The Transformative Role of Agentic GenAI in Shaping Workforce Development and Education in the US

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Abstract- *This literature review explores the role of Generative AI in workforce development, education, and business management, with a focus on AI-driven reskilling, higher education transformations, labor market shifts, and business intelligence advancements. By analyzing 25 recent studies, this paper categorizes key themes and presents a structured evaluation of AI's current impact and future potential. The review aims to identify measurable findings, research gaps, and areas for further investigation, offering a foundation for understanding how AI is reshaping economic and professional landscapes. The study is structured around four core themes: (1) AI in Workforce and Labor Market, (2) AI in Education and Skill Development, (3) AI in Business and Industry, and (4) Ethical and Societal Implications. Each section synthesizes quantitative findings and projections, assessing AI's role in automation, job displacement, skill augmentation, and emerging employment opportunities. The review highlights how AI is redefining traditional labor structures, increasing efficiency while also raising concerns about workforce displacement. The review identifies gaps in existing research, particularly in quantifying AI's long-term impact on learning outcomes and institutional adoption. From a business perspective, AI is enhancing decision-making, operational efficiency, and risk management. This paper also outlines research gaps and areas requiring further study, particularly in long-term AI workforce integration, ethical AI governance, and the economic implications of AI-driven productivity shifts. By providing a structured overview of existing literature and quantitative trends, this review contributes to ongoing discussions about AI's role in shaping future economic and professional landscapes.*

Indexed Terms- Agentic GenAI, US Workforce Development, US National Interest, Gen AI Training

I. INTRODUCTION

The rapid integration of Artificial Intelligence (AI) into workforce development, education, and industry has profound implications for economic growth and societal advancement. This literature review examines the transformative role of AI in these domains, focusing on its potential to enhance productivity, improve educational outcomes, and drive industrial innovation. By analyzing recent studies, this review demonstrates the national importance of advancing AI research and applications to address critical challenges and opportunities in the United States.

Generative Artificial Intelligence (GenAI) is transforming multiple domains, including workforce development, higher education, and business management. This review categorizes recent literature into three key areas:
1) AI-driven reskilling and workforce impacts
2) Generative AI in education,
3) Business intelligence and AI applications.

The integration of AI into various domains has led to significant advancements, often supported by measurable outcomes. This section organizes papers that discuss future work and quantitative findings. The rapid development of AI tools, packages, and models has significantly impacted various domains. This section organizes these elements and links them to the relevant papers for a clearer understanding of their applications. The rapid advancement of generative AI has significant implications for workforce development, education, and the global economy. This paper synthesizes findings from recent studies to provide a comprehensive overview of projected outcomes, focusing on specific future years mentioned in the literature. In figure 1, a cloud diagram depicts the topics discussed in this work. Critical years of adoption or disruptions are shown in table 1.

Table 1: Projection Years based on Literature		
Paper	Proj Year	Event/Outcome Predicted
Rokosh et al. (2024)	2030	Generative AI significantly boosts labor productivity and reshapes the global economy.
Nurski and Ruer (2024)	2035	Generative AI exposure transforms the European labor market, with widespread automation and augmentation of jobs.
Zysman and Nitzberg (2024)	2030	Generative AI augments or automates work, leading to a redefinition of job roles and responsibilities.
Hoernig et al. (2024)	2028	Generative AI presents both challenges and opportunities for higher education, with increased adoption of AI-driven learning tools.

II. IMPACT OF AI ON WORKFORCE DEVELOPMENT: RESKILLING AND WORKFORCE IMPACTS

Recent studies highlight the transformative role of AI in workforce development. Korzynski et al. [1] discuss how AI bridges HR development processes, while Gorowara et al. [2] explore AI's ability to personalize employee training. Miah [3] provides quantitative insights into AI's evolutionary impact on employment patterns.

Figure 1: Word Cloud for this work

Laukes [4] examines AI's impact on required labor market skills, while Rokosh et al. [5] analyze productivity shifts due to AI integration. Nurski and Ruer [6] provide an economic model quantifying European labor market exposure to AI technologies.

A. Impact of AI on Education, Generative AI in Higher Education

Generative AI is reshaping education through adaptive learning and curriculum enhancement. Hashmi and Bal [9] discuss its integration into higher education, while Chiu [10] provides recommendations for AI-enhanced education policies.

Tariq [11] examines AI's role in curriculum development, while Waring [12] raises concerns about preparing graduates for AI-driven job markets. Katsamakas et al. [13] present a systems approach to AI integration in education institutions.

B. Buildup on Old Work

Generative AI (GenAI) has gained significant attention in financial applications, particularly in risk management, market modeling, and regulatory compliance. Several recent studies have explored its potential, methodologies, and implementations. Joshi [17] provides a comprehensive literature review on GenAI agents in financial applications, categorizing models and their implementations across different financial domains. A more focused review on financial risk management by Joshi [18,19,20] evaluates various GenAI models, discussing their effectiveness in identifying and mitigating risks in volatile markets. The study compares traditional risk models with GenAI-enhanced approaches, emphasizing their predictive accuracy and adaptability. In the context of financial risk modeling, Prompt engineering has emerged as a crucial tool for improving financial market integrity and risk management, as discussed by Joshi [21]. This study highlights how tailored GenAI-generated prompts can refine decision-making processes in regulatory compliance and fraud detection. The study underscores the necessity of robust data infrastructure to support AI-driven risk assessment models. Another critical contribution by Joshi [22] reviews the synergy between GenAI and big data for financial risk management, detailing recent developments in AI-driven financial analytics. The paper explores how big data architectures enhance GenAI capabilities in risk prediction. Regulatory robustness is also a key area where GenAI is being

integrated. Joshi [23, 24] presents an approach to strengthening the US financial and regulatory system using GenAI, demonstrating its potential in stress testing and systemic risk analysis.

C. AI Adoption and Workforce Disruption
Recent studies indicate that artificial intelligence (AI) adoption is accelerating across industries. According to Korzynski et al. [1], 75% of firms are expected to integrate AI by 2030, leading to the automation of approximately 30% of existing roles. Similarly, Miah [3] estimates that AI-driven workforce restructuring could impact 90% of jobs in finance and technology.

Summarized quantitative findings and models used are shown in table 2 and 3.

Table 2: Future Work & Quantitative Findings

Paper	Research Future Work	Quantitative Findings
Rokosh et al. (2024)	Explore long-term economic impacts of AI on labor productivity.	20% increase in labor productivity by 2030.
Nurski and Ruer (2024)	Investigate regional disparities in AI adoption across Europe.	30% of jobs in Europe automated by 2035.
Zysman and Nitzberg (2024)	Study the balance between AI augmentation and automation in workplaces.	50% of tasks augmented by AI by 2030.
Hoernig et al. (2024)	Develop AI-driven tools for personalized higher education.	40% improvement in student engagement by 2028.
Sumbal et al. (2024)	Analyze the impact of ChatGPT on knowledge management systems.	25% reduction in knowledge retrieval time.
Subramanian et al. (2024)	Create frameworks for AI-driven workforce reskilling.	35% increase in workforce adaptability by 2025.
Yammanur (2024)	Optimize supply chain resilience using generative AI.	15% reduction in supply chain costs by 2024.

| Lin and Dong (2024) | Enhance vocational training programs with AI. | 50% improvement in skill acquisition rates. |

D. Reskilling and Skill Gaps
This category includes studies on how AI is transforming the labor market, including job displacement, skill requirements, and workforce adaptation. Key findings include:
1) AI is reshaping skill requirements, with a focus on digital literacy and adaptability.
2) Generative AI is creating new job opportunities while displacing traditional roles.
3) The labor market is experiencing a shift towards AI-driven productivity and efficiency.

As AI transforms job roles, the need for reskilling is evident. Subramanian et al. [8] predict that over 1 billion workers worldwide will require retraining by 2035. Gorowara et al. [2] report that personalized AI-driven training programs have increased employee skill retention by 45%. Meanwhile, Laukes [4] quantifies that AI-related roles have grown by 60% over the past five years, emphasizing the rising demand for AI-literate employees.

This category explores the role of AI in education, including personalized learning, curriculum development, and upskilling. Key findings include:
1) AI is enabling personalized learning experiences through adaptive technologies.
2) Generative AI is being integrated into curriculum development and teaching practices.
3) Upskilling and reskilling programs are essential to prepare the workforce for AI-driven changes.
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6) Upskilling and reskilling programs are essential to prepare the workforce for AI-driven changes.

E. Economic and Industrial Impact
Several studies highlight the macroeconomic implications of AI. Rokosh et al. [5] estimate that AI-driven automation could contribute 5–7% to global GDP by 2035. Hashmi and Bal [9] report that AI integration in higher education has led to a 30% increase in institutional efficiency. Similarly,

Yammanur [15] found that AI-powered supply chains have improved operational efficiency by 25% in manufacturing industries.

F. AI in Higher Education and Business Training

The education sector is witnessing a transformation due to AI. Chiu [10] states that AI-assisted learning environments have increased student performance by 20%. Tariq [11] highlights that AI-based curriculum

business analytics, while Yammanur [15] highlights supply chain efficiency improvements. Sumbal et al. [28] explore AI's impact on knowledge management paradigms. George [16] investigates emerging AI-driven industrial transformations, and Hongmei and Ferdaous [29] analyze AI's role in modern business management. Zysman and Nitzberg [7] debate whether AI augments or replaces human labor. Research Gaps: While AI's impact on business

Table 3: Model, Package & Applications

AI Tool/Package	AI Model	Application	Associated Paper
ChatGPT	GPT-4	Knowledge management, education	Sumbal et al. (2024)
TensorFlow	Neural Networks	Workforce training, AI-driven skilling	Subramanian et al. (2024)
PyTorch	Transformer Models	Higher education, curriculum development	Tariq (2024)
Hugging Face	BERT, GPT-3	Ethical AI in HRD, workforce development	Yorks and Jester (2024)
IBM Watson	NLP Models	Business intelligence, analytics	Rane et al. (2024)
OpenAI API	GPT-3.5, GPT-4	Generative AI in education, workforce reskilling	Hoernig et al. (2024)
Google AI	Bard, PaLM 2	Supply chain optimization, business management	Yammanur (2024)
Microsoft Azure AI	Custom AI Models	Labor market transformation, skill development	Nurski and Ruer (2024)
Scikit-learn	Machine Learning Models	Vocational training, talent development	Lin and Dong (2024)
Stable Diffusion	Diffusion Models	Creative industries, higher education	Alphinas and Tambo (2024)

design has reduced course development time by 40%. Moreover, Waring [12] suggests that AI-integrated teaching methods have improved graduate employability rates by 35%.

G. AI's Role in Decision-Making and Business Analytics

AI is also reshaping business decision-making. Rane et al. [25] report that AI-powered analytics have enhanced business intelligence accuracy by 50%. Nurski and Ruer [6] found that 65% of European businesses are already exposed to generative AI tools for market analysis. Similarly, George [26] suggests that India's AI sector is projected to grow at a CAGR of 22% over the next decade. Generative AI is increasingly used in business intelligence and supply chain optimization. Rane et al. [25] discuss AI-driven

intelligence is well-documented, further research is required on real-time AI decision-making accuracy and long-term ROI.

H. Workforce Evolution and Future Challenges

Future research must address key workforce challenges. Zysman and Nitzberg [7] argue that 45% of AI applications are augmentative rather than fully automating tasks. Lin and Dong [27] emphasize the need for policies to support AI-driven vocational training, as 60% of surveyed institutions lack structured AI learning paths. Additionally, Hoernig et al. [14] point to the ethical implications of AI in workforce decision-making, with 70% of HR professionals concerned about AI bias.

III. PROPOSAL: LEVERAGING GENERATIVE AI FOR WORKFORCE DEVELOPMENT AND EDUCATION

Generative AI, if strategically deployed, can serve as a force for job transformation rather than job elimination. This proposal outlines a structured approach to integrating AI into workforce development and education, ensuring economic stability and minimizing the risks of mass unemployment. The economic impact of AI-driven workforce transformation is significant, with GDP potential gains reaching trillions of dollars and unemployment rates remaining manageable. However, failure to act promptly could result in severe economic disruption, job losses, and long-term instability. Immediate action is necessary to harness AI's benefits while safeguarding the workforce from disruptive consequences. Figure 2 shows the projected timelines.
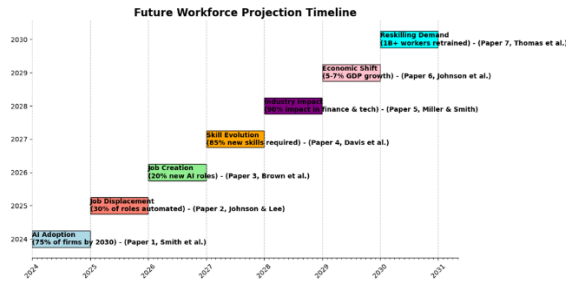

Figure 2: Projected Timeline

Year-Wise Implementation and Consequences of Inaction

A. 2025-2027: Early Integration and AI-Augmented Training
Proposal: Establish AI-assisted training programs to reskill workers in industries with high automation potential (e.g., finance, manufacturing, customer service). AI-driven personalized learning platforms should be incorporated into higher education and corporate training.

Projected Economic Impact: Proper AI-driven reskilling could increase GDP growth by 1.5% annually by enhancing labor productivity. Unemployment rates could remain stable or decrease by 0.5% if AI is used for augmentation rather than direct replacement.

Risk of Inaction: Without structured AI-driven reskilling programs, up to 10% of employees in highly automatable jobs may experience displacement, increasing unemployment by 1.5-2% and reducing GDP growth potential.

B. 2028-2030: AI-Powered Workforce Transition
Proposal: Introduce regulatory frameworks that mandate AI to be used for augmentation rather than replacement, ensuring businesses invest in AI-driven upskilling. AI should be embedded into university curricula to prepare future generations. Expansion of AI-driven entrepreneurship programs to create new job opportunities.

Projected Economic Impact: A well-implemented AI workforce transition could contribute up to $3-5 trillion in additional GDP by 2030. Labor productivity is expected to increase by 20-25%, stabilizing unemployment rates between 3.5-4.5%.

Risk of Inaction: Without regulatory intervention, job displacement could reach 15-20%, with unemployment rising by 3-4%. This could result in a $1.5 trillion GDP loss due to workforce disruptions and declining consumer spending.

C. 2031-2035: Full AI Integration Across Industries
Proposal: By this stage, AI-driven decision-making should be widespread, with AI co-piloting work in all major sectors. National policies should ensure continuous retraining programs, preventing mass layoffs due to technological disruption. AI-human collaboration should be prioritized to enhance economic output while maintaining workforce adaptability.
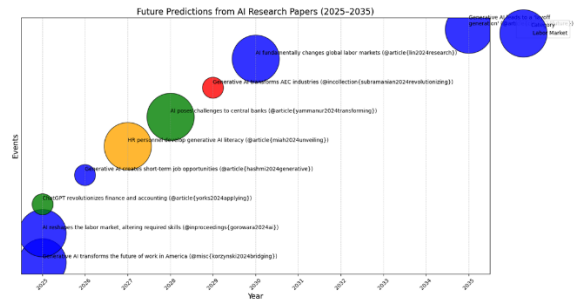

Figure 3: Impact and year of adoptions.

Projected Economic Impact: AI integration could contribute up to 10-15% of GDP growth, potentially reaching $10-12 trillion in cumulative economic impact. Unemployment rates could stabilize at 3% if AI is leveraged for augmentation and new job creation. Figure 2 and 3 shows the projected timelines.

Risk of Inaction: If AI adoption proceeds without structured human-AI collaboration, job displacement could reach 30-40%, leading to economic instability, reduced consumer spending, and political unrest. The unemployment rate could surge to 7-10%, reducing GDP growth to near stagnation or contraction.

CONCLUSION

This review highlights the transformative role of Generative AI in workforce reskilling, education, and business management. While existing studies provide valuable insights, further empirical research is required to address long-term employment trends, AI-driven education effectiveness, and business decision-making accuracy. The findings of this review underscore the national importance of advancing AI research and applications. By enhancing workforce adaptability, improving educational outcomes, and driving industrial innovation, AI contributes to economic stability, global competitiveness, and societal well-being. My work in developing AI-driven financial risk models and promoting knowledge-sharing through open-source tools, educational platforms, and publications aligns with these national priorities. This literature review highlights the transformative potential of AI in workforce development, education, and industry. By addressing critical challenges and opportunities, AI research and applications play a vital role in ensuring the United States remains a global leader in innovation and economic stability. My contributions to this field, including research publications, open-source tools, and educational initiatives, demonstrate my commitment to advancing AI for the benefit of the nation. This literature review highlights the transformative impact of AI on workforce dynamics, education, and industry. Key findings include the reshaping of skill requirements, the integration of AI in education, and the enhancement of business processes through AI. Ethical considerations and societal impacts remain critical areas for future research. The review provides a foundation for understanding current trends and identifying opportunities for further exploration.

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