FORECAST REPORT

Forrester's 2023 Generative AI Jobs Impact Forecast, US

Generative AI Will Reshape Far More Jobs Than It Eliminates

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Summary

Generative AI has captured the imaginations of leaders and employees alike, experiencing exponential growth in the workplace. This catalyzes questions about the future of jobs: It's commonplace to hear pundits suggest that numerous job categories are doomed. We forecasted the future impacts of generative AI and found significant influence — that is, generative AI will reshape how many jobs operate and how work gets done. But job losses will be lower than many expect, and influence will far outweigh job cannibalization.

Additional resources are available in the online version of this report.

Generative AI Is Poised To Change How We Work

Generative AI is experiencing hyperadoption, hurtling toward becoming the fastest technology to routinely engage billions of users in history. ChatGPT is already leading the way, as it gained 1 million users in just five days and reached 1 billion page views in just four months. But OpenAI's powerful large language model (LLM) isn't the only player in this revolution: Image generators like Adobe Firefly, Dall-E, and Midjourney and productivity enhancers like Microsoft 365 Copilot and Google Duet are capturing the imaginations of employers and employees alike. Forrester defines generative AI as:

A set of technologies and techniques that leverage massive corpuses of data, including large language models, to generate new content (e.g., text, video, images, audio, code). Inputs may be natural language prompts or other noncode and nontraditional inputs.

Discussions of AI technologies inevitably turn to the impact on jobs. This is unsurprising given that 36% of global workers employed full or part time fear losing their jobs to automation in the next 10 years. We've been tracking how AI affects jobs for nearly a decade, analyzing the impact that AI and automation have on the future of jobs. But generative AI has spurred a brand-new round of urgent conversation around this issue because:

- **The magic is clear for all to see, but so is the mayhem.** AI injects both magic and mayhem into the future of work. Generative AI, specifically, has seen hyperadoption because of the seemingly magical results it generates. The flipside of this magic, however, is mayhem. Will your workplace find itself disrupted the way schools and universities have been in the past six months? Students are cheating with ChatGPT, necessitating new pedagogical approaches like writing essays only in the classroom. At least one professor improperly tried to fail students after falsely accusing them of using ChatGPT. Unintended consequences await your workplace as these technologies exponentially grow in popularity.

- **We're already starting to see anecdotal job impacts.** The Washington Post recently published a profile of two unemployed people, a copywriter and a marketing content writer: "ChatGPT took their jobs. Now they walk dogs and fix air conditioners." Online vendor Resumebuilder.com surveyed business leaders and reported that one in four companies supposedly claims to have replaced workers with ChatGPT. In the same vein, a small cottage industry of articles asks ChatGPT itself which jobs it'll replace. And first-person accounts of job loss are easy to find

on TikTok and Twitter.

- **Some predict the kind of exaggerated job losses that have been claimed before.** Goldman Sachs made waves by concluding that "shifts in workflows triggered by [generative AI] could expose the equivalent of 300 million full-time jobs to automation." An academic study from the University of Pennsylvania and OpenAI found that "around 80% of the US workforce could have at least 10% of their work tasks affected by the introduction of LLMs, while approximately 19% of workers may see at least 50% of their tasks impacted." Though these predictions abound, it's much harder to locate evidence for them in real-world job data.

- **Vendor offerings will soon affect far more employees.** Generative AI is disrupting the future of work even before some major offerings come to market. Adobe's much-anticipated Firefly — currently in preview but due for release in the second half of 2023 — can automatically "fill in" extensive image backgrounds generatively, potentially reshaping the work of graphic designers and artists. Microsoft 365 Copilot, which taps into OpenAI's ChatGPT models, currently only reaches 600 pilot customers but will eventually roll out widely. It'll change how users in a majority of roles in most industries do everyday things like write emails, build spreadsheets, and put together presentations.

Let's Be Clear: Generative AI Is Coming After White Collar Jobs

Exaggerated forecasts, heart-wrenching anecdotes, general panic — it can be hard to see the scope of the fire amid all this smoke. Only through analysis grounded in the most robust data can we understand the impact generative AI will have on jobs. We focus on three key analytical categories (see Figure 1). We model the automation potential — from which we derive the total number of jobs lost to AI and automation, not just generative AI — as context. Next, we forecast the slice of those lost jobs that's due to generative AI specifically, which we derive from a measure we call "generative AI job loss potential." Finally, we measure the impact generative AI will have on the core attributes of a job, reshaping how work is done, which we call "generative AI influence." The bar here is high: We target those attributes that are within 90% of the top attribute score for each job to localize generative AI's deepest impact. Modeling all these factors, we find that:

- **Automation and AI overall will replace 4.9% of US jobs by 2030.** Looking at the impacts of all automation and AI technologies, not just generative AI, we forecast around 0.6% yearly US job losses through 2030 (see Figure 2). The end year of our forecast represents an increase from 4.6% in its previous iteration. Job

replacement has uneven impacts on the workforce. In some cases, automation will stand in for jobs that have been hard to fill: For instance, physical robotics and automation are only beginning to fill the workforce gaps that have plagued frontline work in the 2020s. In other cases, workers lose jobs they need, creating deep social challenges like those faced in the postindustrial Rust Belt.

- **Generative AI will make up almost 30% of the jobs that will be lost to automation by 2030.** Generative AI will make up a growing percentage of all US jobs lost to automation and AI, climbing from 9.3% of jobs lost to automation and AI overall in 2023 to 30.4% by 2030. In terms of the number of jobs, we forecast that generative AI will replace 90,000 jobs in 2023, growing to 2.4 million by 2030. In our model, we assume that job losses from generative AI over the next two years will remain modest until questions on intellectual property rights, copyright, plagiarism, model refresh rates, model bias, ethics, and model response reliability are resolved.

- **Generative AI will influence 4.5 times more jobs than it replaces.** By 2030, we forecast that generative AI will influence more than 11 million US jobs, or 4.5 times the number of jobs replaced (see Figure 3). Influence is different from job loss. It means reshaping, retraining, and upskilling existing workers to incorporate generative AI tools into the daily workflow. Jobs that are easier to automate that also have high generative AI influence, such as technical writers, social science research assistants, proofreaders, and copywriters, are more likely to be lost. Harder-to-automate jobs with high generative AI influence, such as editors, writers, authors and poets, lyricists, and creative writers, are more likely to influence how jobs are conducted (via augmentation) rather than replace them.
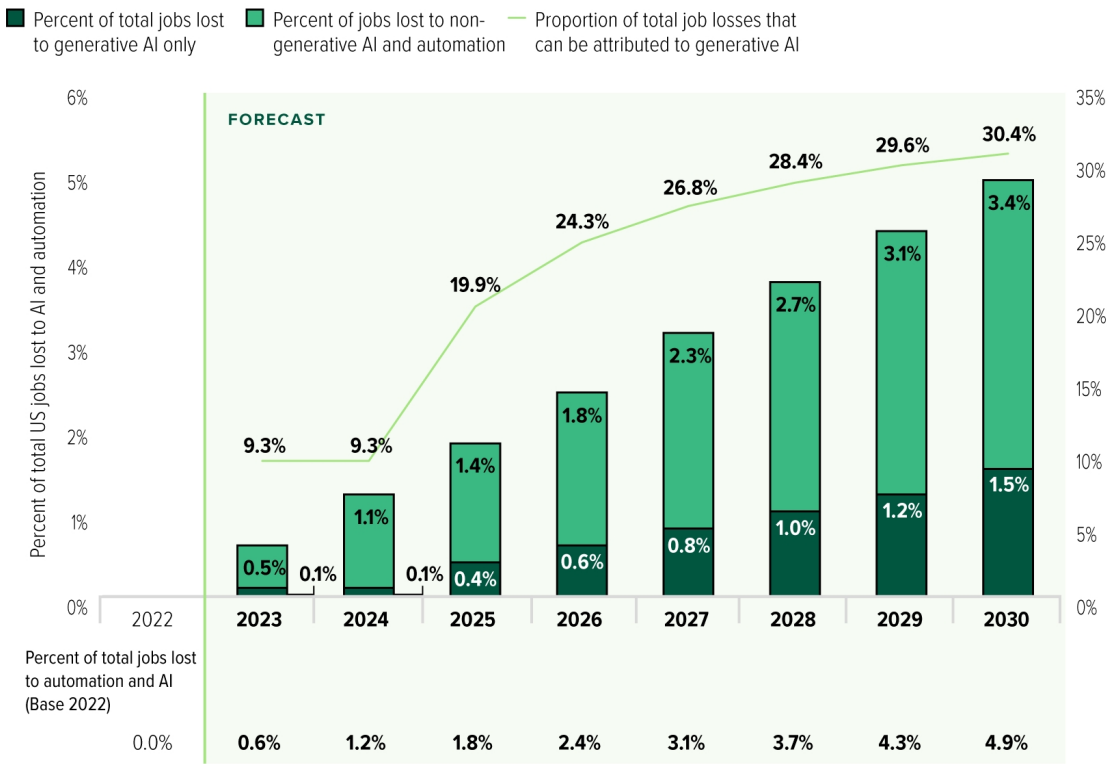
Figure 1

Forrester's Methodology For Forecasting The Future Of Jobs

Forecast category	Description	Methodological notes
Generative AI influence	Impact that generative AI technologies have on core attributes of a job, reshaping how work is done.	Forrester measures the overlap between a job's core attributes of knowledge, skills, and abilities with those that we attribute to generative AI. The more overlap, the more influence. We define core attributes of a job as the attributes that are within 90% of the top attribute score for a job.
Jobs lost to automation	Total jobs lost to all automation and AI technologies, not just generative AI.	Forrester uses Frey and Osborne's (2013) job automation potential, derived from the O*Net database, to find the share of job tasks that could be automated. Jobs at risk from automation will not necessarily be automated but will depend on other factors like the availability of automation investment and the availability of automation solutions (ChatGPT increases solution availability). Automation potential is higher for more physical or routine jobs that follow a precise set of instructions.
Generative AI job loss potential	Jobs lost to generative AI specifically. A subset of the automation potential.	Generative AI job loss potential is low for jobs that require a physical/human presence or require "soft" skills like those of a chief executive, judge, lawyer, teacher, supervisor, or manager. Jobs that require higher levels of judgment, insight, and moral reasoning will be less likely to be lost to generative AI. Forrester assumes job losses from generative AI over the next two years will be modest until questions on intellectual property rights, copyright, plagiarism, model refresh rates, model bias, ethics, and model response reliability are resolved.

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Figure 2

Generative AI Represents A Growing Proportion Of Jobs Lost To AI And Automation

Percent of total US jobs lost to AI and automation

■ Percent of total jobs lost to generative AI only ■ Percent of jobs lost to non-generative AI and automation — Proportion of total job losses that can be attributed to generative AI
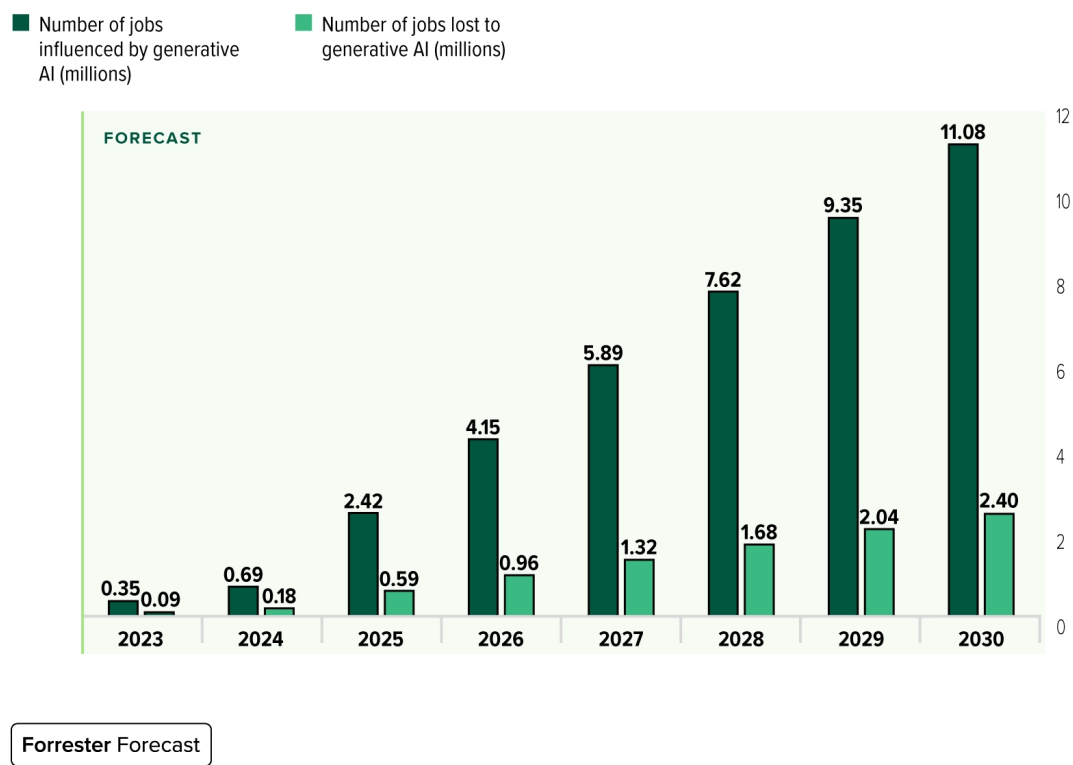

Forrester Forecast

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Figure 3

Generative AI Will Influence Far More Jobs Than It Replaces

■ Number of jobs influenced by generative AI (millions) ■ Number of jobs lost to generative AI (millions)

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Year	Influenced	Lost
2023	0.35	0.09
2024	0.69	0.18
2025	2.42	0.59
2026	4.15	0.96
2027	5.89	1.32
2028	7.62	1.68
2029	9.35	2.04
2030	11.08	2.40

Forrester Forecast

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Who's Affected The Most: Educated, Mid-Salary Workers

When we put together automation potential and generative AI influence, we get a map of which jobs it'll change (high generative AI influence with low automation potential) and which jobs it'll replace (high generative AI influence with high automation potential) (see Figure 4). Some jobs, such as computer programmers, sit in the middle, suggesting lots of changes to how they work but only some job losses. Our research on TuringBots, autonomous development bots that automatically generate code, shows how software developers will make use of these tools. Our model suggests that generative AI will:

- **Disrupt college-educated jobs.** Technological innovations have threatened frontline jobs entailing manual labor since the 19th century (see, for example, the

Swing Riots of the 1830s). Generative AI upends this trend; the more education a worker has, the higher its influence on their job (see Figure 5). Workers with only a high school diploma — 36 million strong — will see a relatively small 2.7% influence level on their jobs. Workers with a bachelor's degree or higher — 64 million — will see 16% to 21%. Occupations with lower educational requirements like transportation and warehousing, construction, agriculture, and manufacturing will see less job influence.

- **Target middle class income earners.** Generative AI's influence increases with income, declining when it reaches managerial positions (see Figure 6). Jobs with annual salaries of less than $60,000 will see half the levels of generative AI influence than jobs paid $90,000 or more. Income correlates in part with education, so it's consistent with our findings about university education. Higher-earning professions, including many high-income managerial jobs, fall on the other side of the inverted U-shaped curve: They see waning influence from generative AI, as their jobs depend on AI-proof skills like human judgment, empathy, and leadership.

- **Reduce administrative jobs while influencing writing jobs, among others.** In terms of job replacement, generative AI will most strongly impact office and administrative positions, which make up nearly half of all job losses (see Figure 7). Other jobs will be influenced by generative AI, meaning that the technology reshapes how those jobs are done (see Figure 8). Replacement and influence will sometimes be conflated, to the detriment of organizations mixing them up. German publisher Bild plans to cut hundreds of editorial jobs and replace them with AI, but it remains unclear whether the technology is ready, whether they have the human skills to implement it, and whether they'll end up reducing customer experience by using it.

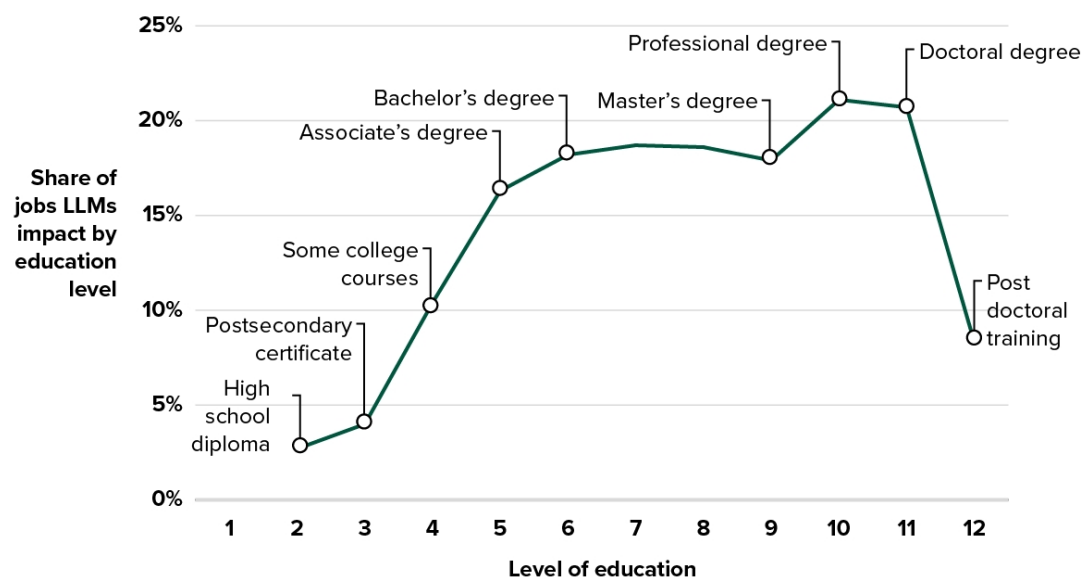### Figure 4

Influence And Automation Potential Together Yield Job Losses
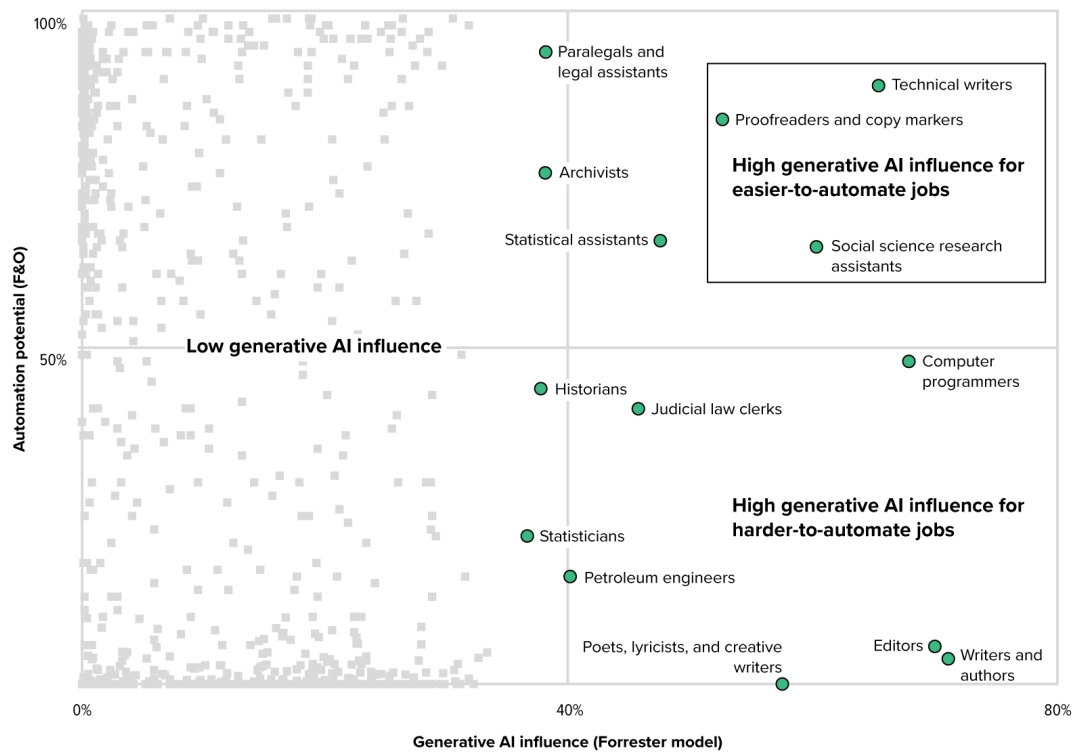
Sources: Oxford Martin School, University of Oxford and O*NET OnLine

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Figure 5

Generative AI's Influence Rises With Education Until The Highest Levels

Source: US Bureau Of Labor Statistics

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Figure 6

Generative AI Influences Middle-Salary White Collar Jobs The Most
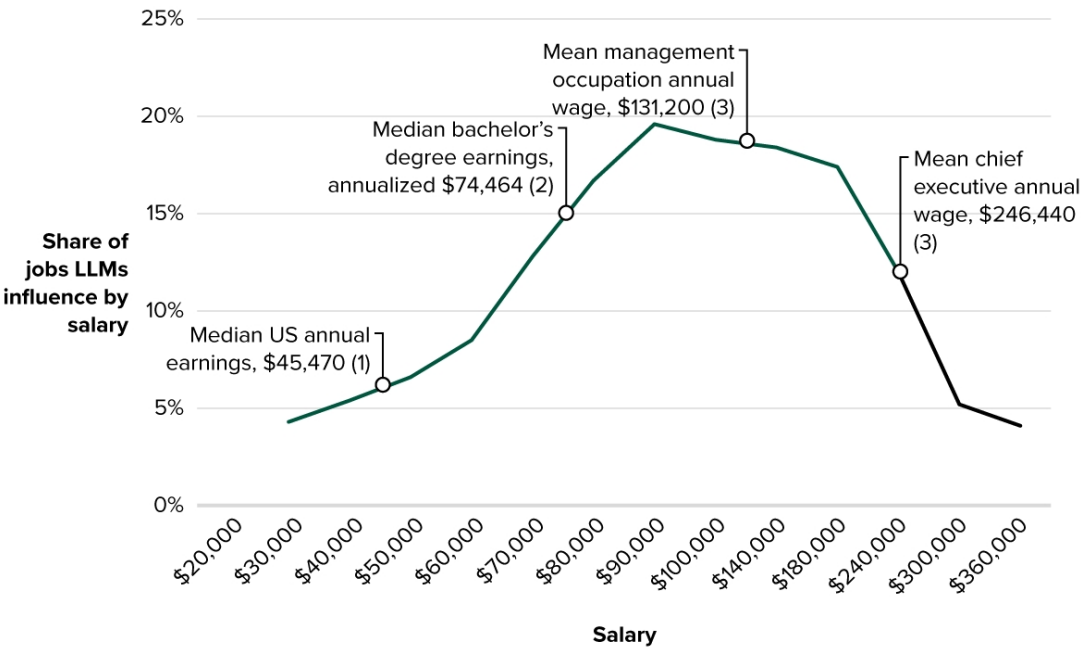
Sources: US Census Bureau and US Bureau Of Labor Statistics

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Figure 7

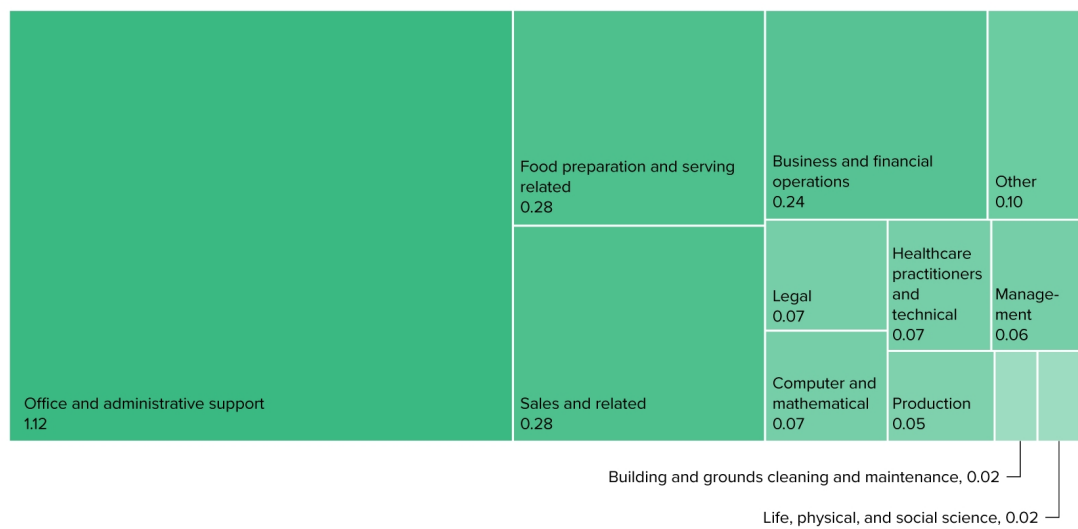**Generative AI Will Hit Office And Administrative Support Jobs The Hardest**

	Food preparation and serving related 0.28	Business and financial operations 0.24	Other 0.10
Office and administrative support 1.12	Sales and related 0.28	Legal 0.07	Healthcare practitioners and technical 0.07	Management 0.06
		Computer and mathematical 0.07	Production 0.05	

Building and grounds cleaning and maintenance, 0.02

Life, physical, and social science, 0.02

Source: Forrester's 2023 Generative AI Jobs Impact Forecast, US

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Figure 8

US Jobs Most Influenced By Generative AI

Occupation	Percentage
Legal occupations	78%
Life, physical, and social science occupations	61%
Office and administrative support occupations	57%
Computer and mathematical occupations	53%
Healthcare practitioners and technical occupations	50%
Architecture and engineering occupations	48%
Business and financial operations occupations	47%
Arts, design, entertainment, sports, and media occupations	41%
Management occupations	38%
Educational instruction and library occupations	33%
Food preparation and serving related occupations	24%
Sales and related occupations	23%
Healthcare support occupations	21%
Personal care and service occupations	19%
Farming, fishing, and forestry occupations	18%
Community and social service occupations	13%
Building and grounds cleaning and maintenance occupations	7%
Production occupations	7%
Installation, maintenance, and repair occupations	5%
Protective service occupations	4%
Construction and extraction occupations	2%
Transportation and material moving occupations	2%

Source: Forrester's 2023 Generative AI Jobs Impact Forecast, US

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Your Workforce Generative AI Strategy Needs Checkpoints And Guardrails

Leaders must move quickly on generative AI. Not only is it exciting technology that promises to increase productivity and employee and customer experience, but it's also being forced from below as employees engage in bring-your-own AI (BYOAI). But reshaping the future of work with generative AI comes with its own risks and challenges, so leaders can't rush in without a plan. Roadblocks include:

- **The prospect of poor performance.** Human experimentation and imagination are pushing generative AI systems to take on monumental tasks like writing a novel.

But many important questions about the performance of these systems remain. Part of this happens because generative AI solutions like ChatGPT can generate "coherent nonsense." Other problems emerge based on use case: In customer service, generative AI systems can offer various customers different answers, subtly or not-so-subtly, and this requires a rethink of how to guarantee consistent customer service.

- **Costly talent gaps.** For all its ease of use, mastering generative AI won't be an easy, linear path for organizations. You'll need to hire new, potentially scarce, and expensive talent — developers, business analysts, prompt engineers, even ethicists. The market for this talent will be tight. On the other side, you might lose valuable legacy talent if the pace of change is too fast. You risk incurring the generative AI analog to Enzo the machinist, who could work well with legacy equipment but couldn't master newer, computerized systems, so he resigned.

- **Engaging in "satisficing" that hurts employee and customer experience.** Sometimes, substituting human labor for AI or automation leads to a suboptimal solution ... but we do it anyway. This is known as "satisficing," decision-making that strives for adequate rather than perfect results. Customers rarely, if ever, thought legacy interactive voice response (IVR) systems that asked them to "press 1 if ..." were better than speaking to a live human, but economics drove the shift. The same fear exists with generative AI, and not just from LLMs: Marvel faced backlash for using generative AI visuals in the opening credits of its TV show Secret Invasion, which customers saw as a lazy, unethical effort yielding low-quality results.

- **BYOAI risks.** In the short term, BYOAI threatens to drag technology and business leaders into the realm of generative AI sooner rather than later, whether they like it or not. Busy employees turning to generative solutions due to time poverty create risks related to security, privacy, and accuracy. Feeding confidential information into ChatGPT could compromise that information and see it used to train the model itself, opening further vectors for data leakage. One law firm faced fines after one of its lawyers used ChatGPT to create a court filing and the generative AI made up false court cases to support its arguments.

Reshape Key Jobs And Systems With A Workforce Generative AI Strategy

Generative AI works probabilistically: Users don't know exactly what outputs — in the form of text, images, or audio — they'll receive back when they submit their prompt. As a result, generative AI is more challenging that traditional computing. You won't be able to plan for every contingency, but you can build a workforce generative AI strategy that better prepares you for the Wild West of generative AI at work. Your strategy should

include investments, guardrails, and checkpoints. Make sure you:

- **Invest in RQ, the robotics quotient.** RQ measures the ability of individuals and organizations to adapt to, collaborate with, trust, and generate business results from AI and automation (see Figure 9). You can self-assess yourself, your team, or your entire organization with our decision tool. You can also benchmark yourself against a broad set of best practices and workforce data. Investing in RQ means upskilling employees, building new norms, cultivating positive beliefs, and being transparent about the role AI will play in your future of work plans. High RQ organizations will be the most successful in integrating generative AI to drive value.

- **Make augmentation the centerpiece of your strategy.** You've seen our forecast that generative AI will influence far more jobs than it replaces. Privilege job scenarios in which generative AI explicitly augments (rather than replaces) workflows to turn this into an advantage. Asking Microsoft Excel's Copilot to create a pivot table or calculate a correlation removes an onerous task — or one that an employee might not even possess the skill to do — but it doesn't replace the employee. Instead, it augments their skill set and reduces the time to complete a specific task.

- **Analyze the jobs that'll benefit most from generative AI.** Equip workers in jobs with high generative AI influence with early pilot tools. These will prove out the most important short-term use cases and help reshape those jobs. Other jobs will see less relevance for these tools. For example, occupations with higher-level professional certifications or higher levels of apprenticeship in their positions will be less influenced by generative AI (see Figure 10). The skills gained through these programs are harder for generative AI systems to replicate and are based in experience, judgment, and precision. They, too, will use generative AI, but it'll be less core to their workflows.

- **Hire or upskill to fill generative AI gaps.** Hiring the right skills for generative AI will be an evolving proposition. For example, prompt engineering is currently a hot skill. It endeavors to elicit the best possible answers out of generative AI systems: By inputting a well-optimized textual input, systems like Midjourney or Dall-E will produce just the right visual output, while Google Bard or ChatGPT produce the right textual output. But prompt engineering might decline in importance in favor of "problem formulation," as generative AI systems become more adept at understanding human intent or even begin to create their own prompts.

Figure 9

RQ, The Robotics Quotient, Helps You Prepare To Add AI To Jobs

RQ, the robotics quotient, measures the ability of individuals and organizations to adapt to, collaborate with, trust, and generate business results from AI.
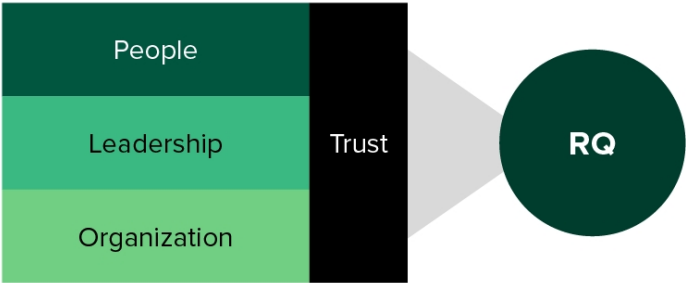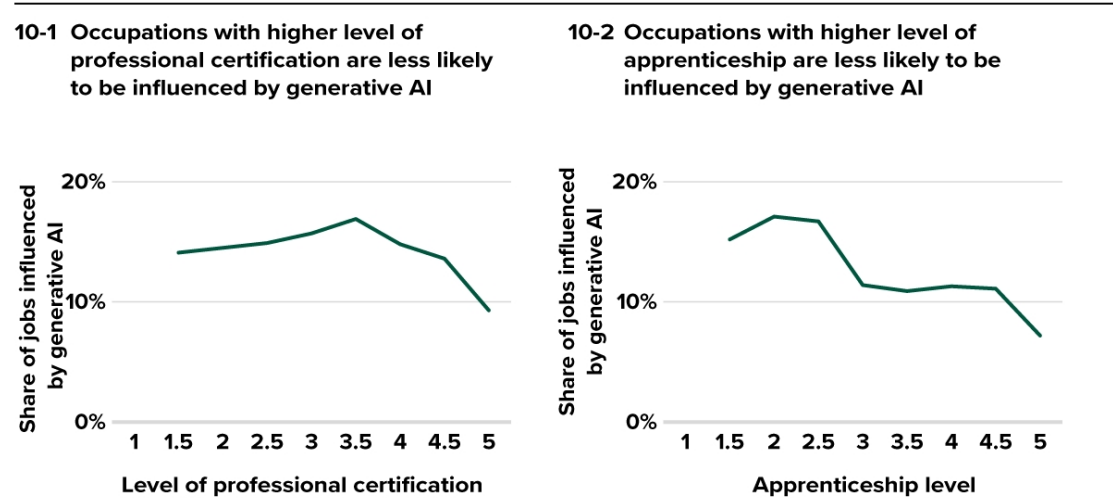

P: People must bring skills, inclinations, and psychological capabilities.
L: Leaders must balance vision with adaptiveness and trust.
O: Organizations must provide resources like skills, structures, training, and governance.
T: Trust varies by technology type, and AI has a high bar for earning it.

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Figure 10

Certifications And Apprenticeship Programs Inoculate Against Generative AI Influence

10-1 Occupations with higher level of professional certification are less likely to be influenced by generative AI

10-2 Occupations with higher level of apprenticeship are less likely to be influenced by generative AI

Source: US Bureau Of Labor Statistics

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Supplemental Material

The Forecast Methodology

Forrester's forecasts offer a quantitative framework for understanding market drivers and inhibitors across several industries to help clients plan and prioritize investment decisions.

Our forecasts employ a unique methodology: By leveraging demand-side data balanced with company supply-side metrics and working closely with Forrester's subject matter experts, we provide a highly detailed understanding of each market. Our forecasts provide data and market metrics over a five-year period for a variety of markets, including e-commerce, digital marketing, and business technology. The forecasting team creates more than 20 forecasts annually across North America, Europe, Asia Pacific, and Latin America.

As part of the forecast modeling, Forrester develops comprehensive historical and base-year market size estimates based on a variety of sources, including public financial documents, executive interviews, Forrester's proprietary primary research and

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Most forecasts are updated on an annual basis and include historic numbers. Each report comes with an Excel deliverable with all the details of the forecast, including definitions, assumptions, and exchange rates.

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