Generative Al and the Workforce

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Maggie Smith

Research Analyst Labor and Economic Analysis Division (LEAD) North Carolina Department of Commerce



LEAD's Previous Research on Automation

• LMI Institutes' Automation Index FIGURE 1: North Carolina has a higher share of jobs exposed to automation-related disruption than the United States Share of total employment by automation disruption potential category

• Jobs highly exposed to Automation tend to:

- Be physical and routine
- Pay mid-lower wage
- Require less education
- Have a higher share of men



SOURCE: Authors' Analysis of LMI Institute and Bureau of Labor Statistics Occupational Employment and Wage Statistics Data



Al vs Automation



	AI	Automation
Scope	Simulate human-like intelligence	Replace manual, repetitive tasks
Goal	Concerned with developing intelligent systems using techniques like machine learning, natural language processing, and computer vision.	Concerned with task execution and reducing human effort using software, machinery, or robotic systems to perform specific tasks.
Flexibility/Adaptability	Designed to be flexible and adaptable . They can learn from new data, generalize knowledge across domains, and perform a wide range of tasks within their capabilities.	Follows predefined rules or instructions and does not possess the flexibility to handle tasks outside of its defined scope.
Human Interaction	AI systems are designed to interact with humans and understand natural language, context, and intent. They can converse, understand user queries, and provide appropriate responses.	Automation systems are typically designed to operate in a predefined manner without significant human interaction . They are often task-oriented and follow a set of instructions or rules.
Level of Autonomy	Can exhibit varying levels of autonomy , ranging from limited autonomy in narrow AI systems to higher autonomy in more advanced AI systems.	Operate under predefined rules or instructions and do not possess the ability to make decisions autonomously .



What is Generative AI?

Type of artificial intelligence that can create **new content**

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https://aimresearch.co/product/generative-ai-tools-a-comprehensive-market-analysis/

ChatGPT

- OpenAl launched ChatGPT in Nov
 2022
- Improvements from previous technology:
 - Conversational
 - Broad knowledge base
 - Versatility in Applications
- User-friendly and widely accessible



ChatGPT reached 100 million users in 60 days



Limitations of Generative Al

Quality of Generated Outputs	May not produce high-quality outputs, and the generated outputs may contain errors or hallucinations.
Control Over Generated Outputs	Can generate outputs that are like, but not identical to, the input data. May give different responses to the same prompt; thus, reproducibility may be an issue .
Bias and Fairness	Can replicate biases present in the training data. This can lead to unfair or discriminatory results, particularly if the training data contains biased information.
Interpretability	Models are complex and often opaque, making it difficult to understand how predictions are made .
Safety and Security	Can be used to generate convincing fake images, videos, and text , which can be used to spread misinformation. Data privacy may also be a concern .



How customer operations could be transformed

Customer interacts with a humanlike chatbot that

delivers immediate, personalized responses to complex inquiries, ensuring a consistent brand voice regardless of customer language or location.

Customer self-service interactions

The economic potential of generative AI: The next productivity frontier McKinsey 2023

Customer-agent interactions

Human agent uses AI-developed call scripts and receives real-time assistance and suggestions for responses during phone conversations, instantly accessing relevant customer data for tailored and real-time information delivery.





Agent self-improvement

Agent receives a summarization of the conversation in a few succinct points to create a record of customer complaints and actions taken.

Agent uses automated, personalized insights generated by AI, including tailored follow-up messages or personalized coaching suggestions.



Use Case #2

How software engineering could be transformed

<u>The economic potential of generative AI:</u> <u>The next productivity frontier</u> <u>McKinsey 2023</u>



Inception and planning

Software engineers and product managers use generative AI to assist in analyzing, cleaning, and labeling large volumes of data, such as user feedback, market trends, and existing system logs.

System design

Engineers use generative AI to create multiple IT architecture designs and iterate on the potential configurations, accelerating system design, and allowing faster time to market.





Coding

Engineers are assisted by AI tools that can code, reducing development time by assisting with drafts, rapidly finding prompts, and serving as an easily navigable knowledge base.

Testing

Engineers employ algorithms that can enhance functional and performance testing to ensure quality and can generate test cases and test data automatically.





Adoption of AI in the U.S.





What Occupations May Be Exposed to AI?



Differences Across Studies

- Debate about AI-exposed occupations, particularly:
 - Postsecondary Teachers
 - Legal Occupations
 - Licensed professionals Lawyers, Pilots, Doctors, Psychologists, Counselors, CPAs etc.
 - Creative professions Artists, Musicians, Writers
 - Leaders Managers, Clergy
- Dependent on exclusion criteria human-human interaction, legal and ethical considerations
- Dependent on type of AI Machine Learning, LLM, or Image-Generating
- Type of disruption exposure vs replacement vs complementarity



Common Results

• Little to no impact on physical and/or outdoor occupations

- Al may impact more white-collar jobs that:
 - Pay more
 - Require more education
 - Have a higher share of women





Al Occupational Exposure (AIOE)

DOI: 10.1002/smj.3286	
RESEARCH ARTICLE	WILEY
Occupational ind	ustry and geographic
occupational, ind	aial intelligences A nevel
exposure to artific	cial Intelligence: A novel
dataset and its po	tential uses 🛯 🗇
Edward Felten ¹ Mana	v Raj ² 0 Robert Seamans ² 0
Princeton University, Princeton, New	Abstract
Persey	Research Summary: We create and validate a new
New York, New York	measure of an occupation's exposure to AI that we call
	the AI Occupational Exposure (AIOE). We use the
Robert Seamans, NYU Stern School of	AIOE to construct a measure of AI exposure at the
Business, 44 West 4th Street, New York,	industry level, which we call the AI Industry Exposure
New York, 10012, USA. Email: rseamans@stern nyu edu	(AIIE) and a measure of AI exposure at the county
chinin iscuminisgisterinity decid	level, which we call the AI Geographic Exposure
	(AIGE). We also describe several ways in which the
	AIOE can be used to create firm level measures of AI
	exposure. We validate the measures and describe how
	they can be used in different applications by manage-
	ment, organization and strategy scholars.
	Managerial Summary: Although artificial intelli-
	gence (AI) promises to spur economic growth, there is
	widespread concern that it could displace workers,
	after industry trajectories, and resnape organizations.
	Despite the interest in this area, we have limited ability
	to study the effects of AI on occupations, firms, indus-
	data that measures arrequire to AL To address this limit
	tation we areate and validate a new measure of
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	tional Europeuro (ALOE). We use the ALOE to construct
	tional Exposure (AIOE). We use the AIOE to construct
	a measure of AI exposure at the industry level (AfIE)

Legal occupations

Business and financial operations occupations Computer and mathematical occupations Educational instruction and library occupations Management occupations Community and social service occupations Life, physical, and social science occupations Architecture and engineering occupations Office and administrative support occupations Sales and related occupations Arts, entertainment, and media occupations Healthcare practitioners and technical occupations Personal care and service occupations Protective service occupations Healthcare support occupations Transportation and material moving occupations Food preparation and serving related occupations **Production occupations** Installation, maintenance, and repair occupations Farming, fishing, and forestry occupations Building and grounds cleaning and maintenance...

Construction and extraction occupations

Higher Al Exposure

Lower Al Exposure



Analysis of data from Felten, E., Raj, M., & Seamans, R. (2021). Occupational industry and geographic exposure to artificial intelligence: A novel dataset and its potential uses. *Strategic Management Journal*, 42, 2195–2217. https://doi.org/10.1002/smj.3286

AIOE vs Complementarity

Figure 2: AI Exposure (AIOE) and Potential Complementarity









Pizzinelli, C., Panton, A., Tavares, M. M., Cazzaniga, M., & Li, L. (2023). Labor Market Exposure to AI: Cross-country Differences and Distributional Implications (IMF Working Paper)

Al May Create NEW Jobs

- Trainers developing Al
 - Al Engineers, scientists
- Explainers making AI easy to use
 - AI UX designers
- Sustainers –making sure AI is used optimally
 - Al content creators, data curators, ethics and government specialists





Al May Increase Productivity

- Research shows AI can improve productivity on a variety of tasks, like:
 - Business Writing (Noy & Zhang 2023)
 - Programming (Peng et al 2023)
 - Customer Support (Brynjolfsonn et al 2023)
 - Consulting (Dell'Acqua et al 2023)

• Stronger benefits to less experienced, lower skilled workers







✓ AI is different from traditional automation

- ✓ AI has the potential to impact more white collar jobs
- ✓ AI can be used to complement jobs (AI Assistants)
- ✓ AI may increase worker productivity, particularly for less experienced workers



Stay Tuned!

LEAD will continue to research and share information on AI and the workforce



Thank you!

Questions, Comments?

Maggie Smith

Maggie.Smith@commerce.nc.gov

Research Analyst

NC Department of Commerce

Labor & Economic Analysis Division

