

McKinsey  
Global Institute

# AI and Disruptive Technology's Impact on Education and the Workforce



CONFIDENTIAL AND PROPRIETARY  
Any use of this material without specific permission of McKinsey & Company  
is strictly prohibited



# Contents

1



What changed emerging from the pandemic: A robust recovery marked by job switching and labor shortages

2



What's next until 2030: Accelerating changes in the era of Generative AI, demographic shifts and federal investments

3



Preparing the workforce for the future of work

4



A call to action: What Ohio leaders and stakeholders can do to prepare for the future of work



# Contents



1 What changed emerging from the pandemic: A robust recovery marked by job switching and labor shortages

# The US labor market has bounced back, with higher employment and labor shortage

AS OF 6/5/2023

**155M**

Total nonfarm payroll employment

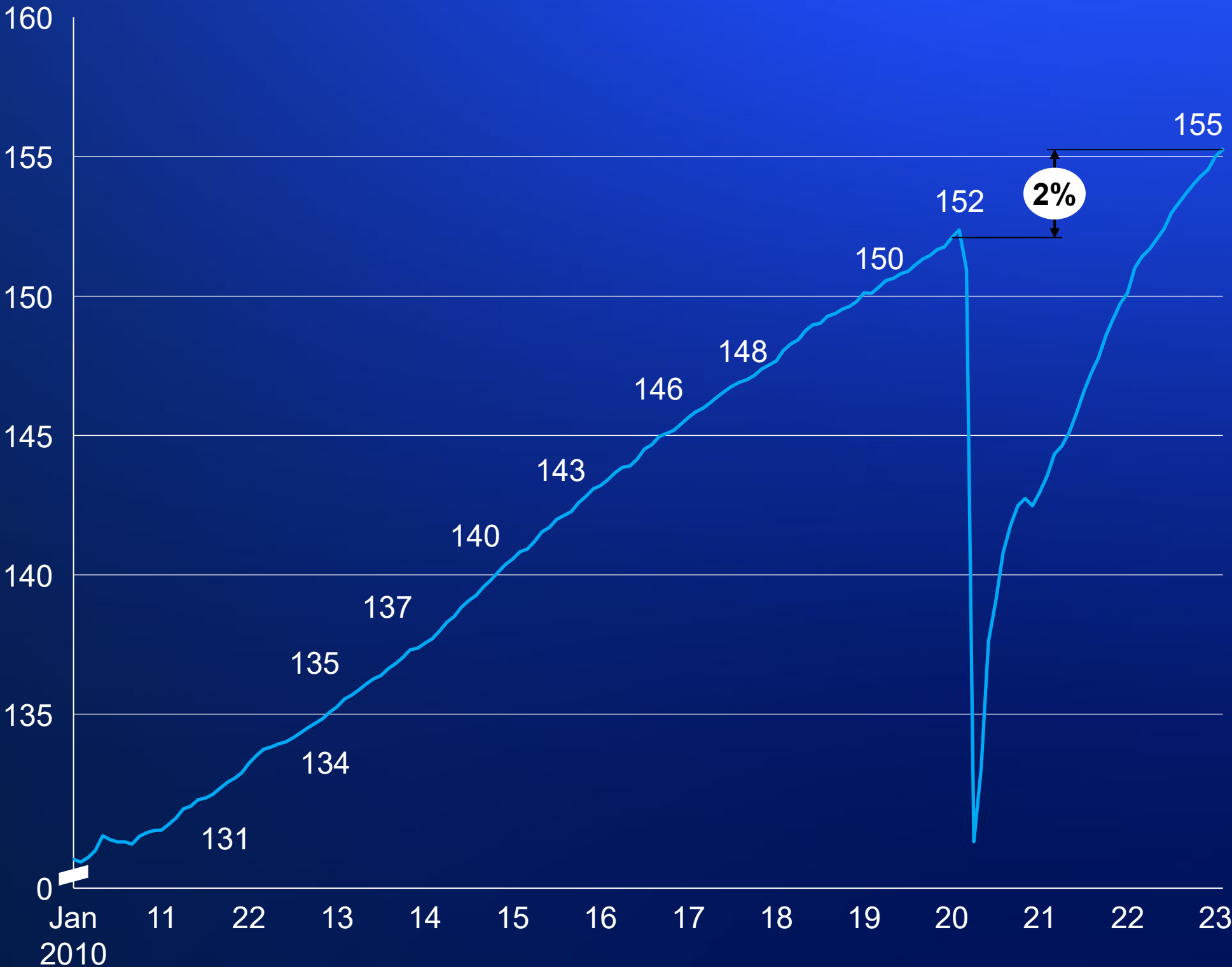
**10M**

Total nonfarm job openings compared to 7.0M pre-pandemic

**6M**

Unemployed individuals

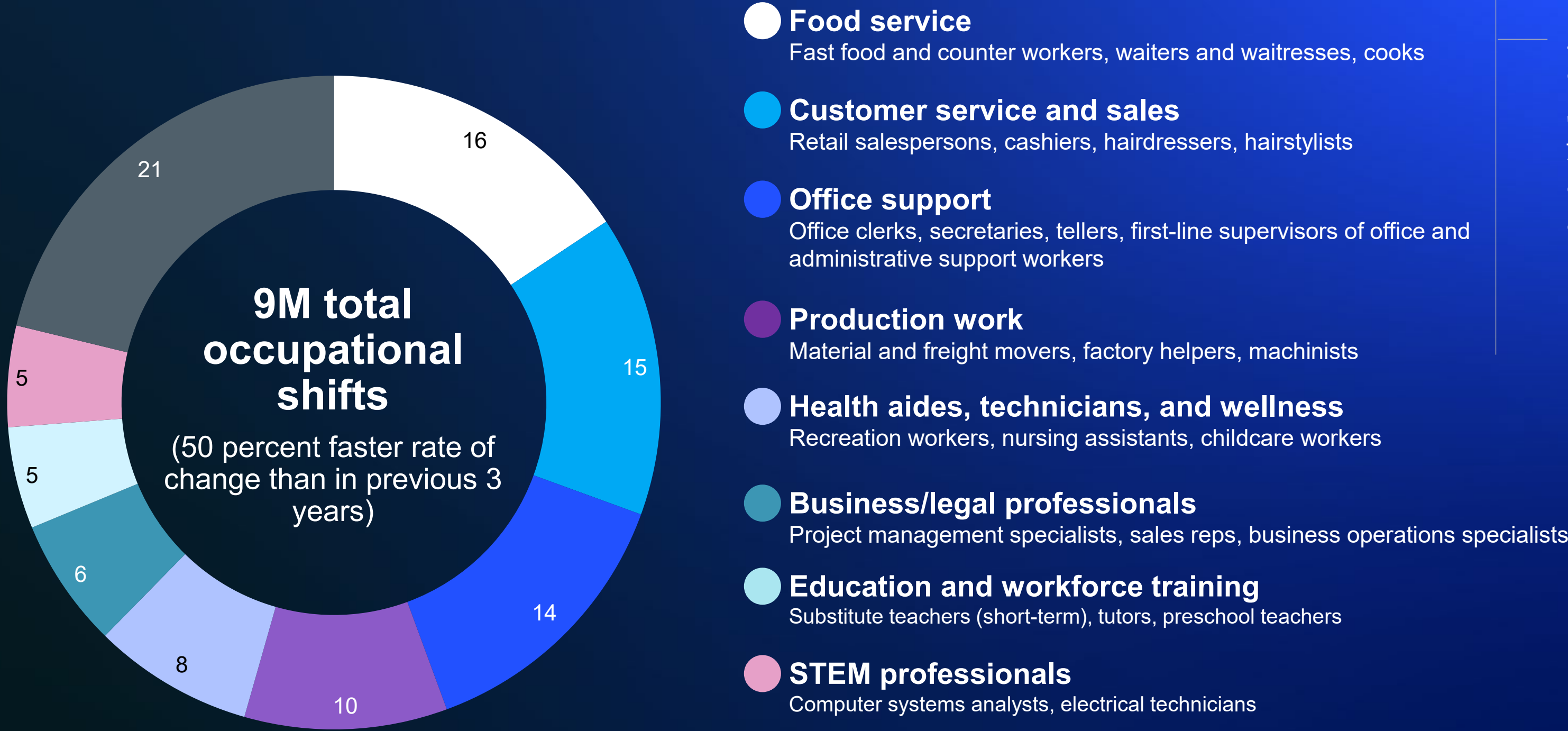
Total nonfarm payroll employment (millions)



Source: US Bureau of Labor Statistics

# In a tight labor market, occupational shifts accelerated

Share of estimated occupational shifts by category,<sup>1</sup> 2019-22, United States



**55% of the occupational shifts happened from 4 occupational categories**

<sup>1</sup>“Occupational shifts” refers to net declines in employment in specific occupations between 2019 and December 2022. However, we do not know exactly how individuals moved from one occupation to another or if they made multiple moves; for that reason, we refer to the number of occupational shifts rather than specifying the number of workers making those changes.



# Contents



2

What's next until 2030: Accelerating changes in the era of Generative AI, demographic shifts and federal investments

# Shifts in labor supply, demand, and employee preferences are driving major disruptions

## A. Changing skills and composition of workers (demand)

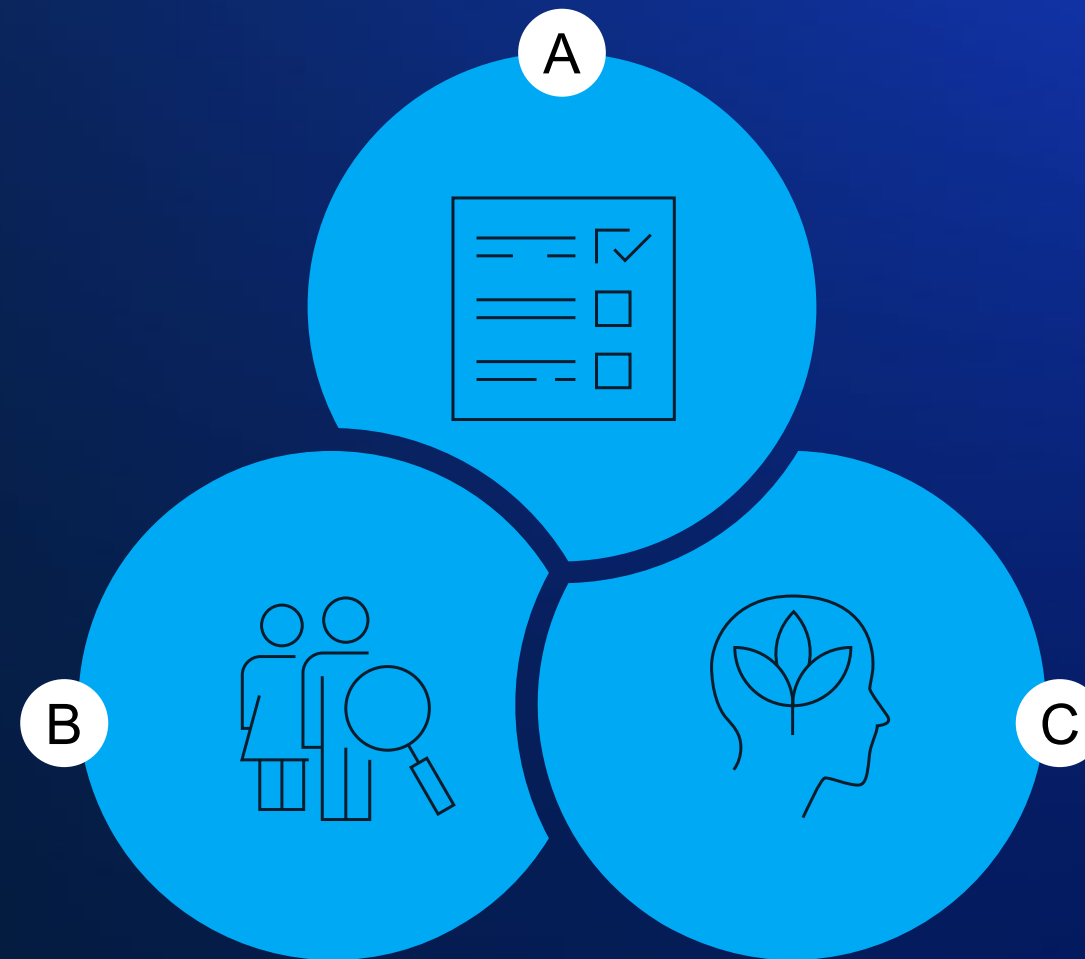
- Increased healthcare needs of an aging population
- Shifting consumer preferences towards e-commerce and delivery
- Accelerated automation adoption from GenAI
- Increased infrastructure and net-zero investment

## B. Shifts in size and demographics of available workforce (supply)

- Aging workforce
- Increased retirements
- Lower labor force participation
- Stalled immigration

## C. Changes in worker preferences

- Demand for new working models (e.g., remote working, flexible hours)
- Growth in non-traditional work (temporary, gig, part-time)
- Increased desire for alignment of work, values, and purpose



# The US workforce could be categorized into three cohorts

## Resilient and growing

36% of total 2022 employment (57mln)  
+ 10m employment, 2022-2030

2016-30 trajectory



Expected occupational transitions<sup>1</sup>

1M

Occupational categories

- Health professionals, aides, technicians, and wellness professionals
- STEM professionals
- Managers
- Transportation services
- Business and legal professionals

## Stalled but rising

25% of 2022 total employment (39 mln)  
+ 2.8 employment, 2022-2030



1M

- Builders
- Creatives and arts management
- Property maintenance
- Mechanical installation and repair
- Community services
- Education and workforce training
- Agriculture

## Hit and declining

39% of 2022 total employment(62 mln)  
- 6m employment, 2022-2030



10M

- Customer service and sales
- Food services
- Production work
- Office support

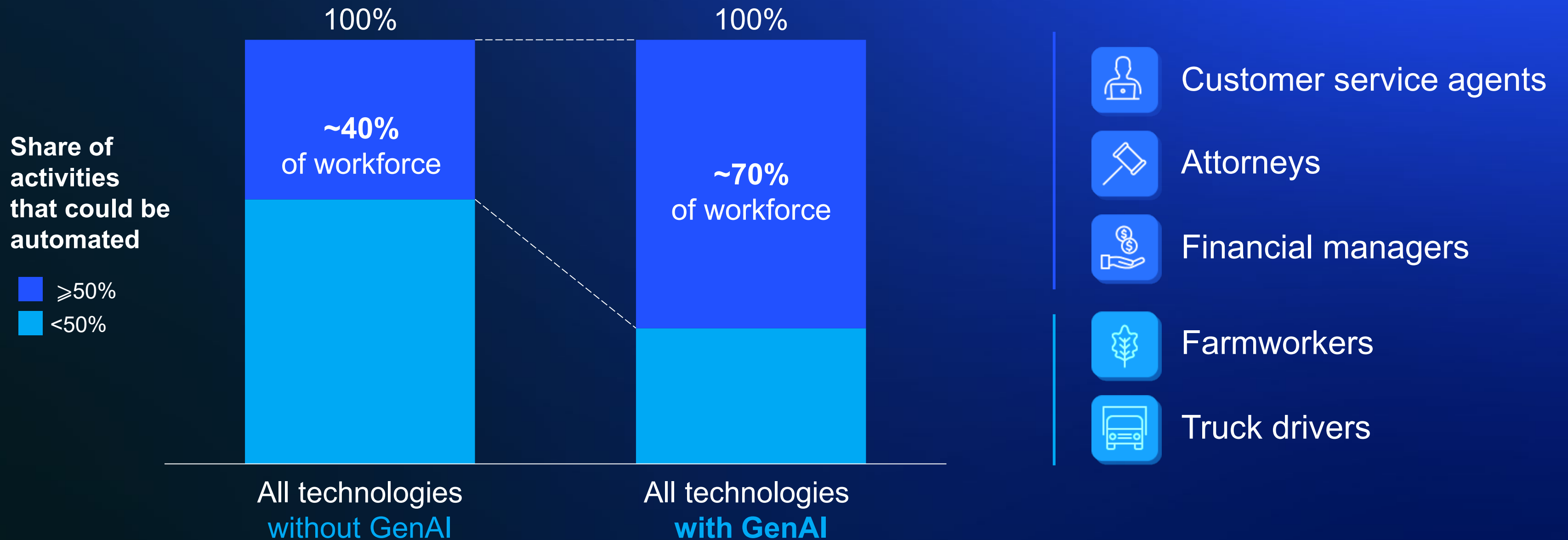
● Occupations with **accelerating automation due to generative AI**. We expect continuing future growth but significantly reshaped work activities.

1. 2022 through 2030. Transitions are calculated where there is a decline in net demand for an occupation and employees of that some workforce would have to **leave for another occupation**. Even in categories that are growing overall, employment may decrease in specific occupations, requiring some workers to find new roles. Please note, people joining a new occupation is not counted towards transitions to avoid double counting



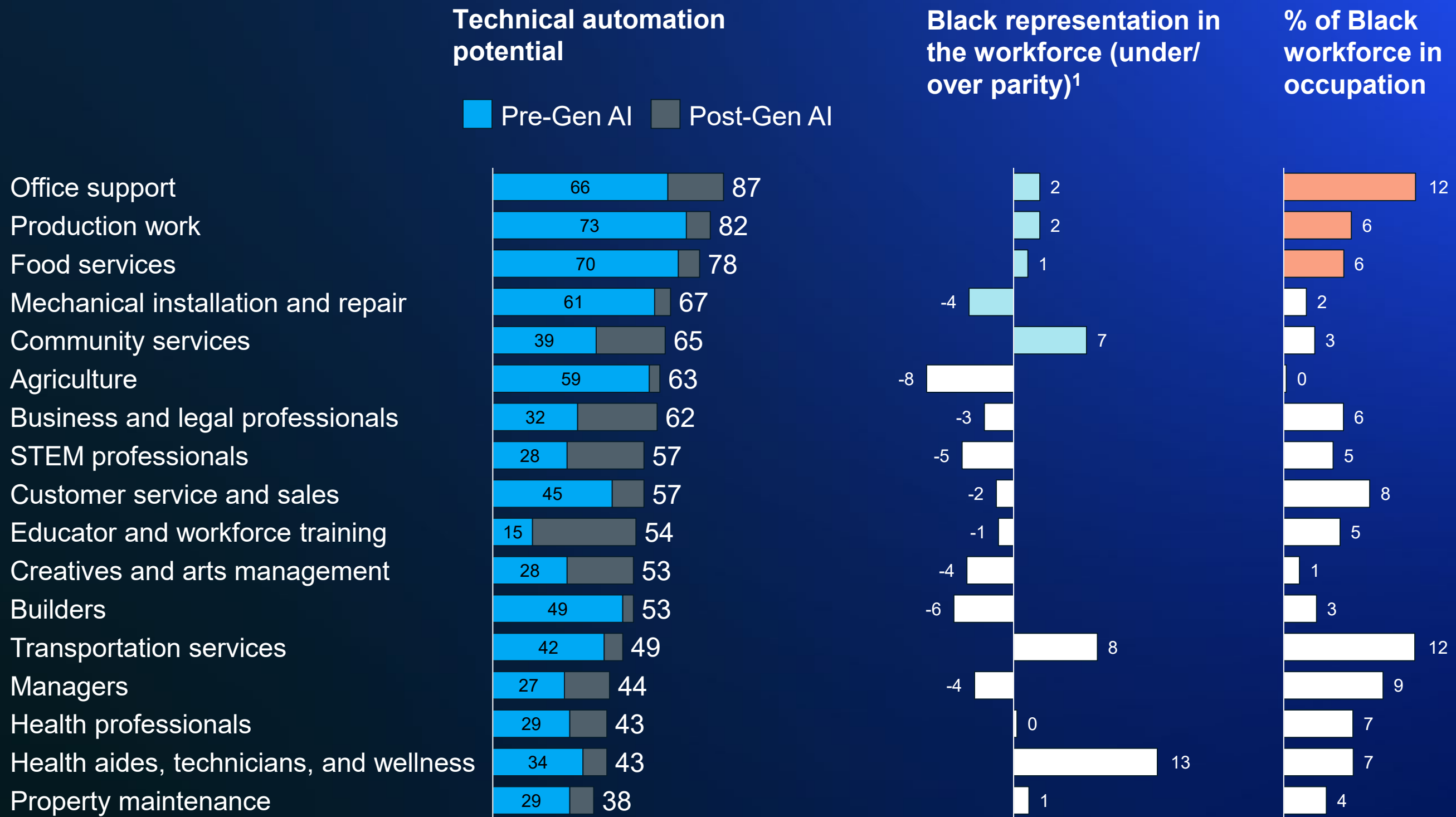
# ~70% of the workforce have the potential to see 50%+ of their activities automated

## Workforce by share of activities potentially automated % of workforce in 2023<sup>1</sup>



1. Theoretical technical automation potential based on current workforce in 2023 in mid-point scenario

# Projections suggest that the Black workforce may be disproportionately impacted by AI – even among the college-educated



4/5

of the occupations with the highest automation potential are ones where the proportion of Black workers' is higher than their share of the workforce overall

24%

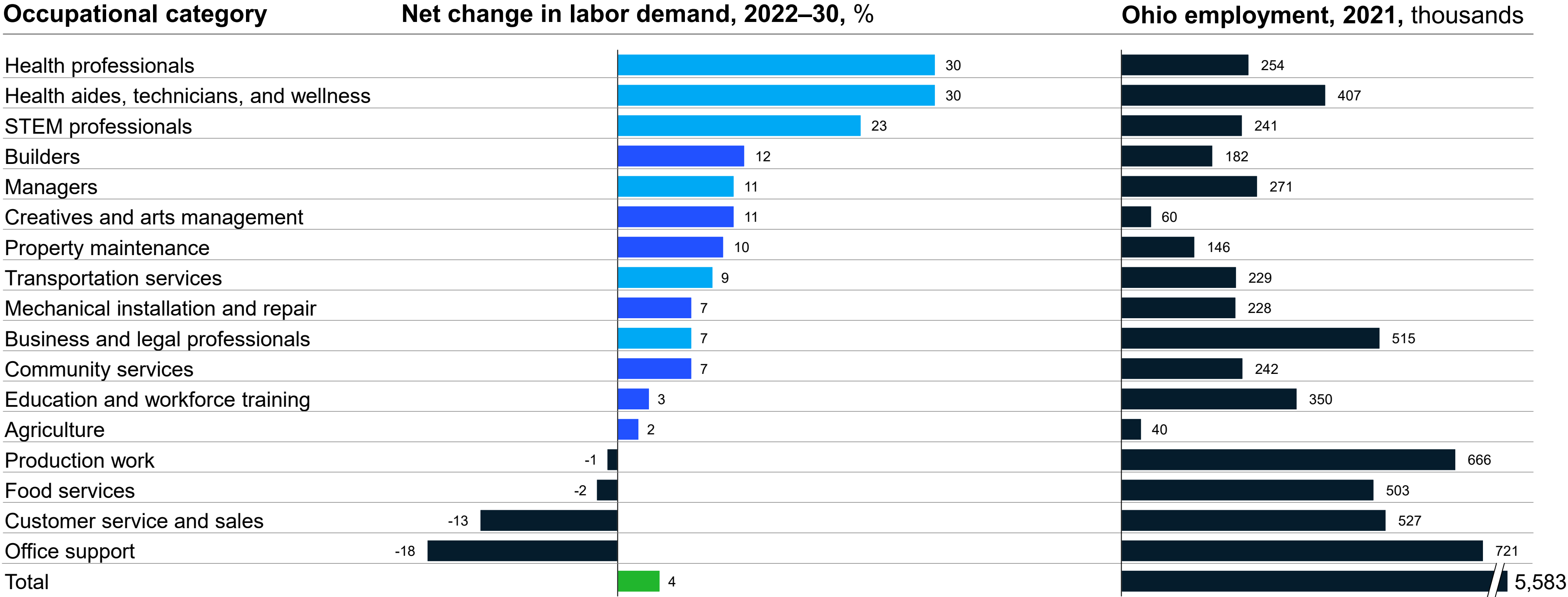
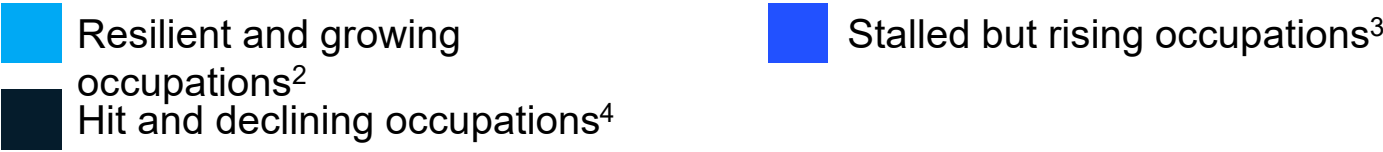
of Black workforce are in occupations with greater than 75% automation potential vs. 20% for white workers

1. Relative to Black share of the workforce (12%)  
 Source: Bureau of Labor Statistics; US Census; McKinsey Global Institute analysis

# Healthcare, STEM, and builder roles could grow, while demand for office support and customer service roles could decline

## Estimated future US job growth by occupational category

Midpoint automation scenario,<sup>1</sup> with generative AI acceleration

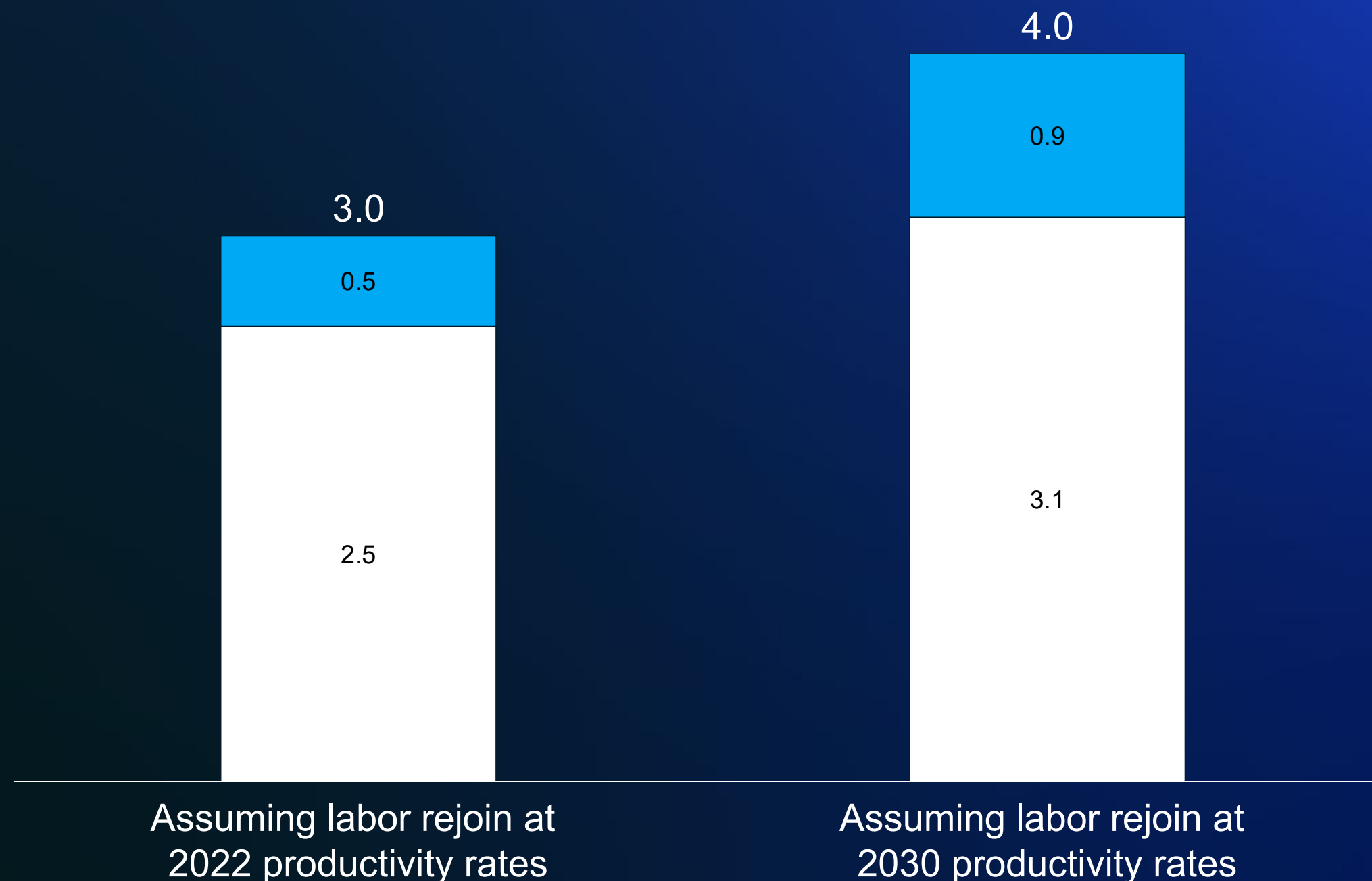


1. Midpoint automation adoption is the average of early and late automation adoption scenarios as referenced in the report of “The economic potential of generative AI: The next productivity frontier”, McKinsey Global Institute, June 2023.2. Resilient during the pandemic, 2019-2022, and expected to grow between 2022 and 2030. 3. Stalled during the pandemic, 2019-2022, and expected to rise between 2022 and 2030. 4. Hit during the pandemic, 2019-2022, and continuing to decline between 2022 and 2030. Source: O\*NET; US Bureau of Labor Statistics; Current Population Survey, US Census Bureau; McKinsey Global Institute analysis

# Automation could help drive US productivity growth to 3 to 4 percentage points annually by 2030 ...

Productivity growth from automation adoption in the midpoint scenario, CAGR, 2022-2030 (%)

■ Productivity boost from generative AI



Automation and redeploying workforce could help US productivity to grow by

**3% – 4%**

Of which

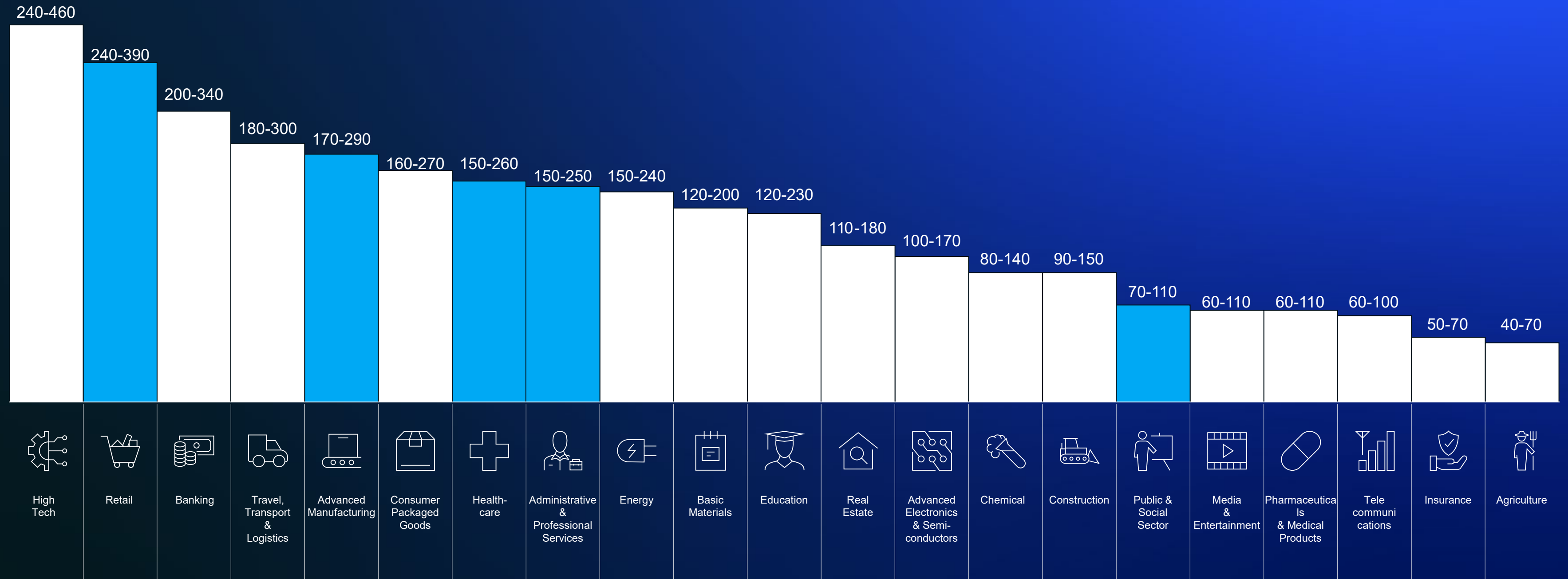
**0.5pp – 0.9pp**

is attributed to generative AI

# ...with significant impact across all industry sectors

Generative AI productivity impact by sector (Total, \$ billion)

Leading industries in Ohio





# Contents



3 Preparing the workforce for the future of work

# Twelve million occupational transitions will be required by 2030

Estimated number of occupational transitions by category, 2022–30, midpoint automation scenario, with generative AI acceleration

■ Resilient during pandemic and continuing to grow
 ■ Stalled during pandemic but starting to rise
 ■ Hit during pandemic and continuing to decline

Occupational category	Occupational transitions, million	Employment, 2022, million
Office support	4.7	20.1
Customer service and sales	2.7	14.7
Production work	1.4	13.3
Food services	1.2	13.7
Business/legal professionals	0.7	16.0
Education and workforce training	0.3	9.9
Builders	0.2	7.0
Mechanical installation & repair	0.2	6.6
Community services	0.2	6.8
Managers	0.1	9.7
Agriculture	0.1	2.1
Transportation services	0.1	5.6
STEM professionals	0	7.9
Creatives and arts management	0	2.2
Health aides, technicians, and wellness	0	11.6
Property maintenance	0	4.6
Health professionals	0	6.5

**Total = 11.8M**

Source: O\*NET; US Bureau of Labor Statistics; Current Population Survey, US Census Bureau; McKinsey Global Institute analysis



# Workers in lower-wage jobs, those with less educational attainment, women, and people of color are more likely to transition



**14X**

**Workers in lower-wage jobs**

More likely to be affected than high wage workers



**1.5X**

**Women**

More likely to be affected than men



**1.7X**

**Workers in jobs that require less education**

More likely to be affected than those with bachelor's or above



**1.1X**

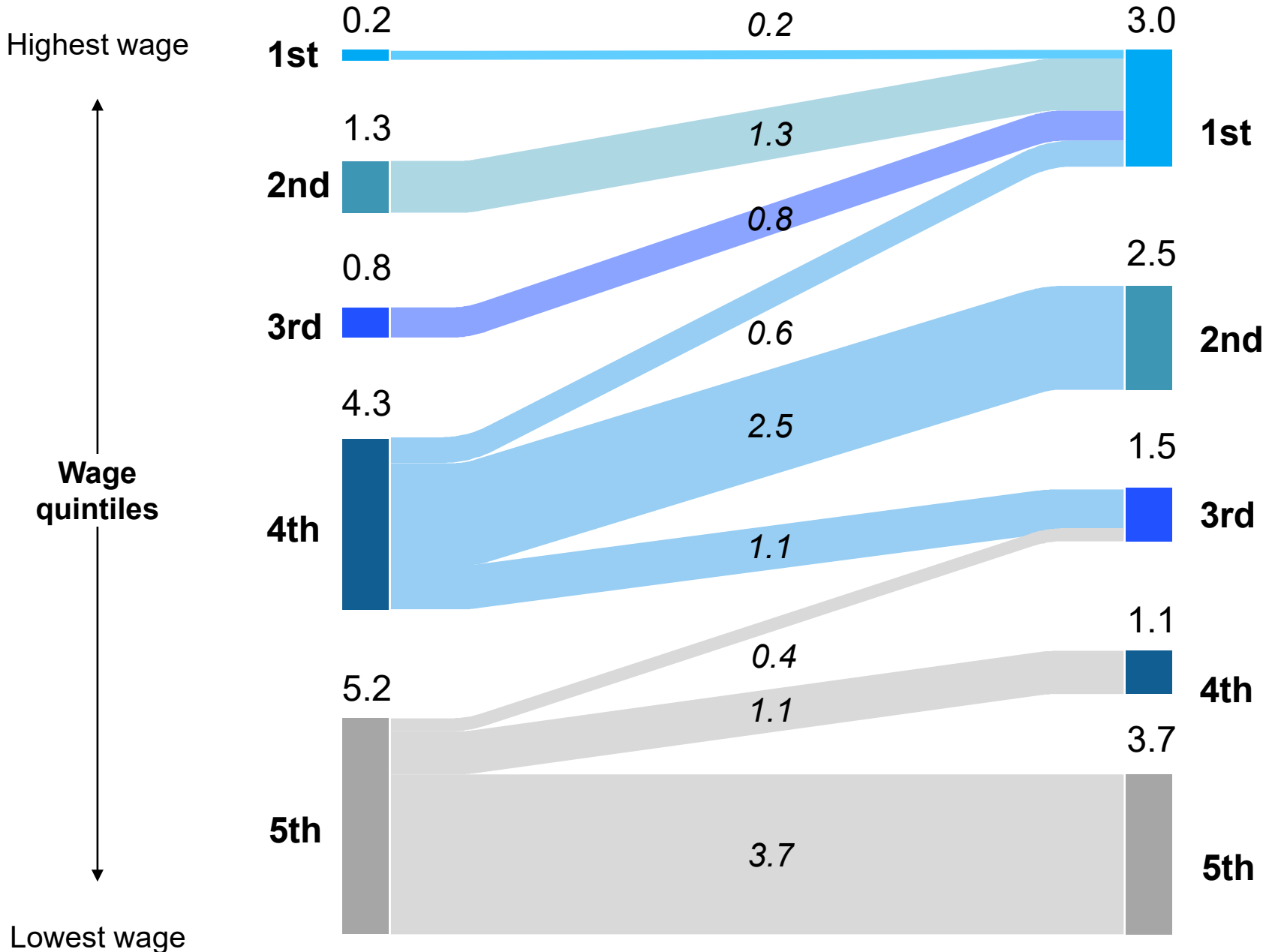
**People of color**

More likely workers to be affected than White workers





# Occupational transitions create opportunities for workforce to move into higher-wage roles



Assumes workers transition to jobs in higher-wage quintiles if there are not enough jobs in their current wage quintile.

Source: O\*NET; US Bureau of Labor Statistics; Current Population Survey, US Census Bureau; McKinsey Global Institute analysis

**-2.3pp**

Change in share of total US employment in low-wage jobs

**-0.3pp**

Change in share of total US employment in medium-wage jobs

**2.6pp**

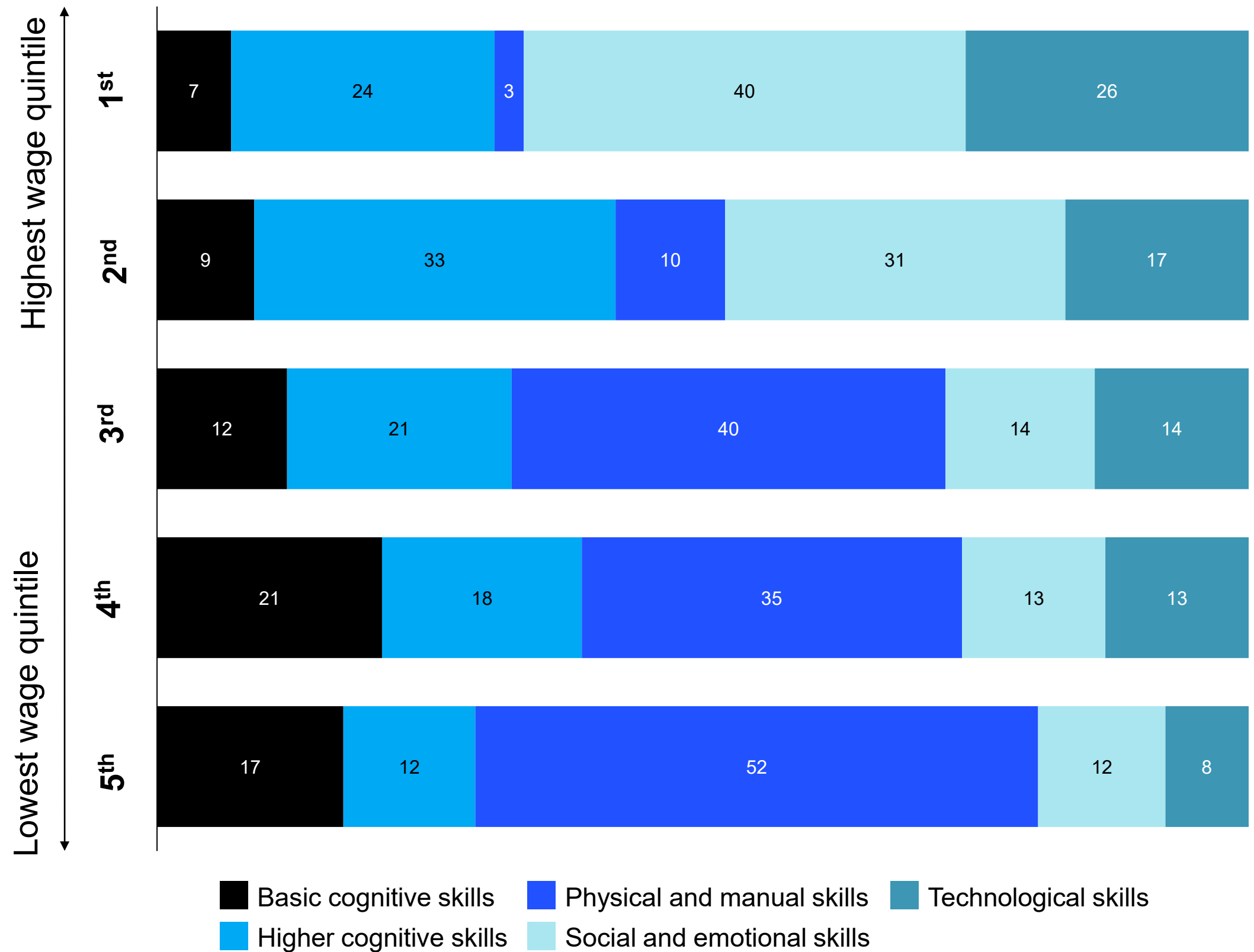
Change in share of total US employment in high-wage jobs



As workers move to higher-wage jobs of the future, they are more likely to need digital and people skills



Time spent using various types of skills by wage quintile<sup>1</sup>  
2030, %



1. Using O\*NET data, we classified ~2,100 work activities associated with ~850 occupations according to the primary type of skill used.

Source: O\*NET; US Bureau of Labor Statistics; Current Population Survey, US Census Bureau; McKinsey Global Institute analysis

# Four key ideas on generative AI in education



**1**

The question is not whether to allow generative AI in the classroom, but how to ensure usage is ethical and equitable

**2**

Workers who are AI literate will “win” in the workforce; prepare students now

**3**

Generative AI has potential to augment education to be more accessible, personalized, and engaging

**4**

---

Generative AI will have transformative use cases across the education ecosystem

# Generative AI use cases in K-12

## Teacher activities

---

### Preparation

### Activities that generative AI can support

---

- Search for existing and generate new lesson plans and materials
  - Synthesize prior data to understand students' baseline mastery
  - Review pedagogical approaches suggested by other educators
- 

### Instruction and Engagement

- Teach students to use technology or equipment
  - Personalize instructional content based on student interest and performance level
  - Provide individual, conversation-like tutoring to students
- 

### Assessments and Feedback

- Search for existing and generate new assessments
- Grade and provide feedback on student work
- Analyze student performance data and behavioral data (e.g., attendance)

# Generative AI use cases in Higher Ed

## Faculty responsibility

### Activities that generative AI can support

#### Teaching activities

- Preparing lessons and creating instructional content
- Preparing personalized content for individual support
- Grading and providing feedback on assignments, exams, dissertations

#### Research

- Searching for and summarizing existing literature
- Writing and designing a research proposal
- Analyzing and interpreting data/results

#### Advising or mentoring

- Drafting letters of recommendation
- Advising students on course selection or providing other resource navigation support



# Contents



A call to action: What Ohio leaders and stakeholders can do to prepare for the future of work

**The influx of new corporations and investments in Ohio raise two important questions**

- ① Does Ohio have the skilled workforce available to meet current and future demand?
- ② Is Ohio preparing its workforce for the rapidly accelerating future of work?

# A call to action: What Ohio leaders and stakeholders can do to prepare for the future of work

Expand talent pools

## A Hire for skills

Assess candidates on holistic skills rather than specific credentials or experiences

## B Engage and support women

Remove barriers, like the lack of affordable childcare, that keep women out of the workforce

## C Support and leverage historically overlooked populations

Invest in broadband infrastructure allowing rural workers to participate in a digital economy, and provide old workers opportunities to contribute their expertise while offering necessary support and flexibility

Invest in changing work and skills of the future

## D Build pipelines

Build targeted education and apprenticeship pipelines towards growing fields

## E Develop skills

Invest at scale in upskilling and reskilling programs that equip all workers with in-demand skills

Embrace changing workforce preferences

## F Explore new working models

Develop working models that meet the changing needs of workers (e.g., gig economy, hybrid, outsourcing, four-day workweeks)