Jobs for the Future

The AI-Ready Workforce

How Leaders and Workers Can Prepare for a Reshaped Future of Work

PRESENTED BY

The Center for Artificial Intelligence & the Future of Work

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In an era in which everything – the way we live, work, connect, and learn – is becoming more digital, it is critical to understand the impact of emerging technologies, like AI, on our broader workforce. As AI continues to expand across a wide spectrum of use cases, we believe it should not be limited to benefit only the few with vast resources. Our AI-Ready Workforce report explores how key industries can best prepare for success amid these ongoing transformations. These insights will enable workers, learners, and organizations to prepare and train for the future of work. Together, we can leverage the incredible power of technology to create bigger opportunities and a better future for every person on the planet. The possibilities are endless.

APRIL MILLER BOISE, EXECUTIVE VICE PRESIDENT AND CHIEF LEGAL OFFICER AT INTEL CORPORATION

Executive Summary

- New research from JFF shows **AI's impact on jobs** will depend on whether AI increases or decreases the need for a particular skill or task, and how important those tasks and skills are to a given occupation or industry.
- JFF's *The AI-Ready Workforce* report offers **three new resources—a framework model, industry-specific profiles, and a readiness blueprint—**to anticipate coming shifts across industries and occupations, and help workers, institutions, and ecosystems prepare.
- The bottom line: every occupation will benefit by **doubling down on the uniquely human interpersonal skills** that will be elevated or augmented by AI.

New Questions for the Future of Work

Workers, learners, and leaders across the education-to-career ecosystem are racing to understand and respond to the impact of artificial intelligence (AI) on jobs, skills, and the future of work itself. As emerging research projects significant disruptions across industries and occupations, policymakers, employers, and training providers—as well as workers and learners themselves—are asking timely questions about the implications of these shifts for the future of work.

Which tasks and skills will be most important for human workers to thrive in an AI-transformed future, and which will increasingly be best suited for next-generation AI, robotics, and other machine-related advances?

What will these shifts mean for jobs held by millions of U.S. workers today, especially those without bachelor's degrees or who have experienced barriers to economic advancement, in critical industries?

How can leaders across the workforce and education continuum begin now to reshape these jobs to center tasks and responsibilities that are best performed by human workers while still capitalizing on the unprecedented opportunities offered by AI?

Three New Readiness Resources from JFF

To address these questions, Jobs for the Future's new Center for Artificial Intelligence & the Future of Work, incubated within JFF's innovation lab, JFFLabs, collaborated with Intel Corporation, a leader in advancing AI technology responsibly, to craft a new set of resources for thinking—and planning—today for the complex ways in which AI will transform jobs tomorrow.

Drawing on an in-depth analysis of labor market data and surveys of business, workforce, and education leaders, we created:

The AI-Ready Workforce Framework: A New Model for AI's Dynamic Impact on Tasks and Skills

Our new AI-Ready Workforce Framework analyzes tasks and skills based on *how much or how little* AI-driven automation may impact them and the *nature* of that impact. Organized into five groups (**replace, displace, complement, augment, and elevate**), this framework suggests whether the integration of AI is likely to *increase* or *decrease* workers' use of certain skills.

AI-Transformation Profiles: Reshaping Industries and Occupations to Center Human Skills

We then applied that framework to build a series of AI-transformation profiles, demonstrating how AI may impact the ten occupations employing the most workers in the United States across five industries key to both workforce and economic development—business and sales, health care, transportation and logistics, manufacturing, and computer and information sciences.

These transformation profiles examine the relative importance within U.S. industries and occupations of tasks and skills whose use could be increased or decreased by AI. Each profile, which we developed at the industry level as an example for one occupation, describe **four categories of action—Future-Proof, Capitalize, Automate, and Reimagine—**that employers, educators, workforce development partners, and workers themselves can begin to take to emphasize or deemphasize certain tasks and skills, reshape jobs, and upskill or reskill workers to respond to these shifts.

The AI-Ready Workforce Transformation Blueprint: Recommendations and Key Strategies for Policy Leaders, Employers, and Postsecondary Institutions

Finally, we drew from these insights to develop a new blueprint for workforce transformation, offering new, overarching recommendations and key strategies for policy leaders, employers, and postsecondary institutions and training organizations. With humans at the center, we map out critical steps for workers, institutions, and education and workforce ecosystems—grounded in the unique context of the U.S. economy, but, we believe, applicable globally—to ensure that all of us are equitably prepared for the coming AI transformation.

Our Key Insights—and a Call to Action

Durable Skills Will Become a Worker Superpower

AI will be good enough at some tasks—such as information processing and data analysis—that it will become less important for humans to develop those skills. At the same time, AI—especially generative AI—has the potential to augment durable skills such as communication, critical thinking, and relationship-building in ways that make human workers even more effective but without replacing the need for human-to-human interaction, making it more important over time for workers to sharpen these capabilities.

As a result, jobs will evolve—in some cases quickly, in others gradually—and workers, learners, and the entire education and workforce ecosystem will need to adapt.

Jobs Integrating Durable Skills Demonstrate AI Resilience

Encouragingly, our analysis shows that many of the most in-demand occupations in the United States can be better positioned than we might expect to weather this shift.

While skill sets that will be displaced by AI are important or very important to 98% of the top 10 highest-employment occupations across 5 key U.S. industries, **all of these jobs value at least somewhat the uniquely human, interpersonal skills that AI will elevate in importance.**

We Must Act Now to Prepare Humans, Institutions, and Ecosystems for an AI-Transformed Future of Work

That means it's even more critical to design future jobs and training programs to capitalize on these durable skills so that jobs held by humans become, and remain, higher-quality jobs—and that the time to do so is now.

Employers, workforce leaders, training providers, and policymakers will need to look carefully at how AI will interact with a wide range of tasks and skills to determine:

- which occupations and industries are well-suited to **capitalize** on uniquely human skills that are already important for those roles;
- which will need to be **reimagined** to bring more of those skills to the forefront;
- which will need to be **future-proofed** to prepare for AI's transformation; and
- which can benefit from being **automated** to create time for high-value work.

Most jobs will need to take all of these steps. And we'll need to ensure that AI-readiness efforts operate at multiple levels: human workers themselves, the institutions where they learn and work, and the workforce and education ecosystems that surround and support all of them.

The promise and potential of AI are staggering, and its challenges are very real. **The moment has arrived for us to choose, together, how this groundbreaking technology will work to accelerate equitable economic advancement, not hold it back**.

Introduction: Literature Review and Preliminary Research

01

All signs point to AI's task-level impact—and the need for upskilling

There's a flurry of research and analysis to better understand the potential large-scale impacts of AI on labor markets. While business leaders and researchers are already projecting massive transformation resulting from the adoption of AI, most workers are not yet seeing it in their day-to-day—but they know it's coming and are eager to prepare. Across the board, leaders, workers, and learners are calling for more efforts to train and upskill our workforces for an AI-transformed future. Early research literature, JFFLabs's engagement with business, workforce, and education leaders, and public polling are beginning to point to a critical set of early insights that should inform those efforts.

Research Begins to Map AI's Impact Through the Lens of Degrees of Automation

While some anecdotes suggest some firms may be considering using AI to replace entire jobs or categories of jobs now held by human workers, there's a growing consensus that AI's impact will instead be felt more at the level of individual tasks and skills within jobs. In recent months, analysts have been working to better understand and predict that impact, often by quantifying the number of work hours or tasks that could be automated or impacted by AI. To date, the existing analysis seems to treat the impact of AI as if it exists on a single spectrum, from lesser to greater degrees of automation applied to any task.

Our literature review finds that:

AI is consistently projected to transform jobs by automating or impacting specific tasks—potentially reaching millions of workers. A March 2023 paper by a team of researchers from OpenAI, OpenResearch, and the University of Pennsylvania shows that 80% of the U.S. workforce could have at least 10% of their work tasks affected by the introduction of Large Language Models (LLMs), while approximately 19% of workers may see at least 50% of their tasks impacted—"with higher-income jobs potentially facing greater exposure." Another recent study by McKinsey & Co. found that, on average, 30% of current work hours could be automated due to generative AI. These and other studies suggest that AI will change jobs and impact humans' work but not necessarily take humans out of the equation entirely.

However, AI's impact will not be equal across industries and occupations. According to the McKinsey study, AI is expected to empower the work of professionals in STEM, creative, and business fields while reducing demand for jobs in office support, customer service, and food service, based on an assessment that jobs involving greater adoption of automation will be more likely to be impacted by AI solutions across the board.

The report's authors anticipate that more than 12 million job transitions will be needed by 2030, with a focus on upskilling and retraining workers while evolving jobs with new tasks, particularly those in lower-wage occupations. The Pew Research Center found that in 2022, nearly 5.8 million women and 3.6 million men were employed in five occupations with job tasks facing heavy exposure to AI automation, including sales representatives, lawyers, couriers, accountants, and other computer-related occupations.
Similarly, LinkedIn Economic Graph's recent research shows that financial services and retail professionals are adopting AI skills at the fastest rates, while professionals in education or consumer services show the slowest growth.

While existing research is insightful and necessary to help make sense of AI's impact, current research is largely limited to more static task analyses with few insights on how to consider ongoing job transformations—or how industry leaders, policymakers, and workforce development groups can respond.

We surveyed leaders and workers sensing a growing AI transformation

Business, Workforce, and Education Leaders on the Ground Report that AI is Reshaping and Creating Jobs

As part of our preliminary research, JFFLabs conducted an online survey of 70 leaders across JFF's education and workforce networks from February to May 2023 to gauge perceptions of AI and the technology's impact on jobs. Our findings show that:

Industry leaders believe that the AI transformation has begun: Leaders across industries are divided on how transformative AI has been in their fields, but the vast majority (86%) have already felt some impact from AI.

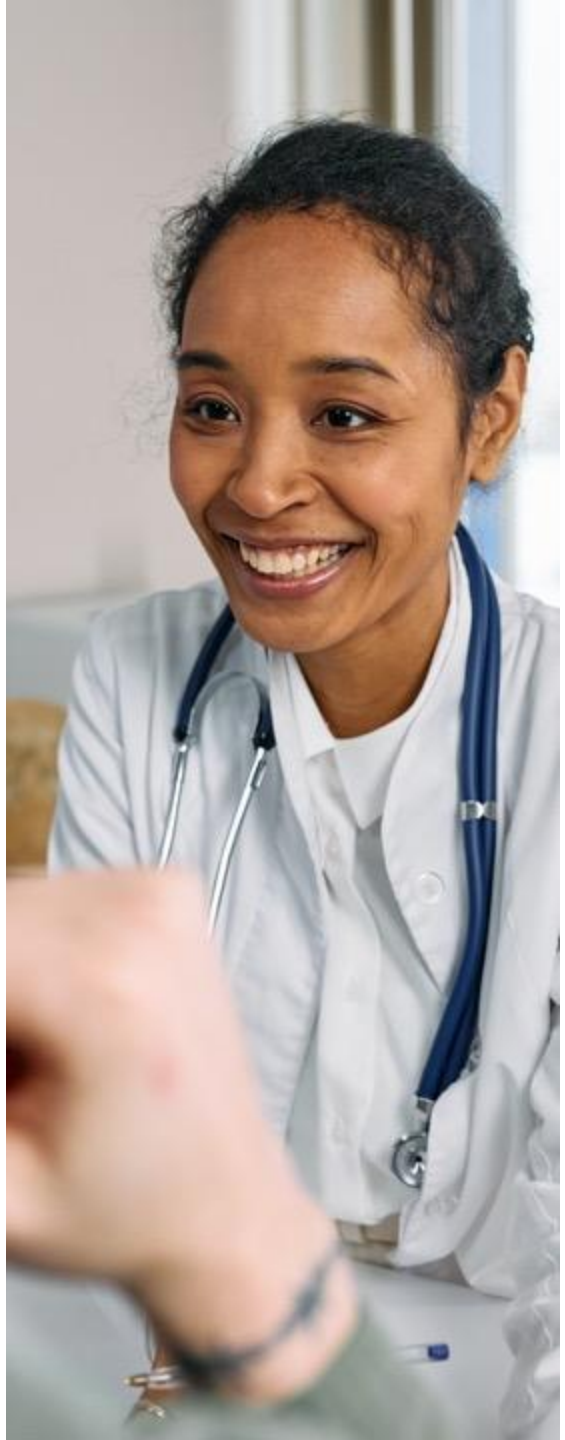
These leaders feel that AI is largely enhancing human work, not replacing it: 52% of those surveyed strongly disagreed or disagreed that AI is entirely replacing jobs; rather, 83% agree or strongly agree that jobs are being augmented by AI, and 71% say new jobs are being created as a result of AI.

87% agree that upskilling will be critical; 87% of those surveyed believe AI tools require new training to upskill incumbent workers.

Workers Are Calling for Upskilling to Respond to AI

Workers also recognize that change is coming, and they need to get ahead of it. In recent public opinion research commissioned by JFF and conducted by Morning Consult, over half of workers surveyed (58%) felt they would need to gain new skills as a result of the impact of AI (58%), including a third who felt they should do so within the next year (34%).

While most (88%) do not yet trust their employers to support them in understanding AI, individuals who have already encountered AI in their current jobs are more than twice as likely to feel AI would do more good than harm. Even so, today, fewer than 1 in 10 are currently experiencing AI in their jobs.



Our Framework and Transformation Profiles

02

Our key insight: the *importance* and *nature* of tasks and skills will help drive AI's impact on jobs

Because AI will affect jobs primarily at the level of tasks and skills—and especially given the increased focus and attention on skills-first hiring and talent development across the economy—the education and work ecosystems will need a more nuanced understanding of how AI's impact will vary based on how different occupations draw on different types of tasks and skills.

Such an analysis needs to consider these distinctions:

Importance of Tasks and Skills Within Occupations:
Labor market data quantifies the relative importance of the same tasks and skills within different occupations. For example, vehicle operation is considered highly important for a heavy tractor-trailer driver but is perhaps less important for a home health care worker. If AI automates aspects of a job that are not considered important, the changes may simply create efficiencies. But if AI impacts tasks and skills that are more important to a particular occupation, integrating AI may completely reshape workers' jobs and priorities. Some research has begun to assess AI's impact on jobs through the lens of task importance, with fascinating early data also emerging about how AI might support workers with different experience levels.

For example, a March 2023 analysis from Goldman Sachs that analyzed the share of important and complex tasks exposed to automation estimates that 7% of jobs will be substituted by AI-driven technologies and 63% will be complemented by these tools. An April 2023 study by a group of researchers from Stanford Institute for Human-Centered Artificial Intelligence (HAI) and MIT, which analyzed the rollout of generative AI within a customer service function at a call center, found that "access to AI assistance increased agent productivity by 14%, with the biggest impact on less experienced workers."

Nature of Tasks and Skills:
While labor market analysis recognizes that many, if not all, jobs share certain common tasks and skills, these differ tremendously. Ranging from physical tasks such as lifting and manipulating objects to cognitive tasks such as processing and analyzing information to interpersonal tasks such as leading others and resolving person-to-person conflicts, different tasks and skills will experience different AI-driven impacts—in ways we believe will be driven mainly by the degree to which those tasks and skills incorporate uniquely human or interpersonal qualities.

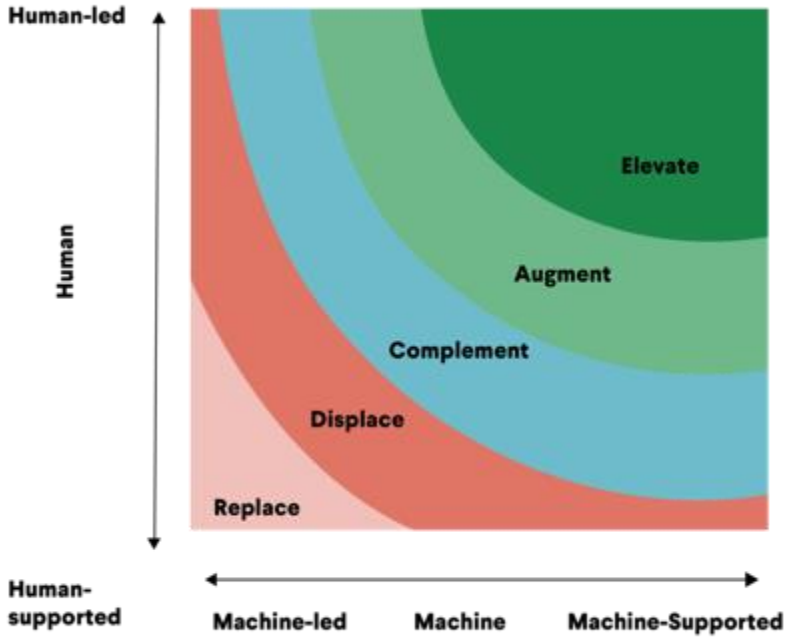
Some examples include an AI-guided robot might replace many routine physical tasks and have a greater impact on a job based on physical labor; AI's unprecedented capacity for data analysis might displace similar tasks performed by a data analyst. An LLM, on the other hand, might augment a manager's tasks by helping script a conversation to resolve a team dilemma. However, the manager must still hold the discussion, weigh their team's responses, and ensure the right outcome.

The AI-Ready Workforce Framework

Building on our recognition that AI will affect types of tasks and skills differently, our team developed *The AI-Ready Workforce* Framework to project how AI operates within in-demand jobs and industries critical to economic advancement in the United States.

Extending the foundation laid by existing research on task automation and leveraging the O*NET skills database, the World Economic Forum (WEF) global skills taxonomy, and Lightcast's open skills taxonomy, the Framework establishes five types of AI impact for clusters of tasks and skills that commonly occur across in-demand jobs.

***The AI-Ready Workforce* Framework: Types of AI Impact on Common Skills**



Elevate | This impact type contains human and interpersonal tasks and skills such as building interpersonal relationships, negotiating between parties, staffing organizational units, or guiding/motivating teams.

- We expect AI to *significantly increase* the use, impact, and importance of Elevate skills, helping employees and organizations integrate new levels of complexity, sophistication, and dynamism into their work.

Augment | This impact type contains complex cognitive/analytical tasks and skills such as public speaking and active listening, systems analysis and evaluation, work planning and organization, and critical/analytical thinking.

- We expect AI to ***increase*** the use of Augment skills, upleveling performance and generating efficiencies as it becomes workers' new first drafts.

Complement | This impact type contains machine collaboration tasks and skills such as equipment maintenance, vehicle and machine operations, control precision, hazard material handling, and troubleshooting.

- We expect AI, combined with advances in robotics and the Internet of Things, will have a more ***neutral*** impact on the use and importance of Complement skills; it will increasingly work hand-in-hand with workers to identify issues, prioritize efforts, and reduce errors.

Displace | This impact type contains routine cognitive tasks and skills such as basic problem-solving, information gathering and processing, data analysis, and rule-based decision-making.

- We expect that AI will increasingly perform these tasks and ***decrease*** their use by humans, with humans' roles shifting to high-level support of analytical processes and applying critical thinking and other Augment and Elevate skills to the results.

Replace | This impact type contains routine physical, labor-intensive tasks and skills such as handling and moving heavy objects, manual and repetitive tasks, routine assembly and inventory management, and transportation and delivery processes.

- Unlike Complement skills, which are human-machine partnerships, many Replace skills will be fully automated, especially as advancements in robotics and other machine automation continue, **significantly decreasing** their use by workers and freeing humans for other tasks.

The AI-Transformation Profile

While it's clear that AI will impact different jobs and industries differently, we were eager to better understand how that impact would play out within key industries in the U.S. economy—and what actions leaders should take to anticipate and respond to these shifts.

For the second stage of our analysis, building from our new framework, we leveraged real-time labor market information, 5- and 10-year projections, job posting data from 2020-2022, and occupation and industry profile analyses in an iterative analysis-and-revision approach to analyze how important each of those task and skill clusters was to the top ten occupations by employment levels across five industries; our range included Very Important, Important, Somewhat Important, and Not Important. We selected these industries—business and sales, health care, transportation and logistics, manufacturing, and computer and information sciences, listed in order of greatest to least employment in the top 10 highest-employing occupations in each industry—both for their potential exposure to AI and automation and to ensure a regionally diverse group.

What we found was striking: while tasks and skills that will be displaced by AI are important or very important to 98% of the top 10 highest-employment occupations across these 5 key U.S. industries, **78% of these jobs value uniquely human Elevate tasks and skills as very important or important—and for the remaining 22%, Elevate tasks and skills are at least somewhat important**.

This suggests that many jobs critical to our economy may be more resilient to AI's impact than expected. But these shifts in job designs and responsibilities won't happen automatically, and they won't happen overnight.

Our AI-Transformation Profile surfaces four sets of recommended actions to guide how leaders should intentionally reshape occupations and their unique mix of tasks and skills to adapt to AI-driven transformation—for instance, where AI offers opportunities for certain industries and roles to capitalize on uniquely human tasks and skills, or signals a critical need for workers and the workforce ecosystem to future-proof or automate tasks.

Later in this report, we present industry- and occupation-level views of these profiles that show how many of the top 10 in-demand jobs fall into each category and offer analysis and recommendations tailored to each. Going beyond a static, point-in-time analysis that suggests that AI's impact on jobs will be a fixed, one-time event, these recommendations acknowledge the inherent dynamism both of jobs today and of the AI technology that will, over time, reshape how all of us learn, work, and live.

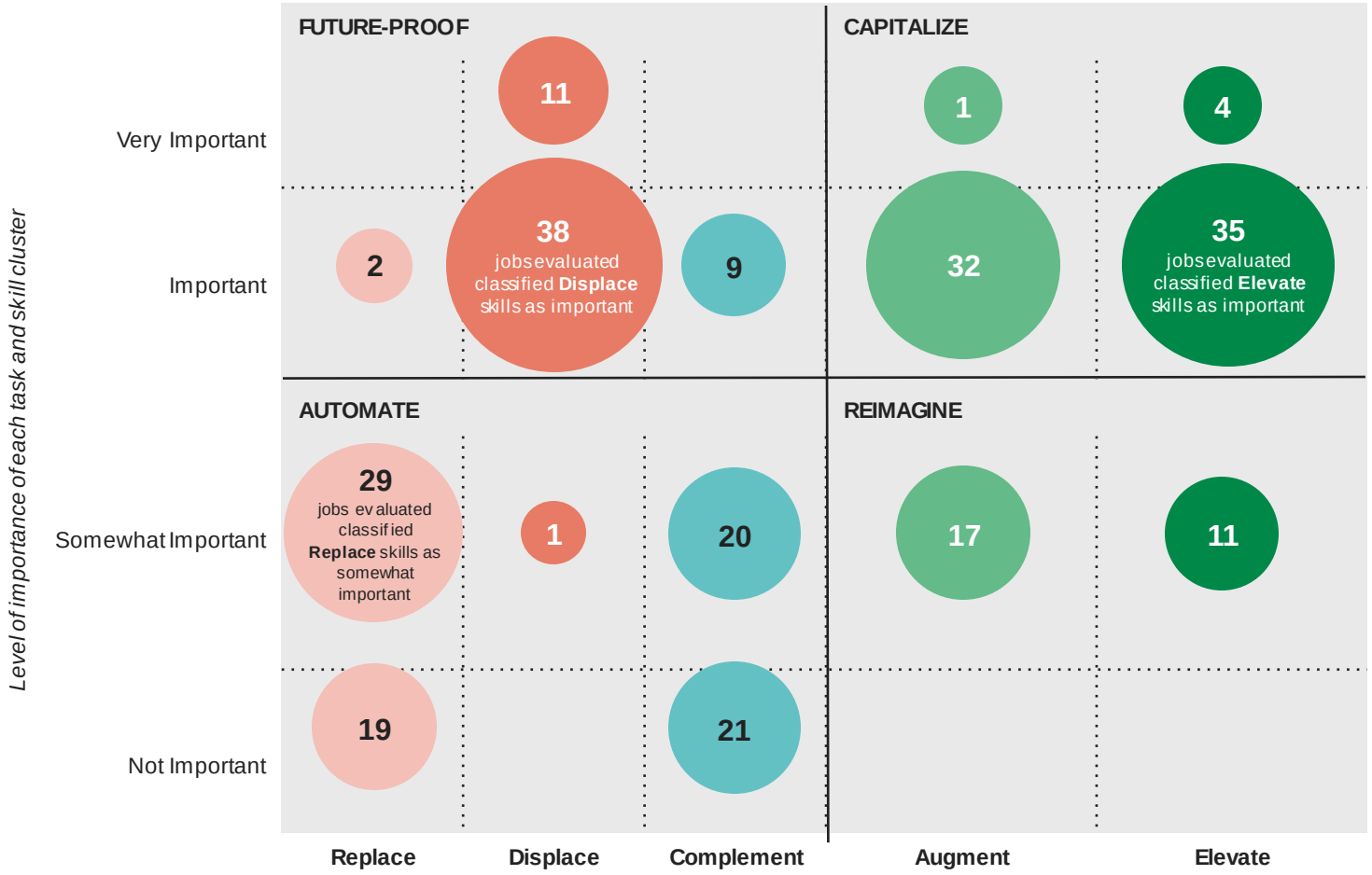
- **Future-Proof |** Tasks and skills we project will be Displaced or Replaced by AI are important or very important to many in-demand jobs. As firms adopt AI tools capable of performing these tasks, leaders must act now to help their workforces adapt, whether through training on AI tools or redefined responsibilities.

- **Capitalize** | Where tasks and skills that will be Elevated or Augmented by AI are important or very important to occupations, their effective integration with AI will unlock new frontiers of human interaction and collaboration. Leaders should support workers to further develop these skills and seek out AI-use cases that build on their potential.

- **Automate |** Tasks and skills that will be Complemented, Displaced, or Replaced by AI are only somewhat or not important to jobs but that can be easily substituted by machines should be high priorities to test AI or other automated solutions.

- **Reimagine |** While tasks and skills that will be Elevated or Augmented by AI may be less important to certain roles today, the impact of AI on these skill clusters suggests that leaders should redesign those roles to take better advantage of the opportunities AI tools will offer.

The AI-Transformation Profile: Four Recommended Actions to Reshape Occupations and Industries



Task and skill clusters in The AI-Ready Workforce *Framework*

Each category shows how 50 jobs (the top 10 highest-employment occupations in 5 key U.S. industries) categorize skill clusters. In **Elevate, 35 jobs**, or **70%**, consider **Elevate** tasks and skills **important**. In **11 occupations**, or **22%**, these tasks and skills are considered **somewhat important**.

Industry Overview: Business and Sales

Data-Enabled Relationship Management

The analytical and problem-solving power of AI combined with a human customer relations touch will increase demand for workers who leverage both skill sets to generate richer insights and deepen relationships.

03

About the Top 10 Occupations

	Top 10 Occupations in Business and Sales	Total Employment (2022)
1	Retail Salespersons	3,587,348
2	Cashiers	2,795,342
3	First-Line Supervisors	1,111,556
4	Sales Representatives, Wholesale & Manufacturing	1,000,446
5	Accountants and Auditors	881,314
6	Sales Representatives, Services	634,129
7	Market Research Analysts and Marketing Specialists	561,707
8	Management Analysts	541,724
9	Securities, Commodities, and Financial Services Sales Agents	448,135
10	Insurance Sales Agents	443,447

FAST FACTS

12 million	Total employment–Top 10, 2022
3.8%	Average projected growth, 2022-2027
$26.87	Average hourly earnings
6 of 10	# not requiring a bachelor's degree
8 of 10	# requiring no work experience for entry
2 of 10	# requiring less than 5 years of experience for entry

SAMPLE VERY IMPORTANT & IMPORTANT SKILL CATEGORIES

- Interpersonal Tasks
- Conflict Resolution
- Information Processing
- Group Task

Source: Lightcast 2023.3 Occupation and Industry Data, O*Net Data, and Bureau of Labor Statistics Occupational Employment data.

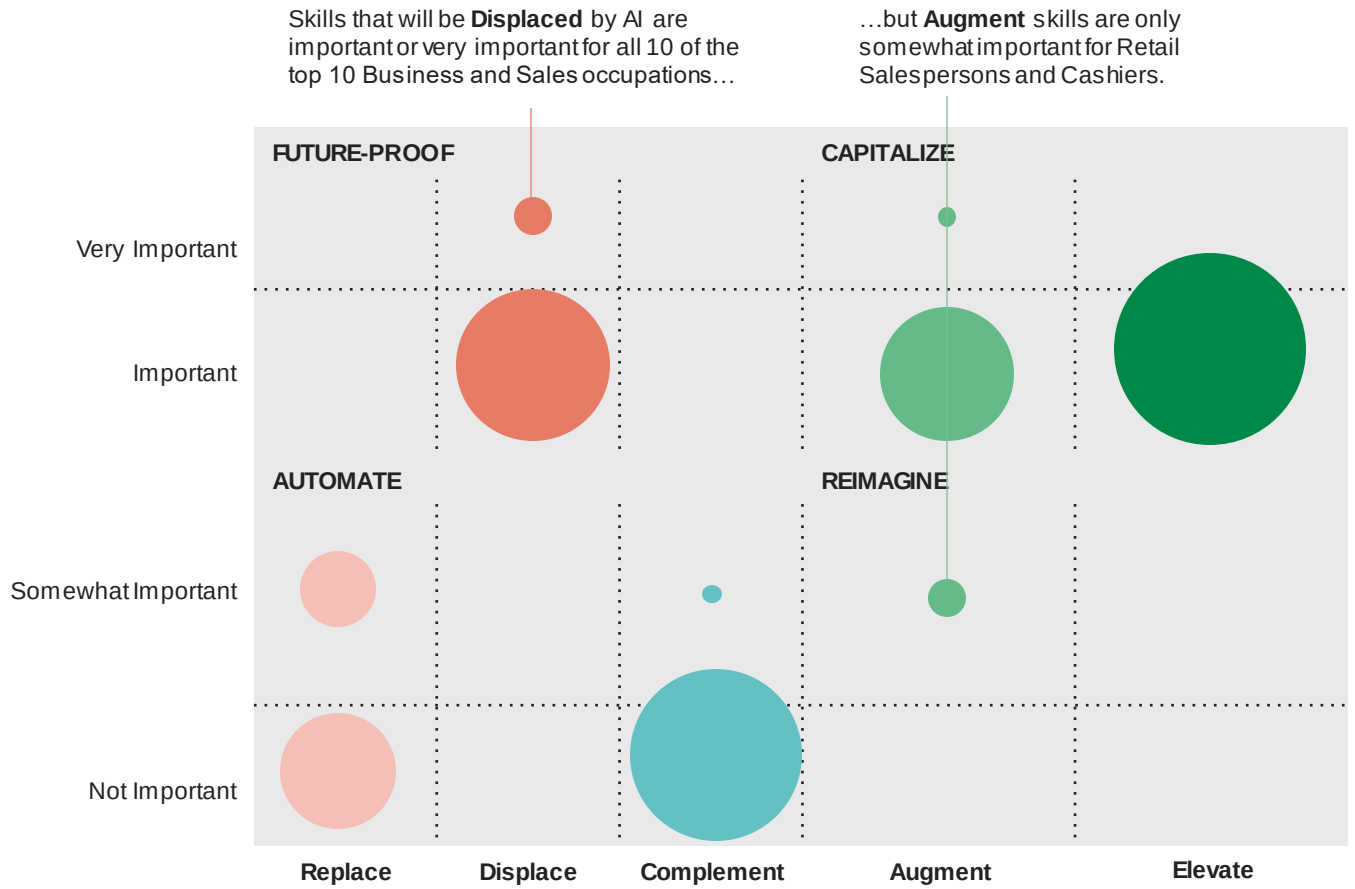
The AI-Transformation Profile: Business and Sales

History of Transformation

The business and sales sector has historically adopted technology to increase efficiency in transactional processes and grow a consumer base through analytics and data. In the next few years, AI will automate administrative tasks such as customer information processing, inventory management, and data entry, while enabling business and sales workers to conduct sales trend modeling and provide more personalized customer service.

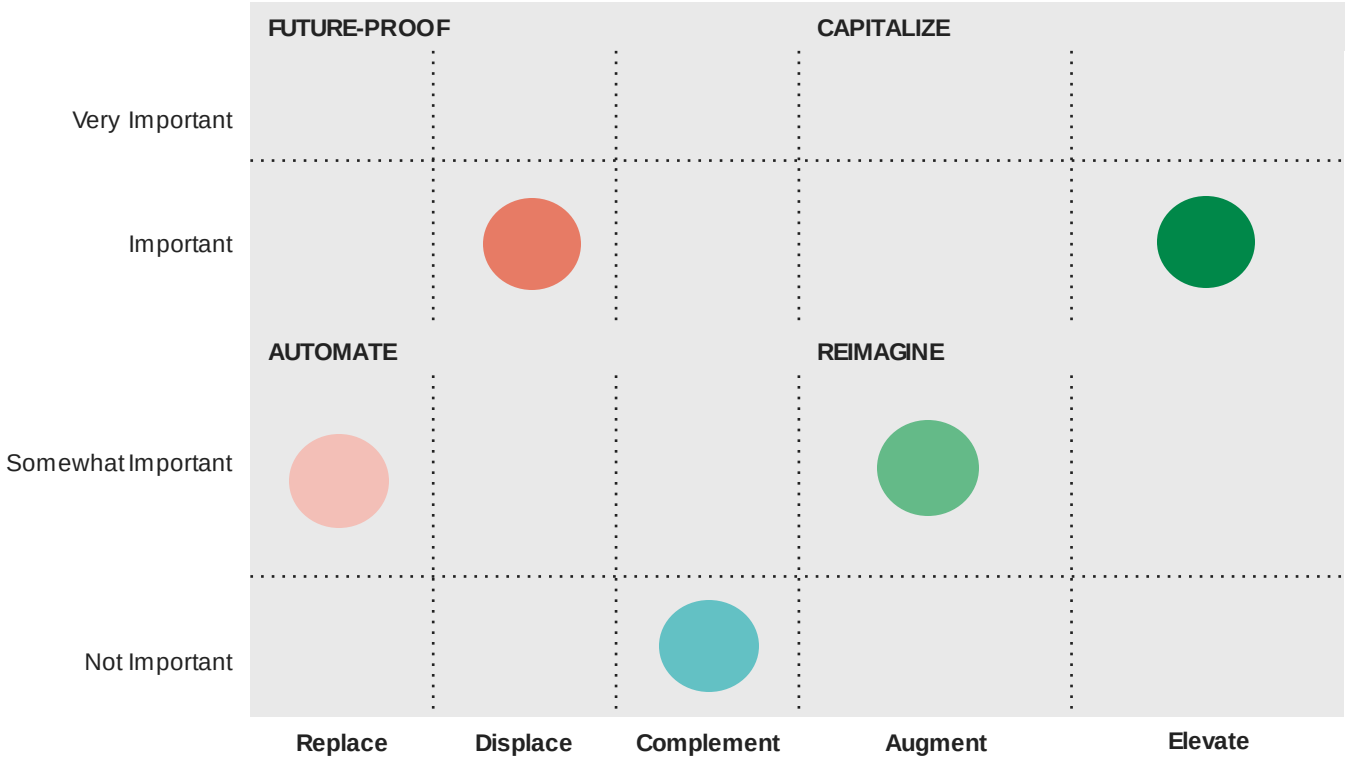
Reshaping Business and Sales Roles for AI Transformation:

- **Capitalize** on complex analytical and interpersonal skills to help workers solve complex customer issues, generate new customer insights, and build strong and trusted customer relationships.
- **Future-proof** roles centering on administrative or analytical tasks such as coding, software testing, application performance monitoring, and troubleshooting by ensuring workers are upskilled on AI tools and develop other durable skills to fully exploit the potential of these technologies.



How to Read This Chart: Each bubble represents the number of the top 10 jobs in this industry; the corresponding skill cluster is on the x-axis and importance is on the y-axis. Larger bubbles indicate that more jobs in this industry fall in a given action category, signaling each one's relative significance.

The AI-Transformation Profile: Retail Salespersons



How to Read This Chart: Each bubble represents the level of importance of a given skill cluster (Elevate, Augment, etc.) to this occupation.

As AI continues to automate route processes once central to frontline retail jobs (e.g., intelligent self-checkout and inventory tracking systems), retail salespersons will thrive by sharpening their communications and customer support skills, and by leveraging AI tools to support even more complex interpersonal tasks.

Reshaping Retail Sales Roles for AI Transformation:

- **Future-Proof:** Repetitive and transactional processes like inventory management and database maintenance will be automated, displacing basic cognitive skills while emphasizing human skills like communication, active listening, adaptability, and relationship management.
- **Capitalize:** Interpersonal skills necessary for customer interactions, conflict resolution, and client management will increase in importance as AI-enabled chatbots allow workers to focus on relationship management.
- **Reimagine:** As AI tools are deployed in retail sales workflows, workers will increasingly rely on complex analytical skills to leverage data and improve customer experience and will have more time to focus on human-to-human engagement needs.
- **Automate:** With low importance, physical and machine-human collaboration tasks in this cluster are not significantly implicated in the current job profile, and AI impacts will be limited.

Top 10 Occupations:

Importance of AI-Impacted Skill Clusters

Top 10 Occupations in Business and Sales		Average % Growth, 2022-2027	Typical Entry Education	Replace	Displace	Complement	Augment	Elevate
1	Retail Salespersons	6.6%	No formal credential	Somewhat important	Important	Not Important	Somewhat important	Important
2	Cashiers	8.6%	No formal credential	Somewhat important	Important	Not Important	Somewhat important	Important
3	First-Line Supervisors	10.7%	High school diploma or equivalent	Somewhat important	Important	Not Important	Important	Important
4	Sales Representatives, Wholesale & Manufacturing	10.8%	High school diploma or equivalent	Somewhat important	Important	Somewhat important	Important	Important
5	Accountants and Auditors	7.0%	Bachelor's degree	Not Important	Very important	Not Important	Important	Important
6	Sales Representatives, Services	7.5%	High school diploma or equivalent	Not Important	Important	Not Important	Important	Important
7	Market Research Analysts and Marketing Specialists	1.7%	Bachelor's degree	Not Important	Very important	Not Important	Important	Important
8	Management Analysts	5.4%	Bachelor's degree	Not Important	Important	Not Important	Very important	Important
9	Securities, Commodities, and Financial Services Sales Agents	12.0%	Bachelor's degree	Not Important	Important	Not Important	Important	Important
10	Insurance Sales Agents	7.4%	High school diploma or equivalent	Not Important	Important	Not Important	Important	Important

Source: Jobs for the Future and Fourth Economy Analysis of O*Net data, Lightcast job postings data, and Bureau of Labor Statistics Occupational Employment data.

Industry Overview: Health Care

Recentering Human Care

AI will have a profound impact across all roles, automating routine and physical tasks and augmenting analytical ones. Interpersonal skills will be critical to enhance worker productivity and improve patient experiences and outcomes.

04

About the Top 10 Occupations

	Top 10 Occupations in Health Care	Total Employment (2022)
1	Home Health Aides	3,305,099
2	Registered Nurses	2,340,295
3	Nursing Assistants	1,109,234
4	Medical Assistants	679,5356
5	Medical Secretaries	581,868
6	Licensed Practical and Vocational Nurses	519,643
7	Receptionists and Information Clerks	471,253
8	Dental Assistants	343,185
9	Medical and Health Service Managers	330,449
10	Preschool Teachers	308,627

FAST FACTS

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$22.13	Average hourly earnings
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SAMPLE VERY IMPORTANT & IMPORTANT SKILL CATEGORIES

- Interpersonal Tasks
- Conflict Resolution
- Critical Thinking
- Information Processing

Source: Lightcast 2023.3 Occupation and Industry Data, O*Net Data, and Bureau of Labor Statistics Occupational Employment data.

The AI-Transformation Profile: Health Care

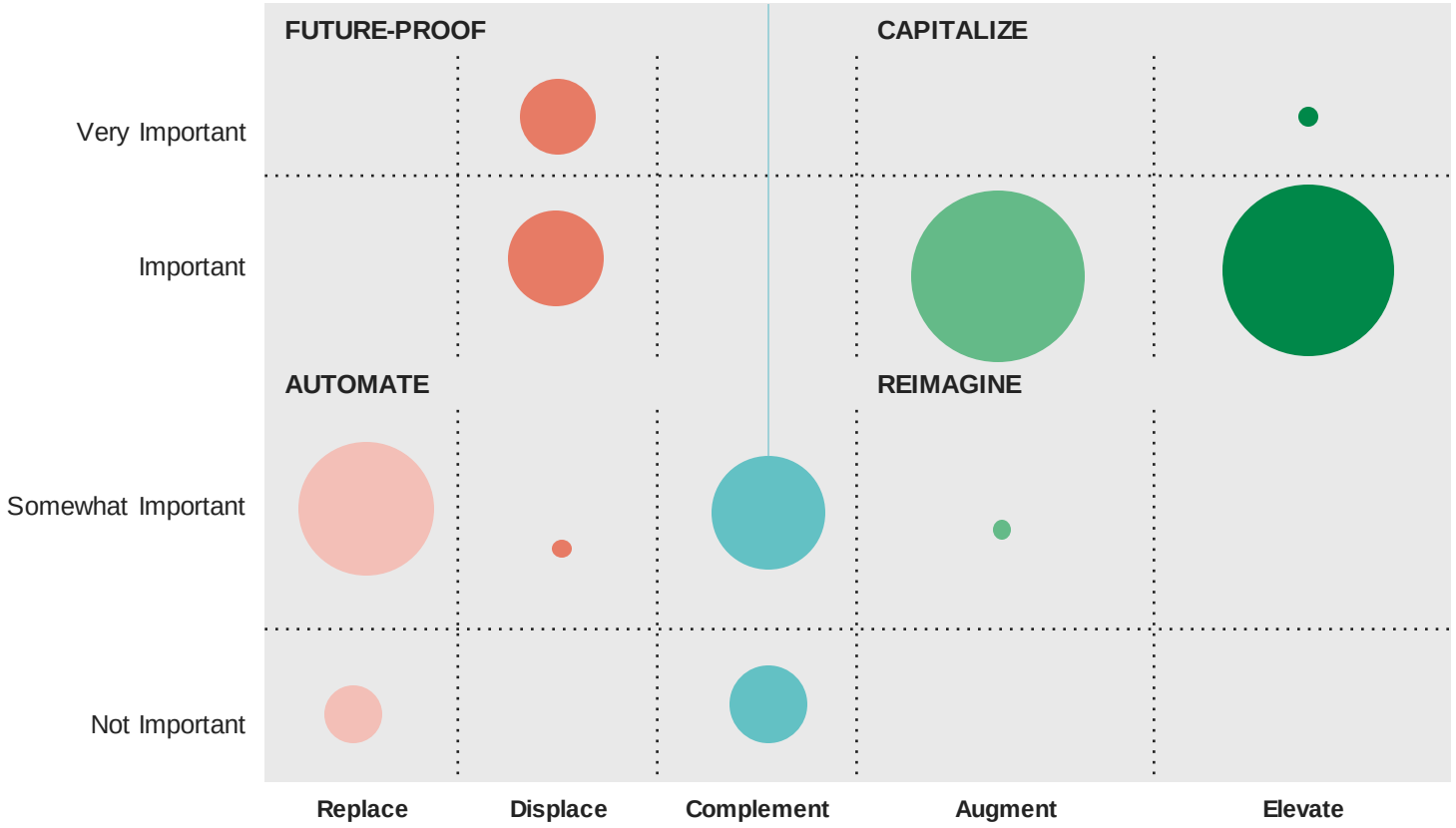
History of Transformation

The Health Care sector has long used technology to improve diagnostic processes, support treatment plans, and manage patient care. The next wave of AI has the potential to dramatically change health care occupations by freeing and enabling workers to focus on preventative and proactive care for their patients.

Reshaping Health Care Roles for AI Transformation:

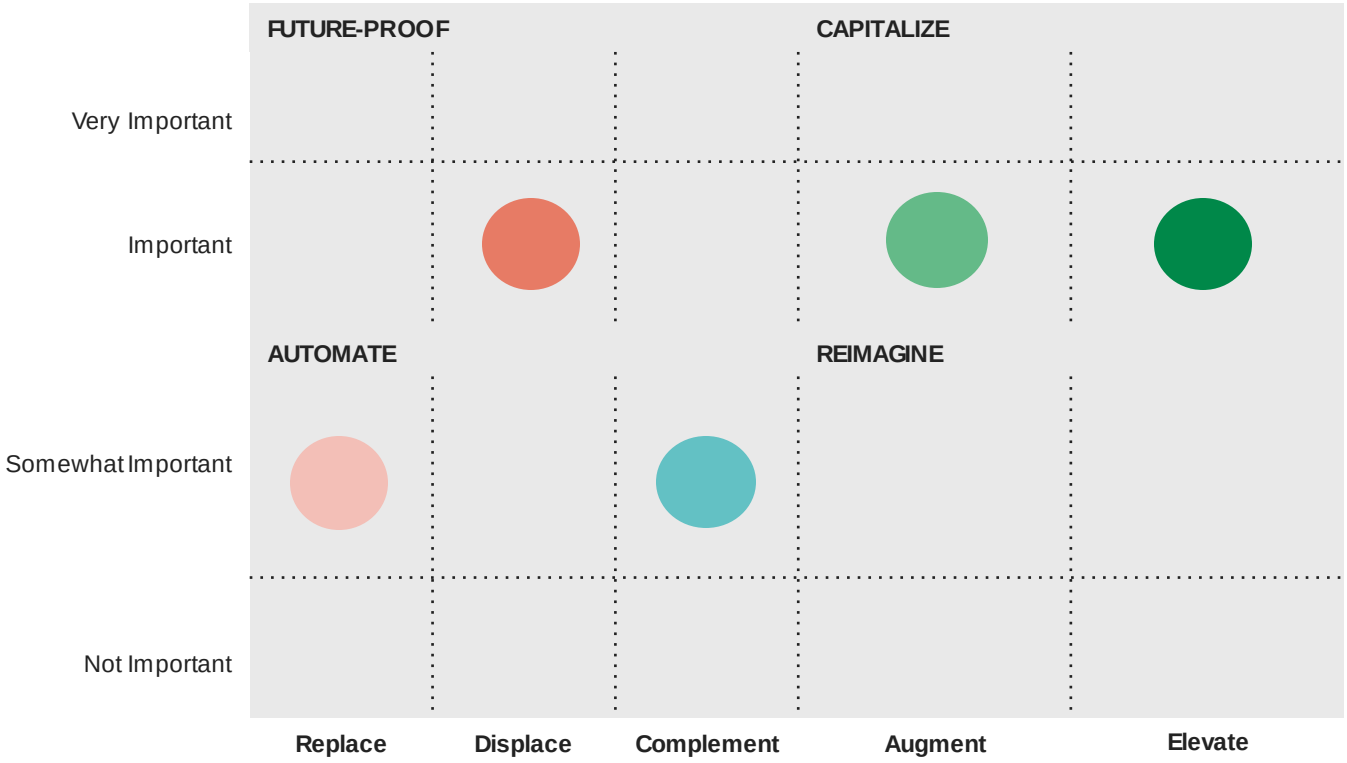
- **Capitalize** on interpersonal skills such as communication, cross-functional collaboration, conflict resolution, and emotional intelligence that help to improve patient support and outcomes. Double down on analytical skills such as critical thinking, ethical decision-making, and complex problem-solving so health care workers can leverage AI to improve patient care.
- **Future-Proof** health care occupations by equipping workers with AI-literacy skills and domain expertise to ensure AI-driven insights are applicable in a health care setting. For example, registered nurses will need the skills to use their domain knowledge to evaluate AI-enabled recommendations for their patients and to ensure high-quality, personalized care.

Skills that will be **Complemented** by AI are somewhat important or not important for all 10 of the top 10 Health Care occupations.



How to Read This Chart: Each bubble represents the number of the top 10 jobs in this industry; the corresponding skill cluster is on the x-axis and importance is on the y-axis. Larger bubbles indicate that more jobs in this industry fall in a given action category, signaling each one's relative significance.

The AI-Transformation Profile: Home Health Aides



How to Read This Chart: Each bubble represents the level of importance of a given skill cluster (Elevate, Augment, etc.) to this occupation.

Home health aides, for whom interpersonal tasks like empathy, patient care, and ethical decision-making are already critically important, will have the opportunity to capitalize on these skills as AI elevates best-practice approaches to patient engagement. Other forms of automation could gradually reduce the role's current emphasis on repetitive physical activities and diagnostic or analytical tasks.

Reshaping the Home Health Aide Role for AI Transformation:

- **Future-Proof:** Repetitive tasks like tracking and reporting patient vital signs and changes in health condition will be increasingly automated, providing an opportunity to increase worker focus on human skills to enhance patient care.
- **Capitalize:** Complex reasoning and analytic skills, used to incorporate AI as a tool, will allow home health aides to more efficiently navigate diagnosis, treatment, and identification of emerging health issues while increasing the efficacy of care provided. AI-enabled processes will increase the need for interpersonal skills like relationship building, patient care and service, conflict resolution, and emotional intelligence, allowing home health aides to increase their focus on patient outcomes.
- **Automate:** Additional manual and physical tasks in patient care may be replaced, potentially reducing fatigue and burnout for care providers.

Top 10 Occupations:
Importance of AI-Impacted Skill Clusters

Top 10 Occupations in Health Care		Average % Growth, 2022-2027	Typical Entry Education	Replace	Displace	Complement	Augment	Elevate
1	Home Health Aides	16.94%	High school diploma or equivalent	Somewhat important	Important	Somewhat important	Important	Important
2	Registered Nurses	5.87%	Bachelor's degree	Somewhat important	Very important	Somewhat important	Important	Important
3	Nursing Assistants	3.36%	Postsecondary nondegree award	Somewhat important	Important	Somewhat important	Somewhat important	Important
4	Medical Assistants	11.46%	Postsecondary nondegree award	Somewhat important	Very important	Somewhat important	Important	Important
5	Medical Secretaries	7.93%	High school diploma or equivalent	Not Important	Very important	Not Important	Important	Important
6	Licensed Practical and Vocational Nurses	5.20%	Postsecondary nondegree award	Somewhat important	Important	Somewhat important	Important	Important
7	Receptionists and Information Clerks	4.74%	High school diploma or equivalent	Not Important	Important	Not Important	Important	Important
8	Dental Assistants	9.03%	Postsecondary nondegree award	Somewhat important	Important	Somewhat important	Important	Important
9	Medical and Health Service Managers	16.71%	Bachelor's degree	Not Important	Very important	Not Important	Important	Very important
10	Preschool Teachers	10.72%	Associate's degree	Somewhat important	Somewhat important	Not Important	Important	Important

Source: Jobs for the Future and Fourth Economy Analysis of O*Net data, Lightcast job postings data, and Bureau of Labor Statistics Occupational Employment data.

Industry Overview: Transportation and Logistics

Greater Reliance on AI Collaborators

Managers and supervisors will see human skills become their primary focus. Operational and front-line roles will increasingly depend on machine collaboration for efficiencies, creating opportunities to reposition these roles.

05

About the Top 10 Occupations

Top 10 Occupations in Transportation and Logistics		Total Employment (2022)
1	Heavy and Tractor Trailor Truck Drivers	1,143,494
2	Laborers and Freight, Stock, Material Movers/Handlers	948,446
3	Light Truck Drivers	503,197
4	Industrial Truck and Tractor Operators	408,791
5	Stocker and Order Fillers	383,973
6	First-Line Supervisors	175,003
7	Shipping, Receiving, and Inventory Clerks	134,736
8	Bus Drivers, School	119,646
9	Flight Attendants	107,287
10	General and Operations Managers	104,792

FAST FACTS

4 million	Total employment–Top 10, 2022
7.8%	Average projected growth, 2022-2027
$23.84	Average hourly earnings
9 of 10	# not requiring a bachelor's degree
7 of 10	# requiring no work experience for entry
2 of 10	# requiring less than 5 years of experience for entry

SAMPLE VERY IMPORTANT & IMPORTANT SKILL CATEGORIES

- Vehicle and Equipment Operation
- General Physical Task
- Hazardous Task
- Group Task

Source: Lightcast 2023.3 Occupation and Industry Data, O*Net Data, and Bureau of Labor Statistics Occupational Employment data.

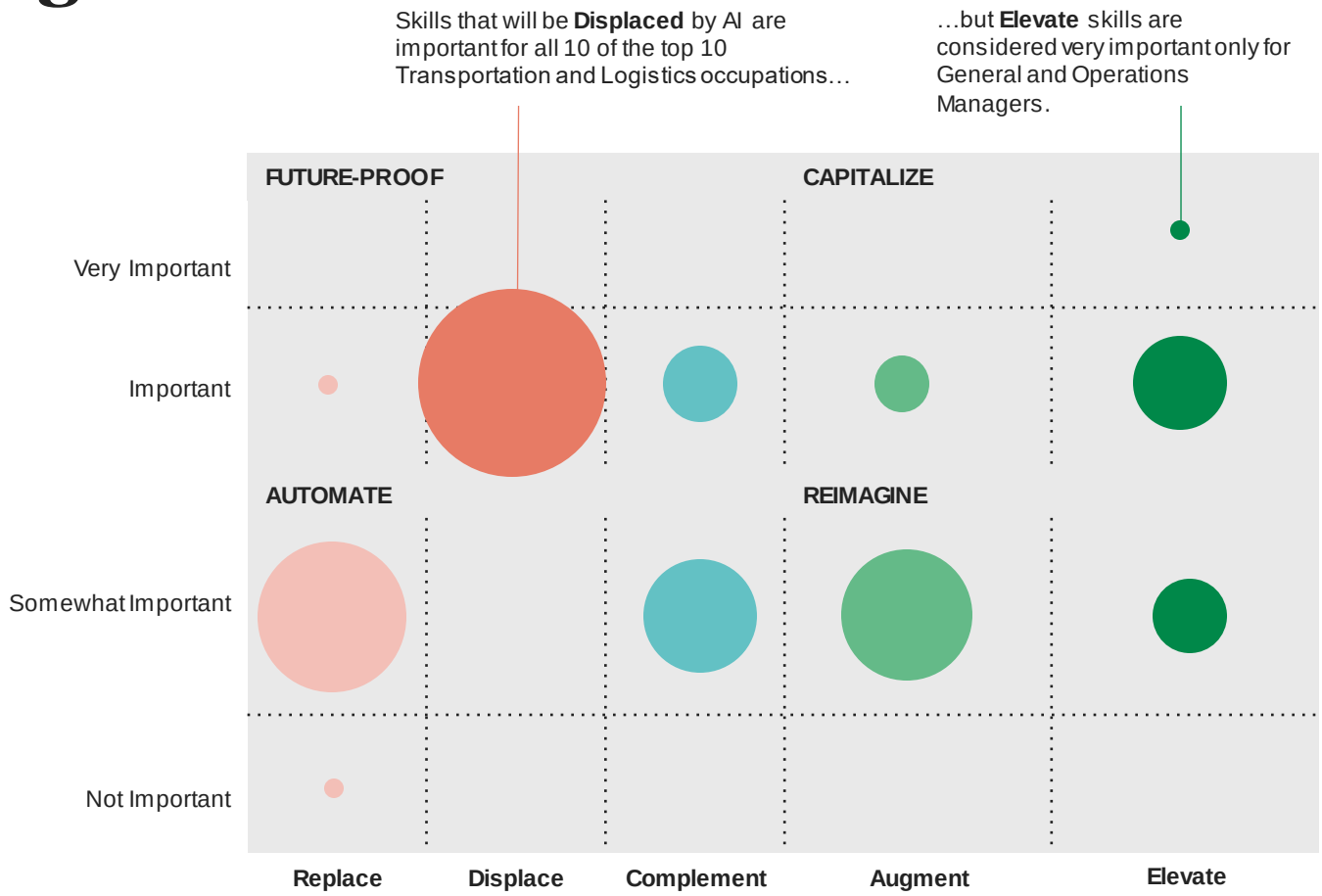
The AI-Transformation Profile: Transportation and Logistics

History of Transformation

The transportation and logistics sector has a history of adopting technology to optimize processes, improve routes, increase fuel efficiency, and manage supply chains. AI's impact on vehicle operation, administrative tasks, customer service, and equipment maintenance will shape the next stage of the industry's transformation.

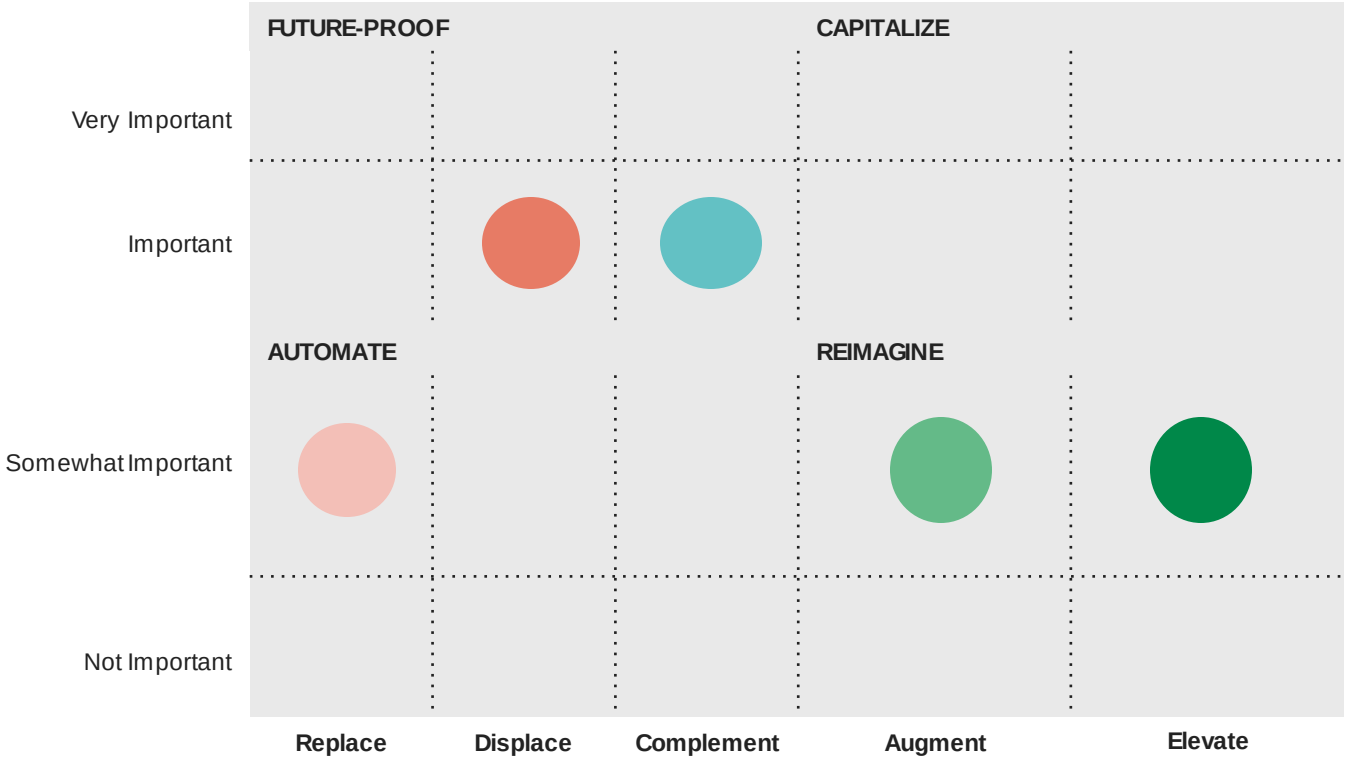
Reshaping Transportation and Logistics Roles for AI Transformation:

- Continue to **automate** workers' collaboration with vehicles and equipment, freeing up humans to manage intelligent transportation systems, utilize fleet management software, and oversee and maintain autonomous vehicles.
- **Future-proof** roles centering on administrative or analytical tasks, such as record-keeping or route analysis, by ensuring workers are upskilled on AI tools and develop other durable skills to fully exploit the potential of these technologies.
- **Reimagine and capitalize** on interpersonal skills where they are present, especially in customer-facing or managerial roles such as flight attendants and first-line supervisors.



How to Read This Chart: Each bubble represents the number of the top 10 jobs in this industry; the corresponding skill cluster is on the x-axis and importance is on the y-axis. Larger bubbles indicate that more jobs in this industry fall in a given action category, signaling each one's relative significance.

The AI-Transformation Profile: Heavy Tractor-Trailer Truck Driver



How to Read this Chart: Each bubble represents the level of importance of a given skill cluster (Elevate, Augment, etc.) to this occupation.

AI, together with developments in autonomous vehicles and intelligent transportation systems, could transform the role of the truck driver. Instead of primarily operating vehicles, they may manage complex systems, make decisions on routes and fleet deployment in collaboration with AI tools, and support customers.

Reshaping Heavy Tractor-Trailer Truck Driver Roles for AI Transformation:

- **Future-Proof:** AI-driven technology, ranging from route optimization to predictive vehicle maintenance, will demand workers develop the skills to collaborate more effectively with machines and in-cabin AI-enabled technologies. Repetitive administrative tasks like record keeping, developing trip and logistics plans, or tracking will continue to be automated.

- **Automate:** Full automation of manual/physical tasks such as cargo loading or inventory management will continue to increase redundancies for workers in this job. Still, it will reduce the risk and physically demanding work individuals must undertake.

- **Reimagine:** As autonomous driving and logistics optimization grow, complex analytical and decision-making skills could become necessary to manage AI-driven systems or improve decision-making on the road. Driving experience and human input will be critical for ensuring AI outputs are applicable. Over time, interpersonal skills may become more important as drivers can shift from routine tasks to strategic customer service and communication.

Top 10 Occupations:
Importance of AI-Impacted Skill Clusters

	Top 10 Occupations in Transportation and Logistics	Average % Growth, 2022-2027	Typical Entry Education	Replace	Displace	Complement	Augment	Elevate
1	Heavy and Tractor-Trailor Truck Drivers	6.6%	Postsecondary nondegree award	Somewhat important	Important	Important	Somewhat important	Somewhat important
2	Laborers and Freight, Stock, Material Movers/Handlers	8.6%	No formal credential	Important	Important	Important	Somewhat important	Somewhat important
3	Light Truck Drivers	10.7%	High school diploma or equivalent	Somewhat important	Important	Somewhat important	Somewhat important	Somewhat important
4	Industrial Truck and Tractor Operators	10.8%	No formal credential	Somewhat important	Important	Important	Somewhat important	Important
5	Stocker and Order Fillers	7.0%	High school diploma or equivalent	Somewhat important	Important	Somewhat important	Somewhat important	Important
6	First-Line Supervisors	7.5%	High school diploma or equivalent	Somewhat important	Important	Somewhat important	Important	Important
7	Shipping, Receiving, and Inventory Clerks	1.7%	High school diploma or equivalent	Somewhat important	Important	Somewhat important	Somewhat important	Important
8	Bus Drivers, School	5.4%	No formal credential	Somewhat important	Important	Important	Somewhat important	Somewhat important
9	Flight Attendants	12.0%	High school diploma or equivalent	Somewhat important	Important	Somewhat important	Important	Important
10	General & Operations Managers	7.4%	Bachelor's degree	Not Important	Important	Somewhat important	Important	Very important

Source: Jobs for the Future and Fourth Economy Analysis of O*Net data, Lightcast job postings data, and Bureau of Labor Statistics Occupational Employment data.

Industry Overview: Manufacturing

Learning from Early Adoption of Automation

Enhancing and refining machine collaboration skills are more critical than ever. Routine tasks typically performed by human workers will continue to be automated, radically changing workers' focus and role.

06

About the Top 10 Occupations

	Top 10 Occupations in Manufacturing	Total Employment (2022)
1	Miscellaneous Assemblers and Fabricators	1,026,308
2	First-Line Supervisors	485,676
3	Laborers	389,527
4	Inspectors	372,950
5	Packing Machine Operators	301,018
6	Machinists	289,401
7	Welders	279,078
8	Electrical Assemblers	255,405
9	General and Operations Managers	253,540
10	Sales Representatives	245,281

FAST FACTS

3.8 million	Total employment–Top 10, 2022
3.6%	Average projected growth, 2022-2027
$22.87	Average hourly earnings
9 of 10	# not requiring a bachelor's degree
8 of 10	# requiring no work experience for entry
1 of 10	# requiring less than 5 years of experience for entry

SAMPLE VERY IMPORTANT & IMPORTANT SKILL CATEGORIES

- Equipment Maintenance and Operation
- General Physical Task
- Controlling Machines and Processes
- Troubleshooting and Routine Problem Solving

Source: Lightcast 2023.3 Occupation and Industry Data, O*Net Data, and Bureau of Labor Statistics Occupational Employment data.

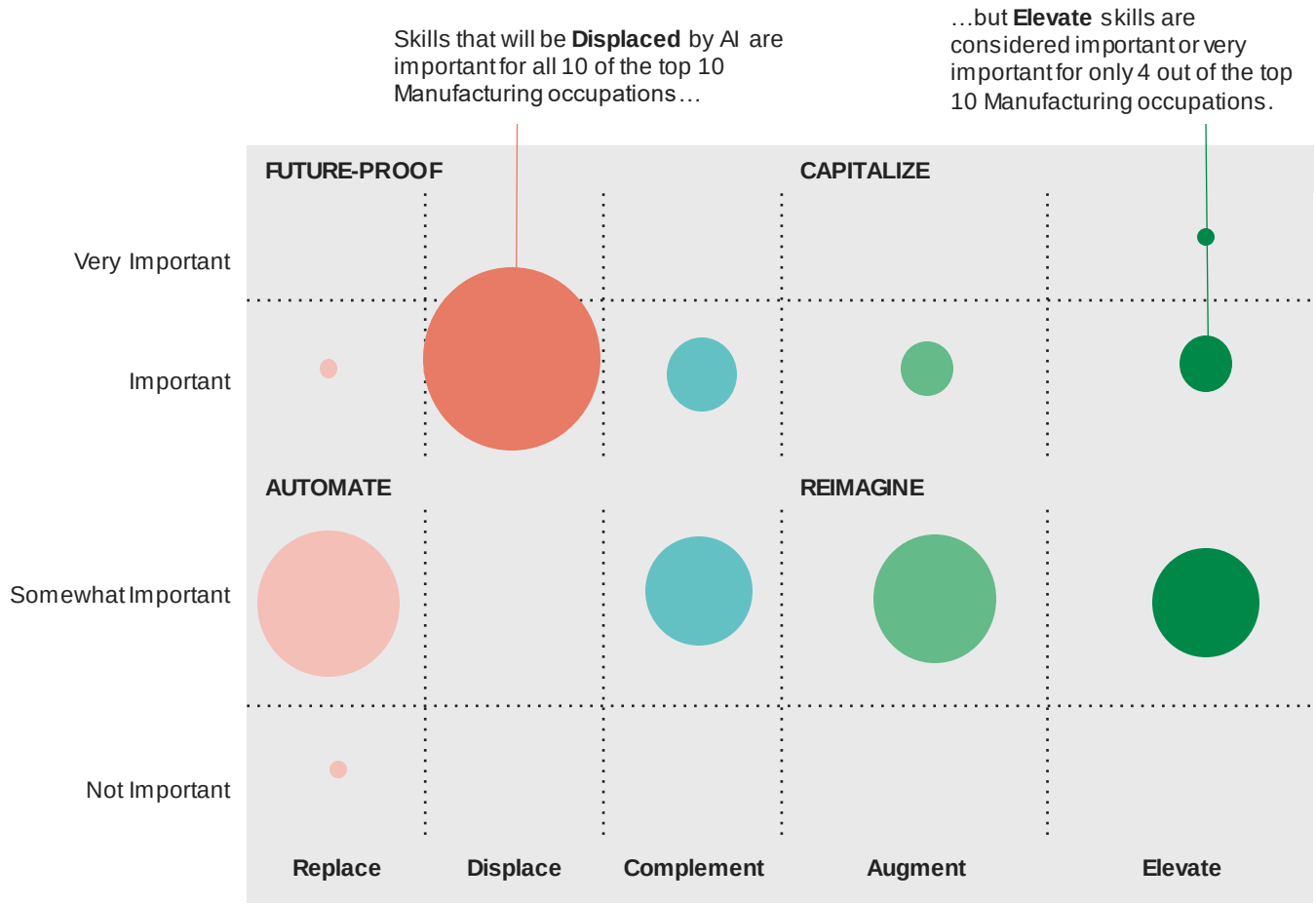
The AI-Transformation Profile: Manufacturing

History of Transformation

The manufacturing workforce has contended with advancements in automation and robotics for decades. AI's impact on tasks such as collecting and reporting data on production performance, work scheduling, and scheduling maintenance and repairs will define the next chapter of industry change.

Reshaping Manufacturing Roles for AI Transformation:

- Continue to **automate** physical and machine collaboration tasks, freeing up workers to focus on technical skills such as robotics or predictive maintenance, as well as human-centered skills like leadership and adaptability.
- **Future-proof** roles centering on administrative or analytical tasks such as documentation and reporting and quality assurance by ensuring workers are upskilled on AI tools and develop other durable skills to exploit the potential of these technologies.
- **Reimagine and capitalize** on interpersonal and analytical skills, especially in customer-facing or managerial roles such as first-line supervisors and general managers. Also, reimagine roles where interpersonal and analytical skills are only somewhat important by leveraging AI in their jobs to maximize human potential.



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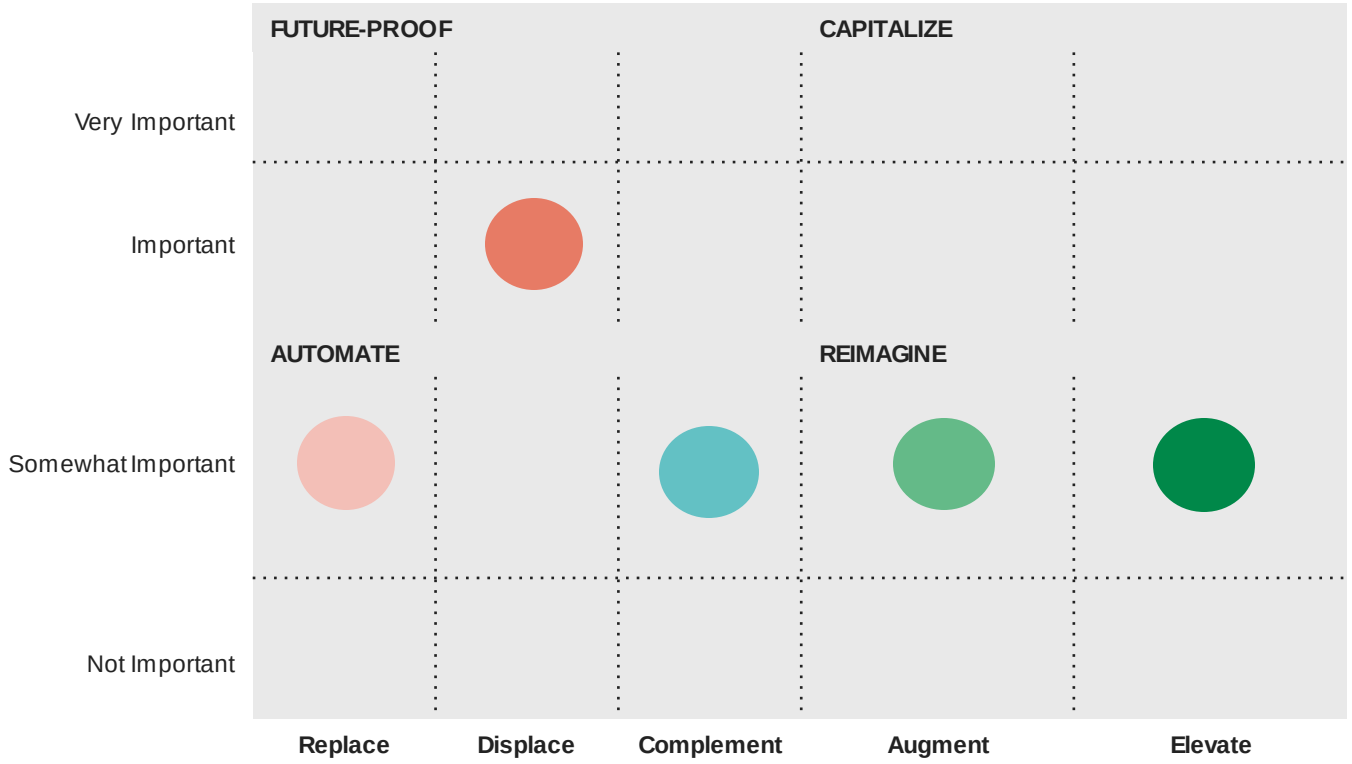
The AI-Transformation Profile: Miscellaneous Assembler and Fabricator



How to Read This Chart: Each bubble represents the level of importance of a given skill cluster (Elevate, Augment, etc.) to this occupation.

Developments in AI-driven robotic assembly could create opportunities for assemblers and fabricators to bring uniquely human skills to machine collaboration, increasing decision-making responsibilities and doubling down on durable human skills that are somewhat important for the role today.

Reshaping Assembler and Fabricator Roles for AI Transformation:

- **Future-Proof:** Key tasks like documentation and reporting, product assembly, and quality assurance will be increasingly automated, creating technology-driven redundancies for workers, allowing them to shift to more complex tasks.
- **Automate:** Equipping workers with AI skills for proactive/predictive maintenance of product equipment or to analyze data on production performance and processes can help workers adapt to AI advances. The potential for full automation of manual tasks like material handling and assembly could reduce the risk of dangerous work individuals must undertake.
- **Reimagine:** Interpersonal skills are the second most important skill cluster of the job today and may become more important as other aspects of the job are automated. This is a key area of focus in the effort to rethink the role of human workers.

Top 10 Occupations:
Importance of AI-Impacted Skill Clusters

Top 10 Occupations in Manufacturing		Average % Growth, 2022-2027	Typical Entry Education	Replace	Displace	Complement	Augment	Elevate
1	Miscellaneous Assemblers and Fabricators	1.98%	High school diploma or equivalent	Somewhat important	Important	Somewhat important	Somewhat important	Somewhat important
2	First-Line Supervisors	4.81%	High school diploma or equivalent	Somewhat important	Important	Important	Important	Important
3	Laborers	8.59%	No formal credential	Important	Important	Important	Somewhat important	Somewhat important
4	Inspectors	3.13%	High school diploma or equivalent	Somewhat important	Important	Somewhat important	Somewhat important	Important
5	Packing Machine Operators	6.88%	High school diploma or equivalent	Somewhat important	Important	Important	Somewhat important	Somewhat important
6	Machinists	4.42%	High school diploma or equivalent	Somewhat important	Important	Important	Somewhat important	Somewhat important
7	Welders	5.51%	High school diploma or equivalent	Somewhat important	Important	Somewhat important	Somewhat important	Somewhat important
8	Electrical Assemblers	5.08%	High school diploma or equivalent	Somewhat important	Important	Somewhat important	Somewhat important	Somewhat important
9	General and Operations Managers	7.42%	Bachelor's degree	Not Important	Important	Somewhat important	Important	Very important
10	Sales Representatives	4.74%	High school diploma or equivalent	Somewhat important	Important	Somewhat important	Important	Important

Source: Jobs for the Future and Fourth Economy Analysis of O*Net data, Lightcast job postings data, and Bureau of Labor Statistics Occupational Employment data.

Industry Overview: Computer and Information Sciences

Automating Analytics, Elevating Teamwork

AI will pick up responsibility for repetitive cognitive tasks, shifting focus for all top occupations towards complex analytics skills that AI can augment. For many, human skills that can be elevated will become far more important.

07

About the Top 10 Occupations

	Top 10 Occupations in Computer and Information Sciences	Total Employment (2022)
1	Software Developers	885,536
2	Computer-User Support Specialist	288,849
3	Sales Representatives	274,128
4	Computer Systems Analysts	210,089
5	Computer and Information Systems Managers	210,023
6	Customer Service Representatives	188,064
7	Computer Occupations, All Others	170,071
8	General and Operations Managers	166,365
9	Telecommunications Equipment Installers and Repairers	153,911
10	Project Management Specialists	118,425

FAST FACTS

2.7 million	Total employment–Top 10, 2022
14.3%	Average projected growth, 2022-2027
$41.30	Average hourly earnings
4 of 10	# not requiring a bachelor's degree
8 of 10	# requiring no work experience for entry
2 of 10	# requiring less than 5 years of experience for entry

SAMPLE VERY IMPORTANT & IMPORTANT SKILL CATEGORIES

- Critical and Analytical Thinking
- Active Listening
- Systems Analysis
- Interpersonal Communication

Source: Lightcast 2023.3 Occupation and Industry Data, O*Net Data, and Bureau of Labor Statistics Occupational Employment data.

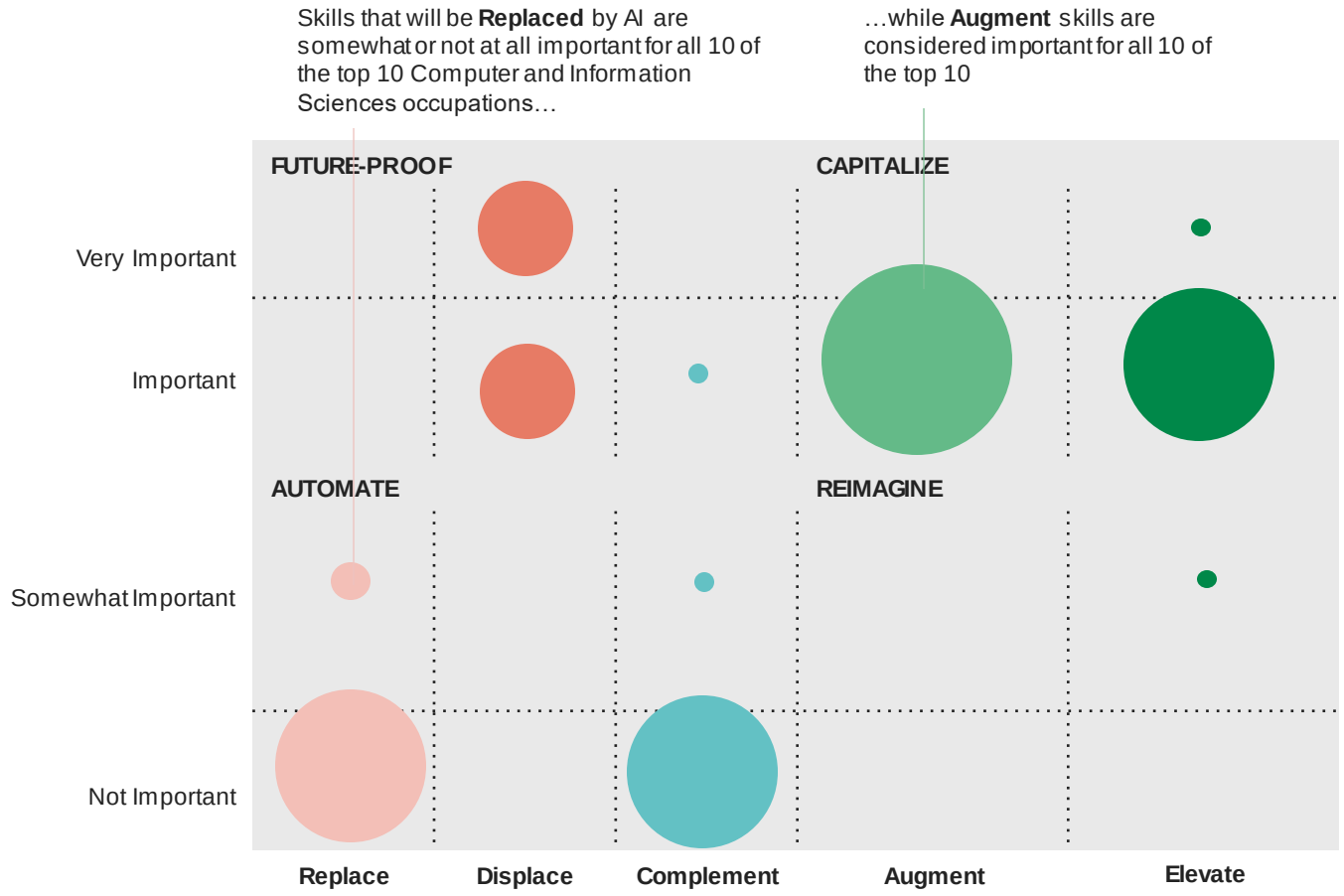
The AI-Transformation Profile: Computer and Information Sciences

History of Transformation

The next wave of AI will drastically impact the computer and information sciences occupations, automating some tasks like troubleshooting, coding, and executing security protocols while deeply augmenting other tasks like data analysis and advanced research in computer science.

Reshaping Computer and Information Sciences Roles for AI Transformation:

- **Capitalize** on interpersonal skills that enable computer science workers to improve customer service and team collaboration skills, and complex analytical skills that can leverage AI, such as translating domain-based technical language, predictive IT systems maintenance, and solving difficult IT user challenges.
- **Future-proof** roles centering on administrative or analytical tasks such as coding, software testing, application performance monitoring, and troubleshooting by ensuring workers are upskilled on AI tools and develop other durable skills to fully exploit the potential of these technologies.



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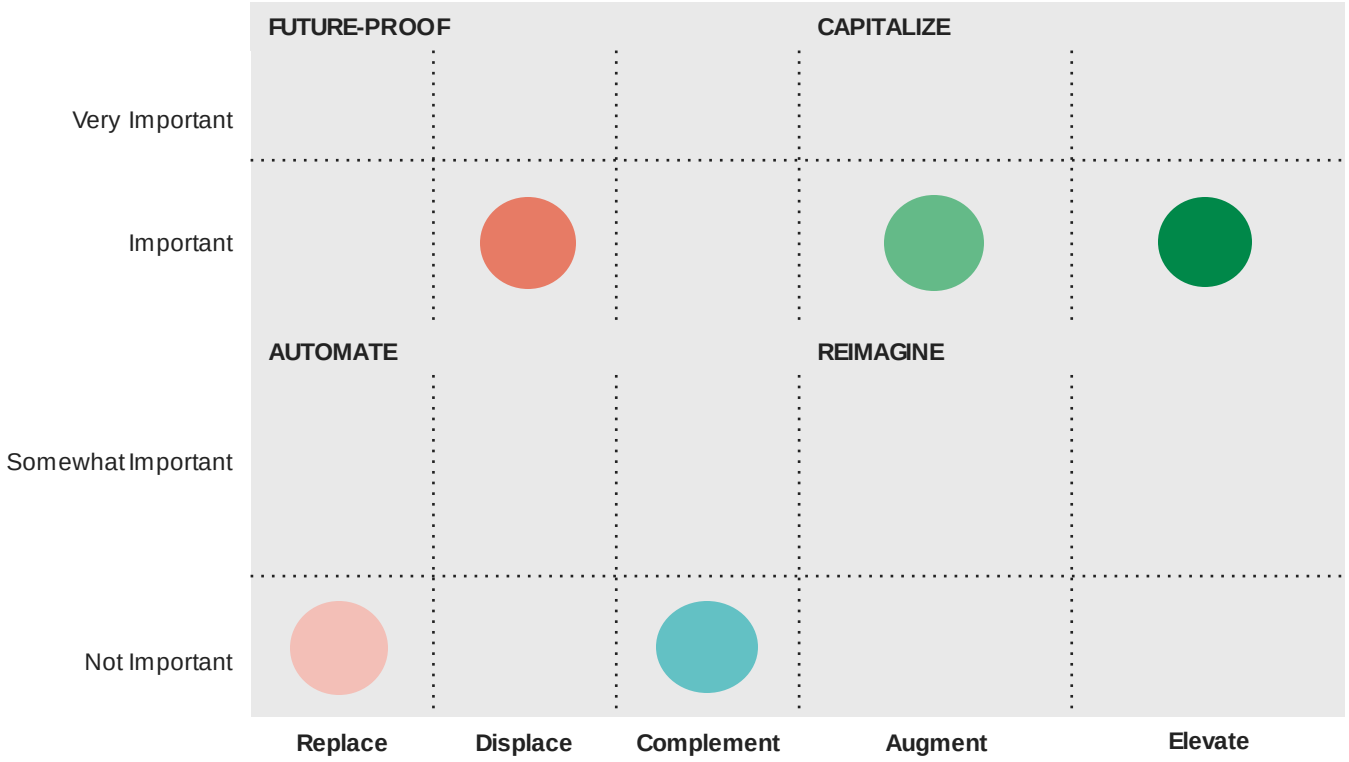
The AI-Transformation Profile: Software Developer



How to Read This Chart: Each bubble represents the level of importance of a given skill cluster (Elevate, Augment, etc.) to this occupation.

Software developers inherently rely on strong human-machine collaboration. As AI's ability to write and test software becomes more advanced, these tools will augment developers' complex analytical and interpersonal skills and domain expertise. The explosion of AI will increase the importance of team-based approaches and customer-focused work for these roles.

Reshaping Software Developer Roles for AI Transformation:

- **Future-Proof:** Repetitive tasks such as code generation, software testing, debugging, and troubleshooting will be facilitated by AI-driven technologies, freeing up workers to focus on interpersonal skills and complex analytical and technical abilities that machines can support.

- **Capitalize:** Skills like creativity, complex information processing, and strategic decision-making remain central to this role as AI adoption continues, demanding domain expertise and critical analysis skills to discern effective deployment of technologies. Skills supporting human-to-human engagement, such as collaboration and relationship management, will increase as AI-enabled processes push workers to function effectively with project managers, designers, testers, and other developers.

- **Automate:** Manual and physical tasks are not important to this role and, therefore, do not pose a major AI-driven risk of replacement.

Top 10 Occupations:
Importance of AI-Impacted Skill Clusters

	Top 10 Occupations in Computer and Information Sciences	Average % Growth, 2022-2027	Typical Entry Education	Replace	Displace	Complement	Augment	Elevate
1	Software Developers	17.47%	Bachelor's degree	Not Important	Very important	Not Important	Important	Important
2	Computer-User Support Specialist	7.80%	Some college, no degree	Somewhat important	Important	Not Important	Important	Somewhat important
3	Sales Representatives	7.27%	High school diploma or equivalent	Not Important	Important	Not Important	Important	Important
4	Computer Systems Analysts	9.10%	Bachelor's degree	Not Important	Very important	Not Important	Important	Important
5	Computer and Information Systems Managers	12.55%	Bachelor's degree	Not Important	Very important	Not Important	Important	Important
6	Customer Service Representatives	2.51%	High school diploma or equivalent	Not Important	Very important	Not Important	Important	Important
7	Computer Occupations, All Others	9.71%	Bachelor's degree	Not Important	Very important	Not Important	Important	Important
8	General and Operations Managers	7.42%	Bachelor's degree	Not Important	Important	Somewhat important	Important	Very important
9	Telecommunications Equipment Installers and Repairers	3.95%	Postsecondary nondegree award	Somewhat important	Important	Important	Important	Important
10	Project Management Specialists	8.11%	Bachelor's degree	Not Important	Important	Not Important	Important	Important

Source: Jobs for the Future and Fourth Economy Analysis of O*Net data, Lightcast job postings data, and Bureau of Labor Statistics Occupational Employment data.

Conclusion: Blueprint and Recommendations

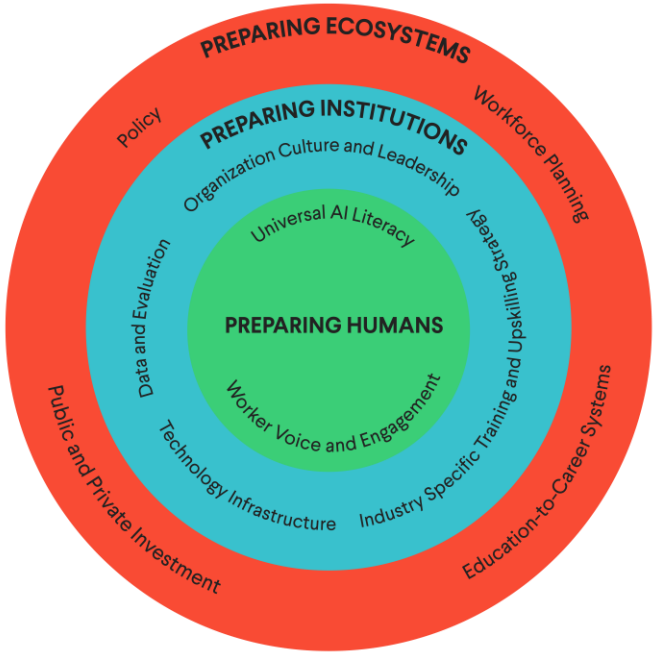
08

Centering Humans: The AI-Ready Workforce Transformation Blueprint

Drawing on insights and analysis from the Framework and Transformation Profiles, *The AI-Ready Workforce* Transformation Blueprint offers new, overarching recommendations and key strategies for policy leaders, employers, postsecondary institutions, and training organizations globally.

With humans at the center, we map out critical steps for workers, institutions (including employers and education and workforce development organizations), and ecosystems to ensure that all of us are equitably prepared for the coming AI transformation.

***The AI-Ready Workforce* Transformation Blueprint**



PREPARING HUMANS:

- **Universal AI Literacy:** Offer foundational awareness-building and training in core AI concepts, tools, and skills, including benefits and pitfalls, for every learner and worker. This includes lifelong learning and continuous skilling in AI as well as enhancement of durable, resilient human skills.
- **Worker Voice and Engagement:** Support and encourage worker experimentation with AI technology to uncover innovative use cases; ensure workers have the agency to adopt and learn from those innovations and that promising ideas get attention from leaders.

PREPARING INSTITUTIONS:

- **Organization Culture and Leadership:** Cultivate organizational cultures that readily anticipate, accept, and adapt to technology-driven change and prioritize both innovation and support for workers.
- **Industry-Specific Training and Upskilling Strategy:** Embed industry- and occupation-specific AI literacy learning in training and curriculum at all levels; focus in-depth on Elevate and Augment skills in education and training; expand pathways for AI talent.
- **Technology Infrastructure**: Upgrade technology infrastructure and systems to both responsibly and transparently integrate AI use cases into day-to-day work and assess their impact.
- **Data and Evaluation:** Engage next-generation labor market intelligence, including upgraded labor market signals, on how AI is reshaping job/skill demand and the talent landscape.

PREPARING ECOSYSTEMS:

- **Workforce Planning:** Create systems, tools, platforms, and practices that support assessment and reshaping of jobs and training pathways to prepare for ongoing AI-driven evolution. Include flexible, human-centered job profiles and support for job-crafting strategies by workers and frontline managers to respond to shifts; accelerate adoption of skills-first hiring and talent mobility practices.
- **Policy:** Support public policies for worker upskilling and reskilling, business and workforce systems transformation, new skill and talent development offerings, and in-transition workers.
- **Public and Private Investment:** Invest in AI and related technology deployment and upskilling to capitalize on new jobs and industries created by AI.
- **Education-to-Career Systems:** Collaborate between public and private partners, including training providers, employers, workforce intermediaries, learners, and workers to assess talent needs and co-create skills development offerings and pipelines; engage cross-industry collaboration on AI-workforce development.

Recommendations

PREPARING HUMANS

POLICYMAKERS

- Support **research into how employers are reshaping jobs** based on evolving technological capabilities, business needs, and worker feedback.
- Hold **listening sessions** to hear from workers and learners directly about their experiences with AI, its impact on education and jobs, and their recommendations for policy changes— including **any needed wraparound supports** to help navigate periods of transition and regulations to support AI as an inclusive and accessible technology for all.

EMPLOYERS

- Create **supportive environments and digital infrastructure** where employees can test AI applications within their roles and innovate with the goal of increasing job quality.
- Establish **real-time feedback loops** to hear directly from employees about their experiences with AI, how it is reshaping their jobs, and supports they may need
- Partner closely with employees and managers to **deliberately reshape jobs** to capitalize on Elevate and Augment skills wherever possible, including employee feedback about how best to train future workers in these skills; leverage AI tools to inform this process.

POSTSECONDARY LEADERS

- Create **new instructional program disciplines** integrating technical and human interpersonal skills.
- Evaluate and adapt **general education requirements** to ensure adequate required technology proficiencies and remove proficiencies that are expected to become obsolete.
- Update **curriculum review and approval processes** to screen for the use of technology within instructional delivery methods and the expectations for technology-related knowledge within the student learning outcomes.

Recommendations

PREPARING INSTITUTIONS

POLICYMAKERS

- Expand **access to workforce training and employment services** by leveraging the Pell program and establishing training accounts.
- Fund **apprenticeship programs and sector-based training** in industries and occupations most likely to be impacted by AI.
- **Understand how access to computing power and other AI technology** can create equitable economic advancement.
- Invest **in labor market data systems** to enable near-real-time assessment of how the demand for skills is changing.

EMPLOYERS

- Carefully build **buy-in** for AI talent strategies among leadership teams at every level; ensure middle and frontline managers are supported in navigating AI transitions with and for their teams.
- Ensure **foundational AI and digital literacy training and upskilling** pathways are available to all employees
- Invest in standard **definitions of current and future critical skills and capabilities.**
- Stay abreast of and leverage **key AI use cases** such as for skills-first hiring and talent mobility; develop policies and regular audit practices ensuring transparency, accessibility, and equity.
- Set strategy-aligned **metrics** and regularly **evaluate** AI's impact.

POSTSECONDARY LEADERS

- Invest in expanding capacity and strengthening innovations of the institution's **credit for prior learning infrastructure.**
- Establish **AI literacy and professional development** opportunities for leadership teams.
- **Build leadership teams** that have experience with transformational change and provide supplemental coaching support.
- **Establish student-alumni advisory committees** to provide a real-time perspective on employment opportunities and workplace skills expectations.

Recommendations

PREPARING ECOSYSTEMS

POLICYMAKERS

- Explore **new approaches to financing education** that shift the cost and risk away from students and hold schools accountable for their outcomes.
- Facilitate and incentivize **cross-industry collaborations and public-private partnerships** on AI-workforce development.
- Establish **regulations** that promote a safe, human-centered, and equity-positive usage of AI in educational contexts.
- Promote **lifelong learning models** to ensure education institutions and employers are encouraged to continue proactive development as AI evolves.

EMPLOYERS

- Engage in **education-to-career ecosystems and build partnerships** to help ensure training programs the organization relies on are integrating AI skills aligned to current and future organizational needs.
- Incorporate an acknowledgment of quality jobs and impact on workforce and training into responsible AI policies, **both within companies and in public policy advocacy.**

POSTSECONDARY LEADERS

- Elevate and build upon **direct assessment competency-based education models**, including financing models and federal policy support.
- **Expand capacity to track employment trajectory data** to identify and productively disrupt patterns of downward career mobility due to industry shifts.
- **Provide professional development** for board members, state agencies, college leaders, and key stakeholder leadership related to the emerging impact of AI and the potential opportunities with this developing competency.

Conclusion

AI and Equitable Economic Advancement

The explosion of artificial intelligence across industries and occupations will create some of the most exciting opportunities—and some of the biggest challenges—we've ever faced. At JFF, we believe that equitably developed, deployed, and utilized AI can dramatically move us forward toward our North Star goal: In 10 years, 75 million people facing systemic barriers to advancement will work in quality jobs.

Yet there's also significant potential for AI to exacerbate existing inequities, deepen digital divides, and degrade opportunities for workers and learners. That's not a version of the future we are willing to accept.

We believe that as this technology evolves, we have an economic imperative and a moral responsibility to make sure that it's used to accelerate, rather than hold back, the cause of equitable economic advancement and quality jobs.

Ensuring that every learner and worker is prepared with foundational AI awareness and skills will put the power and potential of AI directly into their hands, yield benefits for employers, and keep our economy competitive. We hope that our framework, transformation profiles, and blueprint will offer policymakers, employers, and education and workforce partners a new way of thinking about the dynamic impact of AI, and a roadmap for how to prepare workers and themselves for the coming wave of transformation.

At the end of the day, it's up to all of us to shape this AI-transformed future. **The time to start that critical work is now.**

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About JFF

About Jobs for the Future:
Jobs for the Future (JFF) drives transformation of the U.S. education and workforce systems to achieve equitable economic advancement for all. For more information visit www.jff.org

About Jobs for the Future's Center for Artificial Intelligence & the Future of Work:
The JFF Center for Artificial Intelligence & the Future of Work focuses on connecting policy with practices that are grounded in equitable applications of AI so all learners and workers benefit. For more information, and to get in touch about JFF's work on AI, visit www.jff.org/ai.

About JFFLabs
The Center will be incubated under JFFLabs, the innovation lab of JFF that provides the infrastructure to bring solutions from ideation to national-scale social impact. JFFLabs' proven model of insights, incubation, and investment provides robust market analysis, identifies emerging trends, and invests in promising innovators to create, test, and scale transformative models that drive equitable economic advancement. Other incubated practice lines within JFFLabs include climate innovation and lifelong learning. For more information, visit www.jff.org/labs.

About JFF's Language Choices
JFF is committed to using language that promotes equity and human dignity, rooted in the strengths of the people and communities we serve. We develop our content with the awareness that language can perpetuate privilege but also can educate, empower, and drive positive change to create a more equitable society. We will continually reevaluate our efforts as language usage continues to evolve.

About Intel

Intel (Nasdaq: INTC) is an industry leader, creating world-changing technology that enables global progress and enriches lives. Inspired by Moore's Law, we continuously work to advance the design and manufacturing of semiconductors to help address our customers' greatest challenges. By embedding intelligence in the cloud, network, edge and every kind of computing device, we unleash the potential of data to transform business and society for the better. To learn more about Intel's innovations, go to newsroom.intel.com and intel.com.

In 2020, **Intel launched the AI for Workforce program** in the US, as part of the wider Intel Digital Readiness Program portfolio. Since its inception, Intel has scaled the program and as of **September 2023, 85 community colleges in 38 states have joined the program, with over 40 percent of participating schools designated Minority-Serving Institutions.** As part of the AI for Workforce program, Intel provides over **600 hours of AI content** and courses, professional **faculty training, implementation guidance,** and manages the peer community. Partnering community colleges use this content to augment existing courses across disciplines, develop AI certificates, or launch full AI associate degree programs. The program is designed to provide workers with the necessary AI skills to get jobs in the digital economy, including helping students develop and demonstrate solutions through AI projects capturing industrial or social impact.

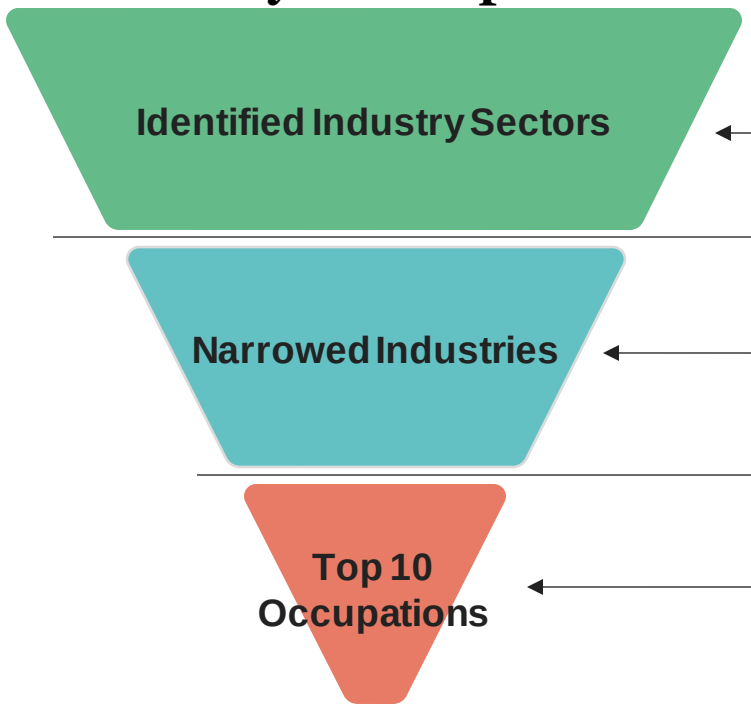
Appendix

Overview

To understand AI's impact on industries and occupations, JFFLabs conducted a multi-step, mixed-method research effort including:

- Literature review of existing research on AI's impact on industries and the future of work
- Cross-industry survey (70 respondents)
- Qualitative interviews (23) of industry leaders to understand perceptions of AI and the technology's impact on jobs
- Detailed labor market analysis in partnership with Fourth Economy to identify and assess AI's impact on in-demand industries and occupations

Industry & Occupation Selection



JFF analyzed labor market demand across a range of industry sectors and identified the **top eight industry sectors** for consideration (see right). The sectors were chosen based on our analysis and research that predicts them to be highly impacted by automation.

- Advanced Manufacturing
- Business and Sales
- Computer and Information Sciences
- Financial Services
- Health Care and Medical Services
- Life Sciences and Research and Development
- Marketing and Communications
- Transportation, Logistics, Distribution, and Related Services

JFF narrowed this list **to five** industries based on regional impact and representation, with the goal of highlighting a diverse range of regions across the United States

- Business and Sales
- Health Care
- Transportation and Logistics
- Manufacturing
- Computer and Information Sciences

JFF selected occupations to spotlight within the five selected industries based on the following factors:

- **Employment in 2022.** The total number of people employed in this occupation in 2022. We selected occupations with high 2022 employment numbers.
- **Proportion of the occupation within a given industry.** This measures the percentage of individuals working in a particular occupation who are employed within a specific industry.
- **Employment growth from 2022 to 2027.** The employment growth projections over the next five years for a given occupation. We selected occupations with high projected growth.
- **AI-impact profile.** The way artificial intelligence (AI) will impact different skills within a job, rather than the entire job itself. AI will impact workers in different ways depending on their specific tasks and skills. Whenever possible, we selected occupations with diverse AI-impact profiles.

Building the Framework

With a more complete understanding of the labor market and the industries and occupations with the most labor market demand, we developed a framework to assess AI's impact on the five select industries and select occupations within them. To do this, we conducted a literature review to explore past patterns of technology-driven transformations, such as the advent of automation, robotics, and machine learning, to understand how industry leaders respond, how jobs evolve, how workers adapt, and general industry trends.

We defined hypotheses based on key assumptions:

- Independent of AI, skills-based economies will continue to be in demand as the workforce evolves.
- Whole jobs won't be eliminated through this transformation.
- Certain typologies of skills will be more resilient and relevant with generative AI in the future, and the nature of these skills requires that they are uniquely human.
- AI's impacts on jobs and industries are not static and will displace some tasks while creating or increasing the importance of others.
- Finally, if the above is true, jobs cannot be evaluated as a holistic unit but must be evaluated at a skill and task level. Jobs and the industries they are in need to be reimagined for *how* work gets done.

Accordingly, we relied on established research methods to qualify and organize skills into AI-impacted categories and approaches to organizing skills. This approach allowed us to focus on iteration and validation. We categorized 45 skill sets and job tasks from O*NET's "Abilities, Skills, Work Activities, and Work Context" database and Lightcast's "Common and Specialized Skills" taxonomy into **five categories of AI-Transformation.** These skill clusters are grouped based on similarity of skill type and the nature of AI impact and human engagement (i.e., machine-led, human-supported) or if humans will continue to take the lead with support of AI (i.e., human-led, machine-supported). We evaluated these clusters against other taxonomies, including the World Economic Forum global taxonomy and emerging research on impacts of AI and large language models, and evaluated skill demand using real-time labor market and job posting data. This approach also allowed us to reconcile the static nature of O*NET profiles with more dynamic and market-driven labor market information.

Finally, we considered the dynamic nature of generative AI and if the real impacts on jobs lay in changing how work is done. Once skills were organized into five categories, we chose names for each category of type of impact, leading us to define tasks and skills that would be **Replaced, Displaced, Complemented, Augmented,** and **Elevated** by AI**.**

Skill Clusters Associated with Each Type of AI-Impact from *The AI-Ready Workforce* Framework

AI-Impact Type	Associated Skills: O*NET		Associated Skills: Lightcast	
Elevate	**Interpersonal Task** • Establishing and Maintaining Interpersonal Relationships • Performing for or Working Directly with the Public • Contact with Others **Group Task** • Work with Work Group or Team • Face-to-Face Discussions • Coordinating the Work and Activities of Others	**Conflict Resolution** • Resolving Conflicts and Negotiating with Others • Deal with Unpleasant or Angry People • Frequency of Conflict Situations **Management and Supervision** • Management of Financial Resources • Staffing Organizational Units • Guiding, Directing, and Motivating Subordinates	**Common Skills** • Interpersonal Communications • Team Management • Team Leadership • Handling Confrontation • Team Motivation	**Specialized Skills** • Conflict Resolution • Financial Management • Staff Management
Augment	**Communication** • Speaking • Communicating with People Outside the Organization • Active Listening **Systems Analysis** • Systems Analysis • Systems Evaluation • Organizing, Planning, and Prioritizing Work	**Creative and Critical Thinking** • Critical Thinking • Thinking Creatively • Originality	**Common Skills** • Communications • Active Listening • Systems Analysis • Decision Making • Critical Thinking • Creative Thinking • Creativity	
Complement	**Equipment Maintenance** • Equipment Maintenance • Repairing and Maintaining Mechanical Equipment • Troubleshooting **Equipment Operation** • Operating Vehicles, Mechanized Devices, or Equipment • In an Enclosed Vehicle or Equipment • Response Orientation	**Machine Control** • Operation and Control • Controlling Machines and Processes • Control Precision **Hazardous Task** • Wear Common Protective or Safety Equipment such as Safety Shoes, Glasses, Gloves, Hearing Protection, Hard Hats, or Life Jackets • Exposed to Hazardous Equipment • Exposed to Contaminants	**Common Skills** • Troubleshooting	**Specialized Skills** • Equipment Maintenance • Machinery Repair and Maintenance • Equipment Operation • Motor Vehicle Operation • Machine Operation • Machine Controls • Safety Standards • Hazardous Material Handling
Displace	**Routine Problem Solving** • Importance of Being Exact or Accurate • Importance of Repeating Same Tasks • Information Ordering	**Information Processing** • Processing Information • Analyzing Data or Information • Getting Information	**Common Skills** • Problem Solving • Information Gathering • Information Processing	**Specialized Skills** • Data Analysis • Information Ordering
Replace	**General Physical Task** • Performing General Physical Activities • Handling and Moving Objects • Static Strength	**Dynamic Physical Task** • Dynamic Strength • Dynamic Flexibility • Gross Body Equilibrium	**Common Skills** • Physical Strength • Physical Flexibility • Dynamic Balance	**Specialized Skills** • Manual Handling

Source: JFF & Fourth Economy Analysis

Applying the Framework and Quantifying AI Impacts

In collaboration with the Fourth Economy, each group of skills was assigned a **skill-cluster importance score** between 0-100, quantifying how important the skills within these clusters are to a given occupation. The higher the score, the more important the skill cluster to that occupation; we broke down groups of scores into not important (0-24), somewhat important (25-49), important (50-74), and very important (75-100). In doing so, we were then able to parse the difference in AI impact on occupations based on how important skill clusters are to an occupation.

When we evaluated the intersection of skill-cluster categories and importance scores for selected occupations across five industries to assess the level of impact AI will have on industries and occupations, we were able to map the trajectory of skill transformation due to AI. For each industry and occupation, we produced an **AI-Transformation Profile** designed to articulate how AI and automation will impact human skills and labor and to outline areas of focus for skills training, development, and restructuring jobs.

We further evaluated the resulting AI profiles based on real-time labor market data produced by Lightcast, including occupation profiles, in-demand skills, certifications, sample job postings, industry overviews, and aggregate job posting data from 2020 through 2023. These AI profiles were then overlayed onto our response framework, or guidance for stakeholders, to suggest responding to impending job transformations by future-proofing, reimagining, capitalizing, or automating certain job tasks, upskilling, or reshaping jobs.

Glossary of Key Terms

AI-Ready Workforce Framework: A framework built by JFFLabs, in collaboration with Intel Corporation, that helps workforce and education professionals, industry leaders, and employers understand the nature of AI's impact on different industries and occupations and assess how human work will evolve as a result.

AI-Transformation Profile: A snapshot outlining how AI is likely to impact/change an occupation or industry across each skill cluster based on the skill cluster's importance.

Artificial Intelligence (AI): The theory and development of computer systems able to perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making, and language translation.

Automation: Automation is the creation and application of technologies to produce and deliver goods and services with minimal human intervention. The implementation of automation technologies, techniques, and processes improves the efficiency, reliability, and/or speed of many tasks that were previously performed by humans (Techopedia).

Job Task: Activity that workers do as part of their job (e.g., enter data into an organization's administrative software or database).

Machine Learning (ML): A subfield of AI that gives computers the ability to learn without explicitly being programmed (MIT Sloan).

Skill Cluster: Group of skills/job tasks categorized by similarity of skill type (e.g., interpersonal skills, analytical skills, etc.) and by how AI will change how those skills/tasks are performed (e.g. machine-led, human-supported or human-led, machine-supported).

Skill: Ability that a worker develops that enables them to complete job tasks (e.g., writing skills are used by workers to communicate with colleagues or publish written material).

Skill-Cluster Importance Score: Scores assigned to each AI-transformed skill cluster that quantifies (on a scale of 0-100) how important skills within each cluster are to a given industry or occupation.

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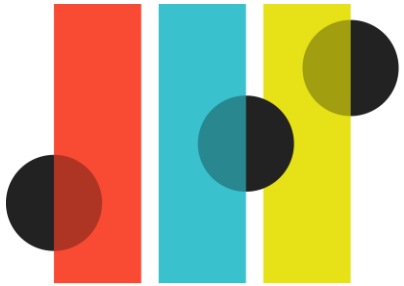

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