivity increases, yet simultaneously presents a considerable risk of job displacement, especially affecting low- and medium-skilled workers. The article presents a framework centered on human empowerment, highlighting the essential contributions of education, collaborations between public and private sectors, and governance that respects cultural nuances. This highlights the importance of prioritizing upskilling, fostering responsible AI development, and addressing both digital and demographic gaps to empower the workforce, transforming a technological surge into a driving force for fair, human-centered advancement.

Keywords

Artificial Intelligence, MENA, Digital Transformation, Workforce, Economic Diversification, Human Capital, AI Strategy, Upskilling, Responsible AI, Public-Private Partnerships

1. Introduction

The MENA region is experiencing a significant and swift transformation, fueled by bold national strategies that emphasize economic diversification and enhancing global competitiveness. This transformation is fundamentally driven by the strategic adoption of artificial intelligence (AI), which has evolved from a futuristic idea to a core element of national progress. Across the region, governments and industries are pouring remarkable investments into digital infrastructure and AI capabilities, aiming to boost economic efficiency, generate new value, and redefine their position on the global stage.¹

This article explores a key idea: the real indicator of AI's success in the MENA region won't be its impact on GDP or the extent of its technological framework, but rather its capacity to convert this digital shift into a transformation of human experience. This calls for a forward-thinking and strategic change in emphasis from solely technological and economic measures to outcomes that prioritize human well-being. The main challenge is in managing the twofold effect of AI—it can replace conventional jobs while also generating new, valuable opportunities. It's crucial to make sure that the advantages of this new age are fairly shared among all workers. This analysis contends that achieving a human-centric outcome relies on an active emphasis on education, accountable governance, and a deep appreciation of the unique cultural and social dynamics specific to each region. This article delves into the government-driven AI strategies from a top-down perspective and examines their grassroots effects on individuals and communities, offering a thorough framework for how AI can truly empower workforces in the MENA region.

2. The Macroeconomic Context: MENA's AI-Powered Digital Renaissance

The MENA region is embarking on a well-orchestrated journey towards an AI-driven future, characterized by strategic planning and significant capital investment, rather than a disjointed or reactive approach. This part lays the foundation for the article by outlining the strategic necessities, measuring the investment, and examining the anticipated economic effects across essential sectors.

2.1 Strategic Imperatives and National Visions

MENA countries are actively crafting their destinies with AI, rather than simply embracing it. At the heart of this strategic initiative are bold national frameworks like Saudi Arabia's "Vision 2030" and the United Arab Emirates' "National AI Strategy 2031," which act as essential guides for economic diversification and aim to establish the region as a frontrunner in the knowledge economy.³ In Saudi Arabia, Vision 2030 establishes a clear connection between the incorporation of AI and the nation's ambition to lessen its dependence on oil income. The implementation of AI-driven megaprojects such as NEOM clearly showcases a vision for a smart city that embodies sustainability and innovation.³ The kingdom's dedication to this future is highlighted by the state-supported AI company Humain, which boasts a multi-billion-dollar infrastructure development plan and a focused venture fund designed to create a worldwide AI footprint.⁷

In a similar vein, the UAE's approach aims to position it as a frontrunner in AI-powered economies, targeting a notable contribution of AI to its GDP by the year 2030.¹ This emphasis is evident in efforts such as Dubai's goal to transform into the globe's "smartest and happiest city" by incorporating AI technology.⁵ Beyond the Gulf, Egypt has introduced its "National AI Strategy 2025-2030," founded on six essential pillars, such as talent development and infrastructure, aiming to elevate AI's contribution to GDP to over \$42.7 billion by 2030.⁸

The collaborative essence of these initiatives highlights that the region's AI advancement is not merely a collection of standalone efforts but rather a unified, strategic priority that spans the most significant economies within the region. The alignment of strategies plays a crucial role in the rapid and extensive adoption of AI.

2.2 Investment and Infrastructure: The Foundation for Scale

The bold national aspirations are receiving an extraordinary boost from a wave of financial investment. In the upcoming year, the MENA region is set to witness a 9% rise in overall information technology (IT) spending, fueled by the momentum of digital transformation and the embrace of AI technologies.¹ Data

center systems are projected to be the most rapidly expanding segment, with expenditures expected to hit \$130 billion by 2026, reflecting a 37.3% rise from 2023. As a result, software spending is expected to increase by 13.9% by 2026, totaling \$204 billion.¹ This investment is mainly propelled by governmental bodies and major cloud service providers, rather than conventional businesses or individual consumers, underscoring the hierarchical essence of the transformation.¹

Leading the charge in this investment competition are major firms supported by the state. Saudi Arabia's Humain is set to embark on a massive \$77 billion infrastructure expansion, featuring 6.6GW of data center capacity, while also introducing a \$10 billion venture fund aimed at investing in startups around the world.⁷ The UAE is actively advancing its AI initiatives via its state-supported company MGX and endeavors such as creating its own large language models, including Falcon.⁸ The importance of these investments goes far beyond just technology and economics. The increasing engagement of major global technology players, highlighted by a collaboration between the Saudi Public Investment Fund and Google Cloud to enhance an AI hub, along with a \$300 million AI and semiconductor fund initiated by Egypt in conjunction with China's Tsinghua Unigroup, indicates a wider geopolitical landscape.

The competition for digital infrastructure in MENA transcends any one technological powerhouse. The area is rapidly evolving into a battleground where Chinese and US tech firms are vying to broaden their physical cable networks and enhance digital infrastructure.¹⁰ This fosters a distinctive environment in which MENA nations can leverage the rivalry between these two powers to enhance the quantity of digital infrastructure initiatives that serve their region. Yet, this also brings forth possible new weaknesses, as dependence on digital infrastructure built by Chinese entities can elevate security apprehensions for Western allies.¹⁰ This vibrant landscape illustrates that the area's digital revival is a crucial front in the worldwide technology competition, carrying significant long-term consequences for data sovereignty and security that require meticulous oversight.

2.3 Sectoral Transformation and Economic Value

Major investments and national strategies are expected to generate considerable economic benefits. An analysis by PwC predicts that AI might add \$320 billion to the MENA economy by 2030, accounting for around 11% of the region's total GDP. Two The anticipated growth is impressive, with AI's impact on GDP increasing each year at a rate ranging from 20% to 34% throughout the region.¹¹ Saudi Arabia is set to emerge as the biggest winner, anticipating a remarkable contribution of \$135.2 billion by 2030. Meanwhile, the UAE is projected to experience the most significant proportional effect, with AI projected to represent 13.6% of its GDP.²

AI is transforming various industries, sparking creativity and enhancing productivity. The public sector, encompassing government, health, and education, is anticipated to achieve a remarkable increase of \$59 billion in value by 2030.¹² In 2023, the BFSI sector dominated the market for AI, utilizing advanced technologies to enhance credit scoring, identify fraudulent activities, and elevate customer experiences.³ The healthcare sector is poised for a remarkable shift, anticipating efficiencies ranging from \$10 billion to \$15 billion, fueled by AI innovations in diagnostics, patient monitoring, and genomics initiatives.² In the oil and gas sector, firms such as Aramco have effectively harnessed AI for predictive maintenance and reservoir management since 2010, resulting in a 50% decrease in flare emissions over a span of 15 years.³ At last, expansive smart city initiatives like NEOM in Saudi Arabia and Smart Dubai are embedding AI into the very foundation of their infrastructure and service design, poised to create more than \$50 billion in AI-driven economic value in the coming decade.³

This analysis highlights the strategic importance of AI adoption in MENA, showcasing a decisive commitment to harnessing technology for economic diversification and growth. The tables below outline the essential strategic initiatives and the anticipated economic effects of this AI-driven renaissance.

Table 1. Key National AI Strategies and Initiatives in MENA³

Country	Strategy/Vision	Key Goals	Key Pillars	Major Projects
Saudi Arabia	Vision 2030, National Strategy for Data & AI	Economic Diversification, Global AI Leadership	Infrastructure, Talent, Regulation, Data	NEOM Smart City, ALLaM, Humain, GAIA Accelerator
United Arab Emirates	National AI Strategy 2031	Global AI-Driven Economy, Public Services	Governance, Capacity-Building, Innovation	MGX, Falcon LLM, Dubai AI Seal, DCAI
Egypt	National AI Strategy 2025-2030	Middle East & Africa AI Hub, Digital Egypt	Governance, Technology, Data, Infrastructure, Ecosystem, Talent	AI & Semiconductor Fund with Tsinghua Unigroup

Table 2. Projected AI Economic Contribution by MENA Country, 2030²

Country	Projected AI Contribution (by 2030)	AI as % of GDP (by 2030)	Annual Growth Rate of AI's Contribution
Saudi Arabia	\$135.2 billion	12.4%	31.3%
United Arab Emirates	\$96 billion	13.6%	33.5%
Egypt	\$42.7 billion	7.7%	-
Other GCC Nations	\$45.9 billion	8.2%	-
MENA Total	\$320 billion	11%	20-34%

3. The Workforce at a Crossroads: Navigating AI's Dual Impact

As governments and industries chase the big-picture benefits of AI, the real effects resonate on an individual and workforce scale. This section delves into the core conflict surrounding AI's dual nature—its ability to replace jobs contrasted with its promise to enhance workers' skills and capabilities.

3.1 The Threat of Automation and Job Displacement

AI represents a significant challenge to traditional job frameworks, especially in economies dependent on low- and medium-skilled workers.¹⁶ A report from McKinsey & Company reveals that as much as 45% of current work activities in the MENA region are ripe for automation at this moment.¹⁷ The World Economic Forum warns that in the coming five years, approximately 23% of jobs may face disruption from technologies such as AI.² This vulnerability is especially pronounced in nations such as Egypt, Jordan, and Morocco, where significant numbers of low- and medium-skilled workers are found in industries like manufacturing, retail, transport, and administrative services.¹²

This presents a core policy dilemma. The macroeconomic data reveals that the key driver of AI's economic impact is the automation of repetitive tasks, leading to significant productivity boosts and enhanced efficiency.³ This establishes a clear connection between the effectiveness of a top-down, efficiency-focused national strategy and the likelihood of significant job loss in conventional industries. The challenge for policymakers lies in realizing the anticipated economic benefits while avoiding substantial unemployment and social unrest. The fundamental issue lies not in technology but in the socio-political realm: it is imperative for governments to navigate the human consequences of the transformation they are fervently promoting. In the absence of focused educational and retraining programs, a significant segment of the workforce may become unemployable, leading to an increase in social inequality and economic stagnation.¹⁶

3.2 The Opportunity for Empowerment and Job Creation

The story of AI's influence on the workforce isn't just about replacement. Automation may pose a challenge to routine tasks, yet it simultaneously presents a remarkable chance to uplift workers and generate new, high-value employment opportunities. According to projections from the World Economic Forum, AI might shake up the job landscape, yet around half of the companies surveyed in the region expect to see new roles emerge due to the integration of AI.² The analysis indicates that AI has the potential to liberate employees from tedious and repetitive tasks, enabling them to concentrate on more strategic, creative, and valuable endeavors.² In the UAE, 49% of workers see a major advantage of AI as the opportunity to dedicate more time to developing their skills.¹⁸

AI goes beyond merely enhancing the efficiency of current jobs; it is also paving the way for the emergence of entirely new, high-skill industries. Investing in AI research and startups is opening doors in new fields like fintech, edtech, agritech, and cybersecurity, providing solutions to the ongoing challenge of youth unemployment in the area.¹⁶

Targeted examples illustrate the ways in which AI is currently enhancing workforces with a focus on human values:

- **Healthcare:** In the UAE, AI is being utilized within genomics initiatives to forecast health conditions and pinpoint disease risks, such as thyroid cancer, by analyzing genetic mutations.¹⁴ This technology is designed to enhance the capabilities of healthcare professionals, not to replace them. Digital and AI tools empower nurses to concentrate on their core mission—delivering patient care—rather than getting bogged down by bureaucratic tasks and routine, non-essential activities.¹⁴

- **Government Services:** In Dubai, AI-driven chatbots such as “Rashid” and “Mahboub” enhance the efficiency of citizen inquiries regarding government processes and transportation services.⁵ These systems deliver immediate, authoritative responses, enhancing the effectiveness of public service delivery and allowing human agents to focus on more intricate, nuanced cases.

3.3 Bridging the Skills Gap: The Critical Challenge

Even with the evident prospects, a major and urgent hurdle persists: the skills gap. A remarkable 62% of businesses in the area indicate they do not possess the essential AI skills to harness swift innovation.²⁰ The issue is further exacerbated by a deficiency in strategic direction from leadership, as merely 23% of CEOs in the MENA region are emphasizing a talent strategy to stay competitive in an AI-driven future.²² This skills gap isn't just an economic hurdle; it directly impacts people's lives. A recent study revealed that the skills shortage has resulted in heavier workloads for 62% of those surveyed, which in turn is fueling burnout and elevated turnover rates across departments.²⁰ This situation generates a core conflict: although AI holds the promise of empowerment, the absence of a skilled workforce hinders organizations from tapping into these advantages, adding further pressure on current employees.

Moreover, the skills gap threatens to deepen the already present social inequalities. Data shows a notable gender gap in AI proficiency, with men and women reporting a 42 percentage point difference in their AI skills.²² A generational gap exists, as younger workers, particularly Gen Z and Millennials, enjoy significantly more access to AI skilling opportunities compared to their older counterparts, Baby Boomers and Gen X.²² This brings to light an urgent issue: if we don't actively work towards providing equal access to training, the digital shift may result in a divided workforce of those who benefit from AI and those who do not, exacerbating the marginalization of already vulnerable groups like women, rural communities, the elderly, and individuals with disabilities, who are often left behind in the digital landscape.¹¹ Confronting these demographic disparities is essential, not only for the sake of social justice but also as a crucial economic necessity to unlock the complete potential of AI.

4. Catalyzing Human Transformation: A Framework for Empowerment

To effectively address the combined influence of AI, the MENA region needs to adopt a comprehensive approach that goes beyond mere technology and delves into the fundamental aspects of human development. A collaborative approach is essential among governments, the private sector, and educational institutions to actively cultivate a workforce prepared for the future.

4.1 The Role of Education and Lifelong Learning

The essence of human transformation is rooted in a dynamic and comprehensive strategy for education. Saudi Arabia leads the charge in this initiative, rolling out a comprehensive AI curriculum across all grades within its public education system, spanning from primary to secondary levels.²³ In collaboration with the Saudi Data and Artificial Intelligence Authority (SDAIA), this innovative initiative seeks to nurture digital and analytical skills from a young age, equipping students for future careers in the rapidly evolving technology landscape.²³

Outside the conventional education framework, governments and major tech companies are rolling out extensive upskilling programs. Google's initiative in the MENA region is set to empower 500,000 individuals with AI skills over the next two years, backed by a \$15 million grant to make sure these opportunities reach those in underserved communities.⁹ The Dubai Centre for Artificial Intelligence

(DCAI) presents tailored programs, including “AI for Civil Service,” in partnership with esteemed global institutions like Oxford Sa’id Business School.¹⁵

These educational initiatives signify a shift from merely cultivating a skilled workforce to a strategic endeavor aimed at ensuring future national competitiveness. In the realm of the geopolitical digital infrastructure competition, nurturing a local talent pool is a crucial move towards realizing “sovereign AI.” Saudi Arabia’s partnership with IBM to introduce ALLaM, an open-source Arabic Large Language Model, along with the emphasis on adapting AI to the region’s linguistic and cultural context, highlights a strategic shift from merely consuming foreign technology to becoming a producer of autonomous, culturally significant AI.¹¹ Education serves as the enduring approach to attain this technological and intellectual self-sufficiency.

4.2 Public-Private Collaboration in Upskilling and Reskilling

The extent and speed of the AI evolution demand a cooperative model that goes beyond the conventional limits of public and private sectors. Public-private partnerships (PPPs) have become essential in advancing AI adoption across the MENA region, enabling governments to tap into the resources and expertise of the private sector for infrastructure development, AI solution creation, and tailored training initiatives.²¹

The DCAI accelerator program in Dubai exemplifies a collaborative approach that transcends conventional government procurement methods. The initiative encourages startups to collaborate closely with government teams to create and implement practical AI solutions for public services.¹⁵ This method cultivates a nimble and adaptive environment, creating a direct connection between technological advancements and the delivery of public services, as well as the growth of the workforce. The initiative is crafted to captivate top talent, providing completely funded housing and travel while guaranteeing that startups maintain complete control over their intellectual property.¹⁵ This model represents a change in perspective, moving from merely obtaining technology to engaging in its creation, nurturing a more sustainable and innovative environment that serves the interests of both the government and the private sector.

4.3 Policy and Social Inclusion

With the rapid pace of digital transformation, the danger of deepening current social and demographic divides also intensifies. About 30% of people in the MENA region remain disconnected, and this gap in digital access is hitting women, those living in rural areas, older adults, and individuals with disabilities the hardest.¹⁶ For the advantages of AI to be shared fairly and broadly, it is crucial to implement inclusive policies.¹⁶

Focused efforts are underway to tackle these inequalities. The grant from Google.org to Village Capital aims to empower Business Support Organizations by providing them with the necessary resources to train underserved workers in AI skills across various MENA countries.⁹ Initiatives such as the MENA Observatory on Responsible AI are honing in on the crucial link between AI and social justice, gender inclusion, and fair development, advocating for tailored policies that guarantee every segment of society is included.¹¹ The achievement of human transformation relies on the capacity of governments and organizations to close these gaps, guaranteeing that access to AI education and opportunities is recognized as a fundamental right, rather than a mere privilege.

5. Governance, Ethics, and the MENA-Specific Context

The quick advancement of AI in MENA calls for a strong structure for governance and ethical considerations. This section delves into the region's distinctive journey towards responsible AI, intricately influenced by its cultural values and social dynamics.

5.1 The Framework of Responsible AI

A significant challenge to the broad acceptance of AI is the absence of a well-defined governance structure. A recent survey of CEOs in the MENA region revealed that 48% identified data privacy as a significant barrier, while 43% pointed to regulatory compliance as a key challenge in adopting generative AI.²¹ As global frameworks like the EU AI Act begin to take shape with a focus on risk-based regulation, the MENA region is crafting its own unique governance models.²⁶ One striking instance is Dubai's "AI Seal," an unprecedented certification initiative introduced in January 2025 that designates AI firms as reliable collaborators for government projects.¹⁵ This certification is essential for engaging in government AI projects in the UAE, fostering trust, transparency, and accountability in a market-oriented approach.¹⁵ This method offers a hands-on, community-focused way to handle risks, potentially serving as a blueprint for neighboring nations.

Even with these initiatives, major obstacles to embracing AI remain. The challenges we face extend beyond just regulations; they encompass a variety of factors, such as talent, infrastructure, and the very culture of our organization. This table outlines the essential challenges, offering a crucial perspective to the enthusiasm about AI's economic possibilities.

Table 3. Key Challenges to AI Adoption and Workforce Readiness in MENA³

Challenge	Supporting Data Point
Lack of Technical Talent/Skills	62% of companies lack the necessary AI skills to leverage innovation.
Organizational Resistance to Change	43% of employees and 41% of top management cited this as a barrier to innovation.
Inadequate Data Architecture	46% of MENA CEOs recognize the importance of modernizing data architecture to achieve AI goals.
Financial Constraints	17.9% of institutions in low-income countries cite financial constraints as a barrier to AI adoption.
Infrastructural Issues	17.1% of institutions in low-income countries face infrastructure issues, including insufficient network bandwidth and inadequate hardware.
Data Privacy & Regulatory Concerns	48% of CEOs cite data privacy and 43% cite regulatory compliance as a top barrier to GenAI adoption.

5.2 Cultural and Spiritual Influences on AI Ethics

The approach to AI governance and ethics in the MENA region is distinctly influenced by its rich traditions and spiritual values. In contrast to numerous Western frameworks that prioritize secular ideals, the approach to AI ethics in MENA is deeply shaped by societal influences and is anticipated to resonate with Islamic principles that highlight justice and accountability.¹³ This viewpoint introduces a moral and spiritual aspect to the evolution and implementation of AI, transcending mere utilitarian or libertarian ideologies.

An illustrative instance of this is the application of AI to safeguard and enhance cultural heritage. A recent workshop organized by UNESCO showcased the innovative use of AI-driven strategies in conservation efforts, particularly emphasizing the application of machine learning to pinpoint archaeological sites in Tunisia.²⁹ This shows that AI in MENA serves not only as an economic asset but also as a cultural force, a technology that can enrich, rather than supplant, the diversity and heritage of communities.²⁹ This distinctly human-focused viewpoint could enable the region to take the lead in crafting “human-first” AI, where technology is intentionally created to enhance human well-being, uphold cultural values, and promote societal harmony. The region’s dedication to developing AI that resonates culturally and linguistically, exemplified by the ALLaM model, strengthens this commitment even more.¹¹

5.3 Case Studies in Human-Centric AI

The most significant examples of AI’s potential are those that showcase a distinct transition from digital transformation to the enhancement of human capabilities. The earlier case studies, examined through the perspectives of governance and ethics, highlight this notion effectively. M42, a healthcare company, leverages AI not just for personalized treatments and enhanced medical outcomes, but also upholds a robust commitment to data privacy. They maintain patient data in a “sovereign environment” and train their models on diverse data sets to ensure representation.¹⁴ This method demonstrates a deliberate commitment to tackling concerns related to bias and data security right from the beginning.

In a similar vein, smart city initiatives such as NEOM and Masdar have sparked discussions around ethical concerns regarding mass surveillance and data privacy. However, they also reflect a fundamental aim: to develop urban spaces that improve quality of life, promote sustainability, and enhance urban mobility.⁶ The task at hand is to strike the perfect equilibrium between our technological aspirations and the essential social protections, making certain that the innovations truly serve the residents and communities they aim to uplift. The true measure of these projects will hinge not on the complexity of the technology, but on their capacity to foster fair participation and clarity.⁶

6. Conclusion: A Path Forward for Inclusive and Sustainable Growth

The AI-powered digital transformation in the MENA region marks a pivotal moment for diversifying the economy and fostering sustainable development. This article clearly shows that the leaders in the region are making significant, strategic investments to develop the essential infrastructure and talent needed to compete globally. Yet, the examination also uncovers that this transformative path is laden with obstacles, especially in managing the dual effects of AI on employment. The conflict between AI’s ability to boost productivity and the risk it poses to job security is the key dilemma that needs to be tackled to guarantee a future marked by inclusive and fair growth.

The true gauge of AI's achievement lies in its capacity to turn digital transformation into a transformation of the human experience. This calls for a change in perspective from simply embracing technology to uplifting the individuals who will coexist and collaborate with it. The area's distinct advantages (bold national aspirations, significant financial resources, and a digitally adept young demographic) set the stage for it to spearhead this transformative change. By focusing on the growth of human potential and integrating AI into the very essence of its communities, the MENA region stands poised to set a precedent, demonstrating that AI can serve as a powerful catalyst for human advancement.

Based on the evidence and analysis, the following actionable recommendations are crucial for a path forward:

1) For Governments: Develop regulatory frameworks that are clear, flexible, and culturally aware, tackling issues of data privacy, algorithmic bias, and accountability, all while fostering innovation. Keep pushing forward with investments in essential digital infrastructure while also focusing on developing sovereign AI that aligns with the region's distinct linguistic and cultural characteristics. Proactively invest in and nurture inclusive innovation ecosystems alongside public-private partnerships that collaboratively develop solutions and training initiatives.

2) For the Private Sector: Adopt AI not just as a means for basic automation, but as a powerful ally that liberates employees from tedious tasks, enabling them to concentrate on strategic and creative endeavors. Take the initiative to implement comprehensive upskilling and reskilling programs across the organization, encouraging a culture where continuous learning thrives for every employee. Engage proactively in collaborations with government and academic institutions to guarantee that talent strategies are in sync with the future workforce's needs.

3) For Educational Institutions: Incorporate AI literacy and ethical considerations into educational programs starting in primary school, equipping students for a future shaped by artificial intelligence. Work hand in hand with the industry to guarantee that educational initiatives and research are in sync with the actual needs of the world and the demands of the job market. Launch focused efforts to close the gap in digital access and tackle demographic inequalities in AI education and training opportunities.

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