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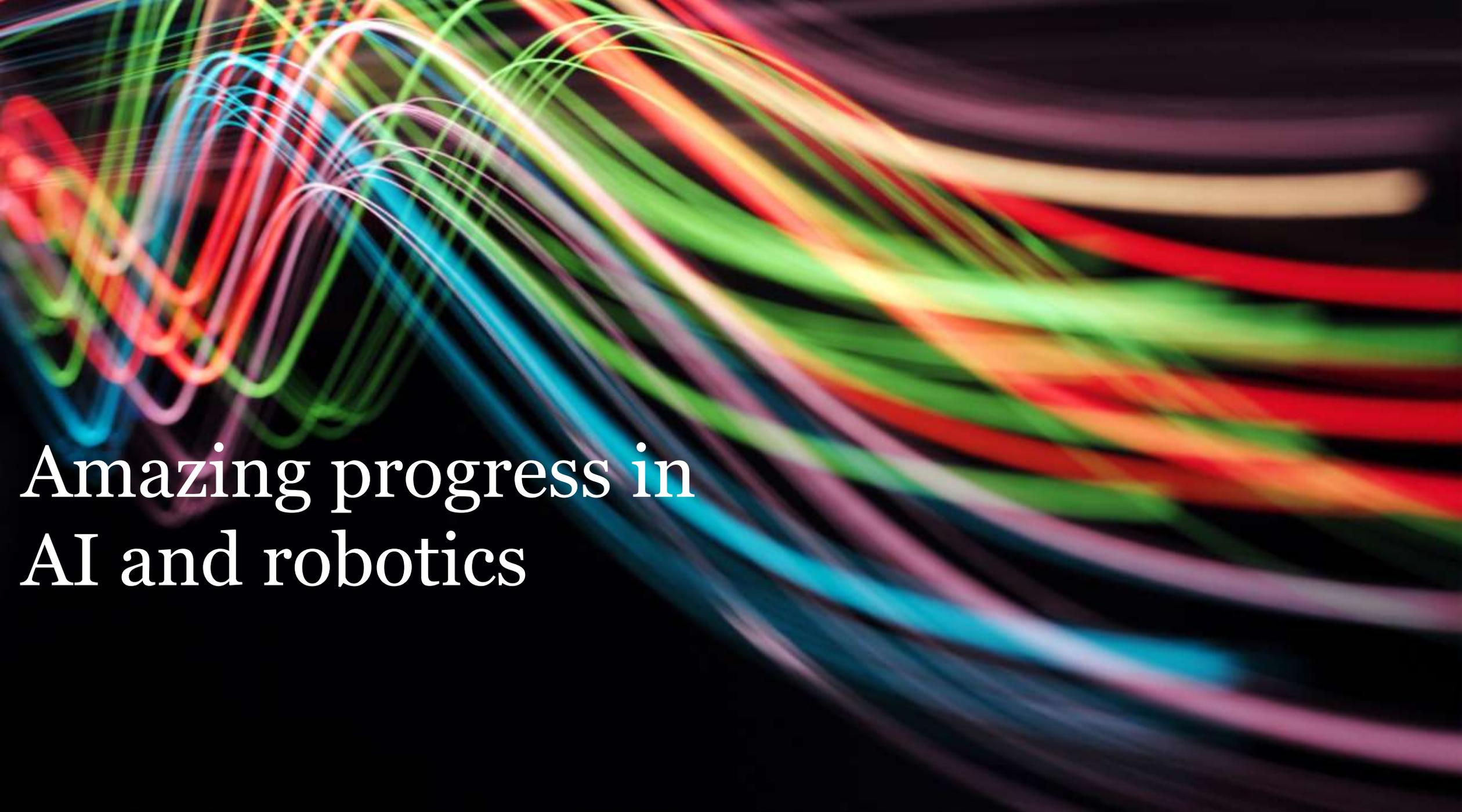
AI, automation, and the future of the workforce

DALLAS FEDERAL RESERVE BANK

May 22, 2019

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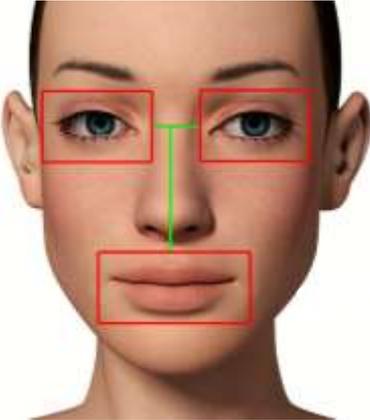
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Amazing progress in
AI and robotics

Five technology systems characterize the current AI landscape

Computer vision



Natural language



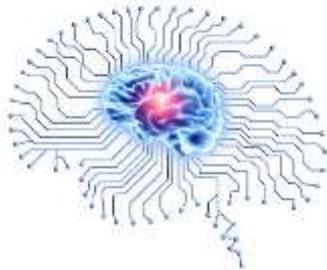
Cognitive agents



Robotics and autonomous vehicles



Machine learning & Deep learning



*“Artificial Intelligence (AI) is intelligence exhibited by machines, with **cognitive functions** that are associated to humans. Cognitive functions include all aspects of **perceiving, reasoning, learning, and problem-solving**”*

Example: Amelia (virtual assistant) deployed at a major retail company customer service center now handles nearly two-thirds of customer questions

Challenge

Improve speed and efficiency of Digital Service Center

Agents handle **65,321** calls / month

MTTR of **18.2** minutes

Average Speed of Answer (ASA) **55** secs



Approach

Amelia deployed



Impact

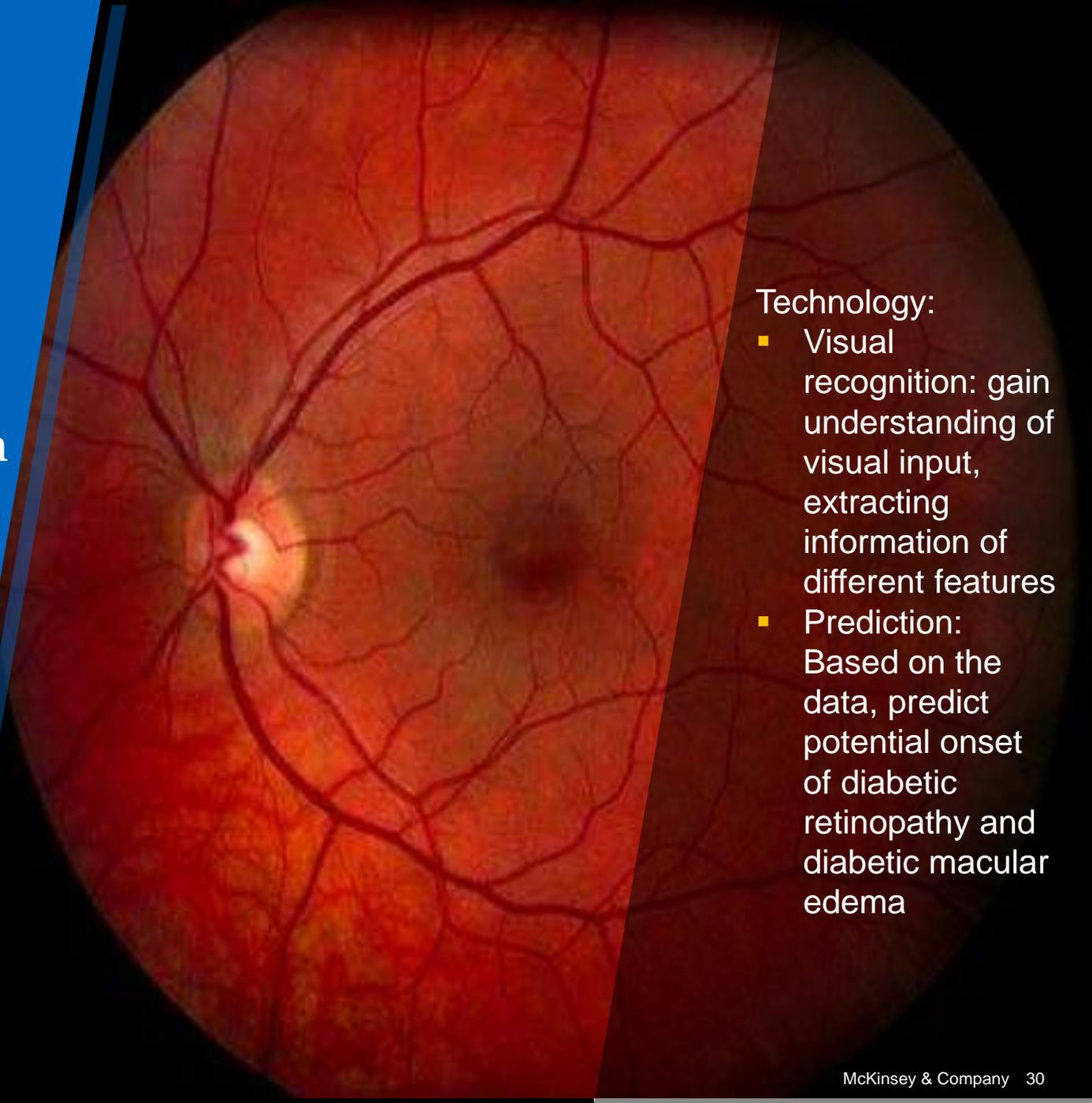
Amelia resolves: **>64% of enquiries**

Amelia handles **42,165** calls / month

MTTR of **4.5** minutes

Average Speed of Answer (ASA) **2** secs

Verily combines machine learning algorithms and image recognition to achieve **95.9% accuracy** in diabetic retinopathy diagnosis



Technology:

- Visual recognition: gain understanding of visual input, extracting information of different features
- Prediction: Based on the data, predict potential onset of diabetic retinopathy and diabetic macular edema

Autonomous robotics are transforming supply chain logistics and in-store operations

Robotic arms can load / unload pallets



Robots bring warehouse shelves to pickers



Robotized in-store inventory scans use image recognition



A futuristic bar scene featuring a robot bartender with a glowing red spherical head and an orange body, positioned behind a bar counter. In the foreground, a human waiter in a dark vest and white shirt stands ready. The bar counter is equipped with several glasses of water with lime slices. In the background, a large digital display shows a menu or data, and other people are visible, suggesting a busy, modern environment.

Automation and AI
are transforming work

Our approach focuses on the tasks and activities within occupations and the capabilities of currently demonstrated technologies

Occupations

-  Retail salespeople
-  Food and beverage service workers
-  Teachers
-  Health practitioners
- ...
- ...
- ...

~800 occupations

Activities

-  Greet customers
-  Answer questions about products and services
-  Clean and maintain work areas
-  Demonstrate product features
-  Process sales and transactions
- ...
- ...
- ...

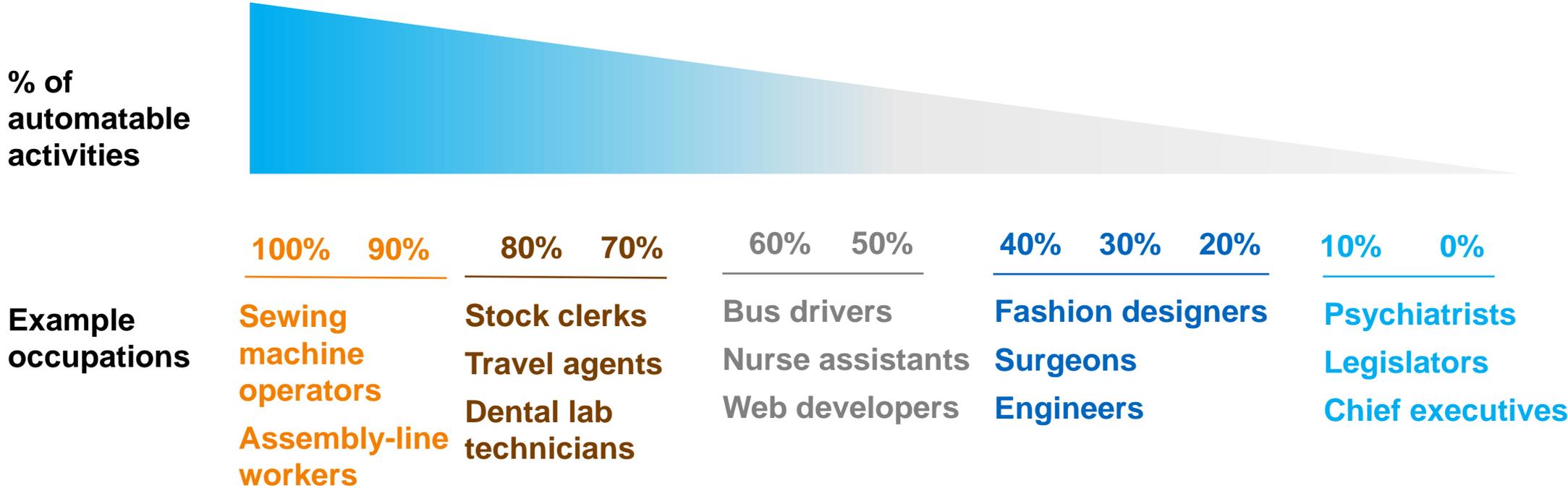
~2,000 activities assessed across all occupations

Machine Capabilities

- 1 Data processing
- 2 Data collection
- 3 Linguistic
- 4 Sensory perception (visual and tactile)
- 5 Physical
- 6 Cognitive

Based on currently demonstrated technology capabilities

Automation will transform most jobs, but fewer than 10% can be fully automated



~60% of occupations have

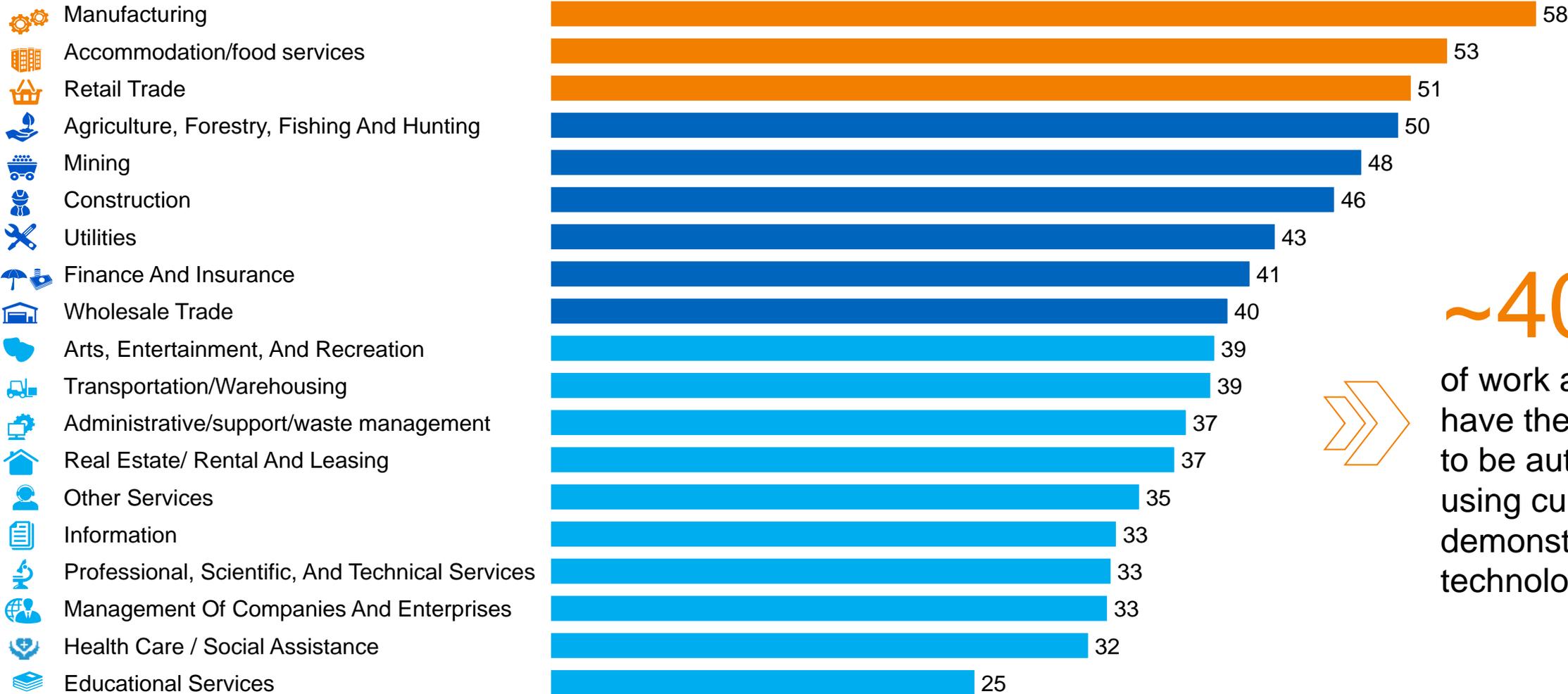
~30% of tasks automatable

The automation potential of work activities varies by sector

Impact of automation by industry in the United States

FTE weighted percent of technically automatable activities by industry using currently demonstrated technologies

Percent



~40%



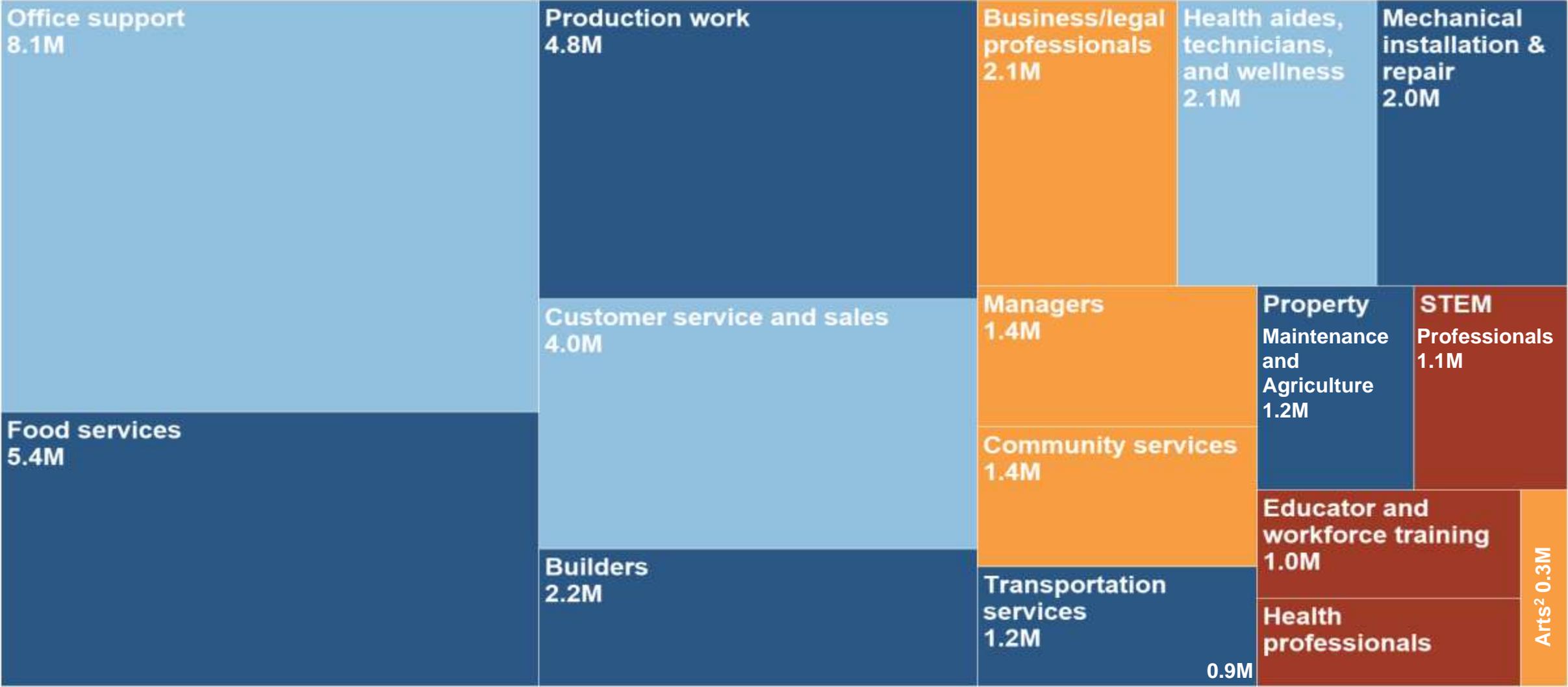
of work activities have the potential to be automated using currently demonstrated technologies

1 We define automation potential by the work activities that can be automated by adapting currently demonstrated technology

The next wave of automation displacements will impact office support, food service, production jobs, and customer service

FTEs displaced by automation in midpoint scenario, 2017-2030¹

Workers with less than a college degree, %
■ 30-60 ■ 0-30 ■ 60-90 ■ >90



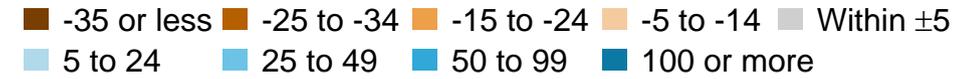
¹ Based on midpoint automation estimate

² Creatives and arts management

How will mix of occupations likely change?

Net impact of jobs lost jobs gained, 2016–30, midpoint automation

% change in FTEs



Some categories will grow...



...Others may decline

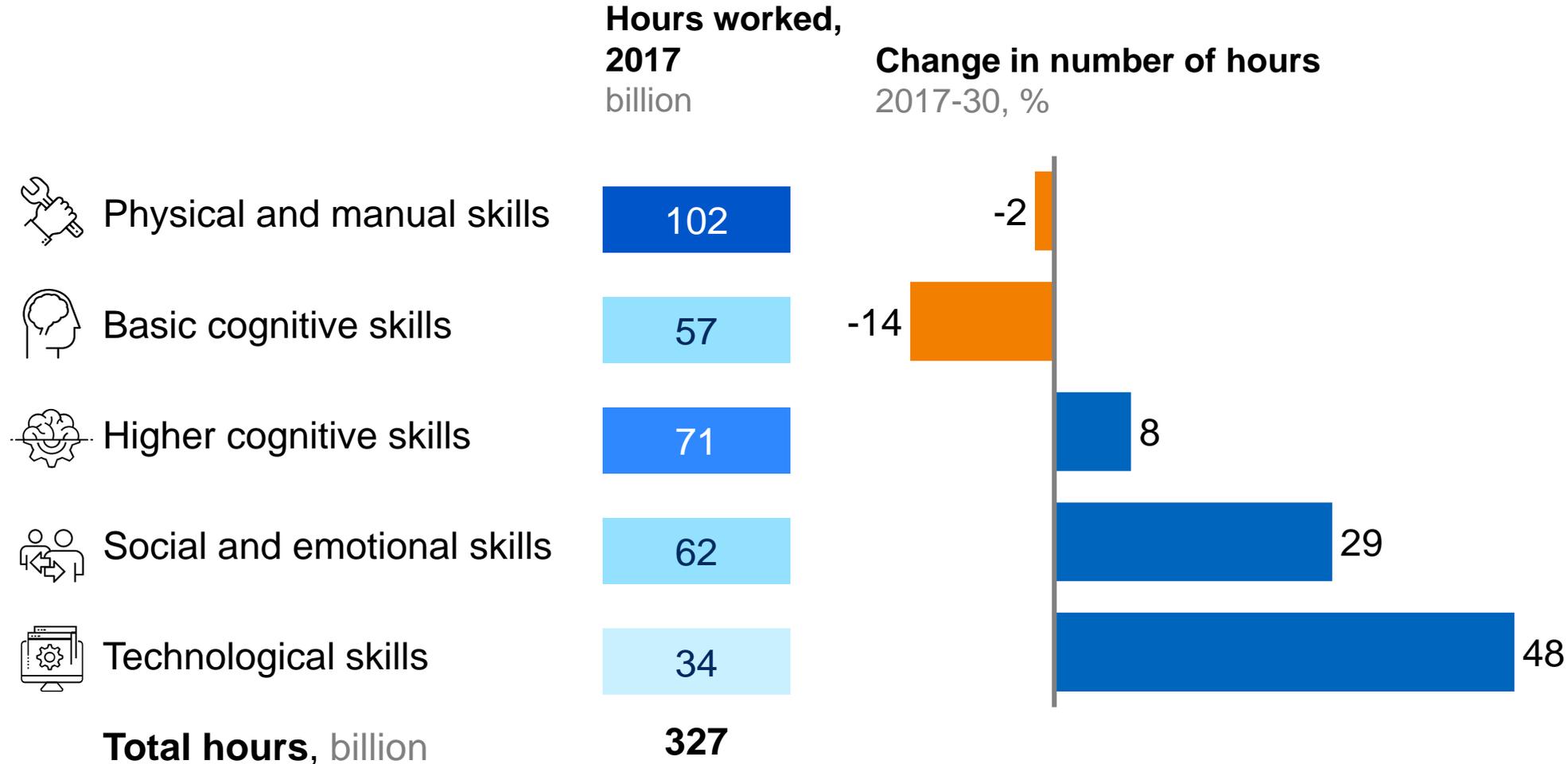


Up to **26 million** (16% of workforce) Americans may need to switch occupational groups by 2030

The skills needed in the workforce will shift, towards more technological and socioemotional skills

United States, all sectors

Importance
Lower  Higher



Thank you

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