

A FUTURE THAT WORKS: AUTOMATION, EMPLOYMENT, AND PRODUCTIVITY

AI Frontiers presentation | January 2017



What is the technical potential of automation in the workplace?

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



NOTE: Analysis based on currently available of demonstrated technology capabilities as of 2016.

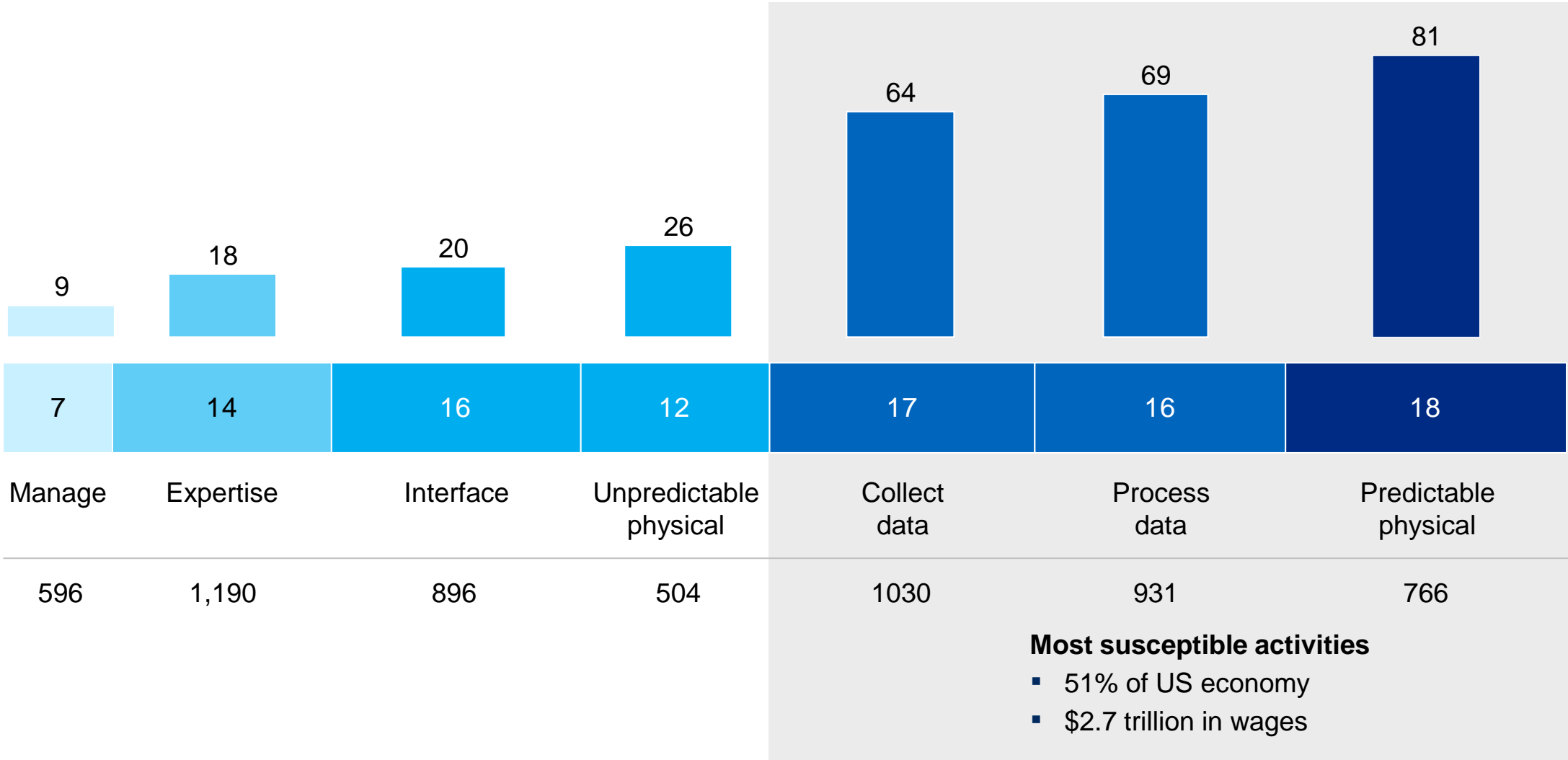
SOURCE: Expert interviews; McKinsey analysis

Some activities have higher technical automation potential

BASED ON DEMONSTRATED TECHNOLOGY

Time spent on activities that can be automated by adapting currently demonstrated technology

%

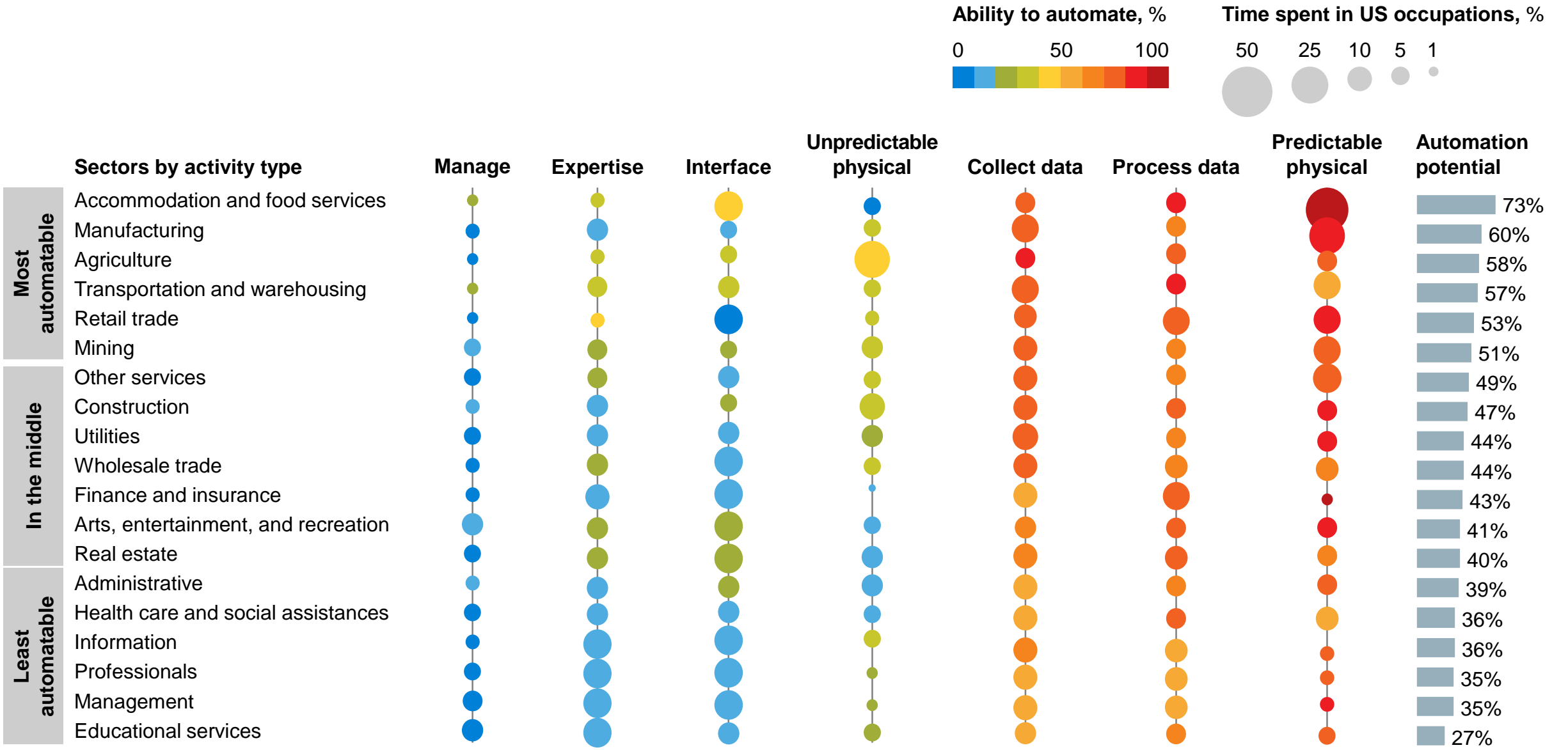


Time spent in all US occupations %

Total wages in US, 2014 \$ billion

Some sectors have more automatable activities than others

BASED ON DEMONSTRATED TECHNOLOGY

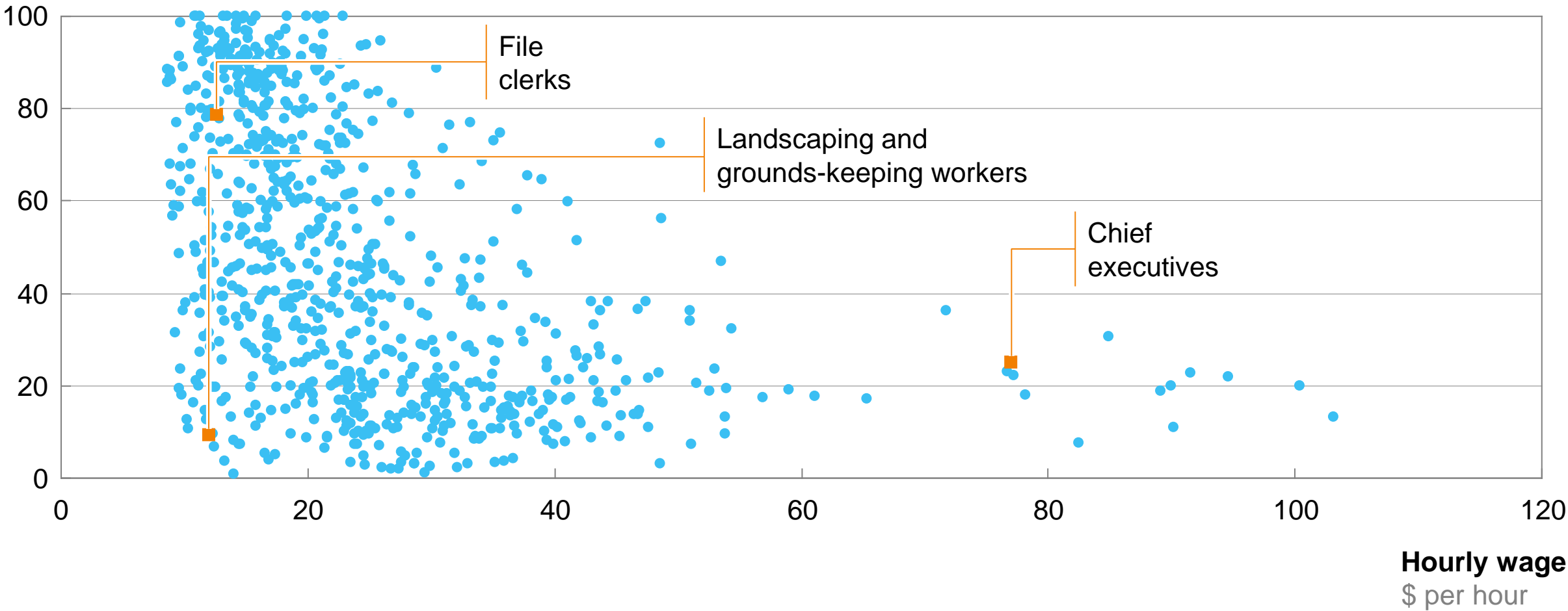


Automation potential spans from high to low wage occupations

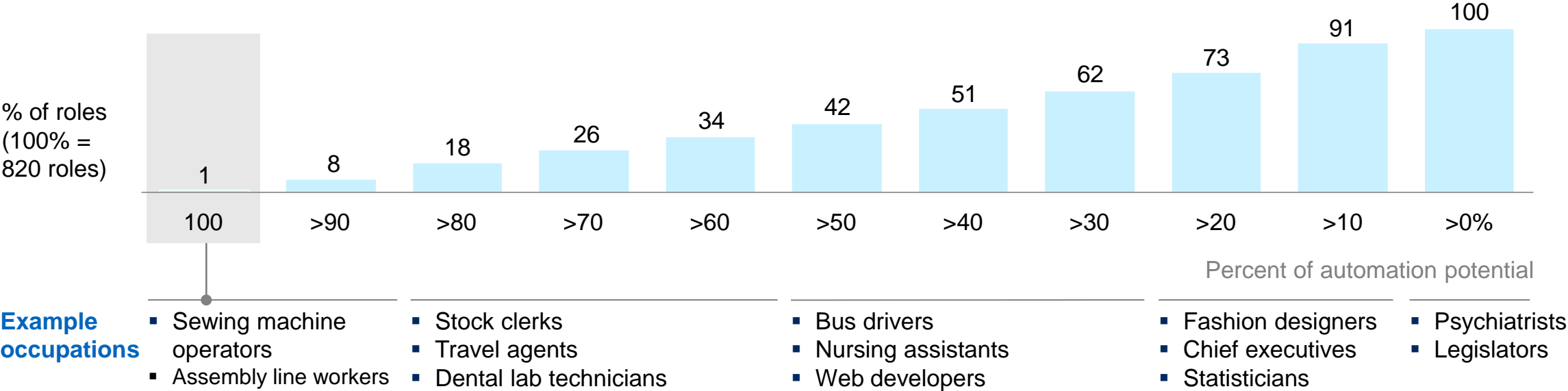
BASED ON DEMONSTRATED TECHNOLOGY

Ability to technically automate

Percentage of time on activities that can be automated by adapting currently demonstrated technology



A small percentage of occupations can be fully automated by adapting current technologies, but almost all occupations have some activities that could be automated



While about
5%
of occupations could have
100%
of tasks automated,

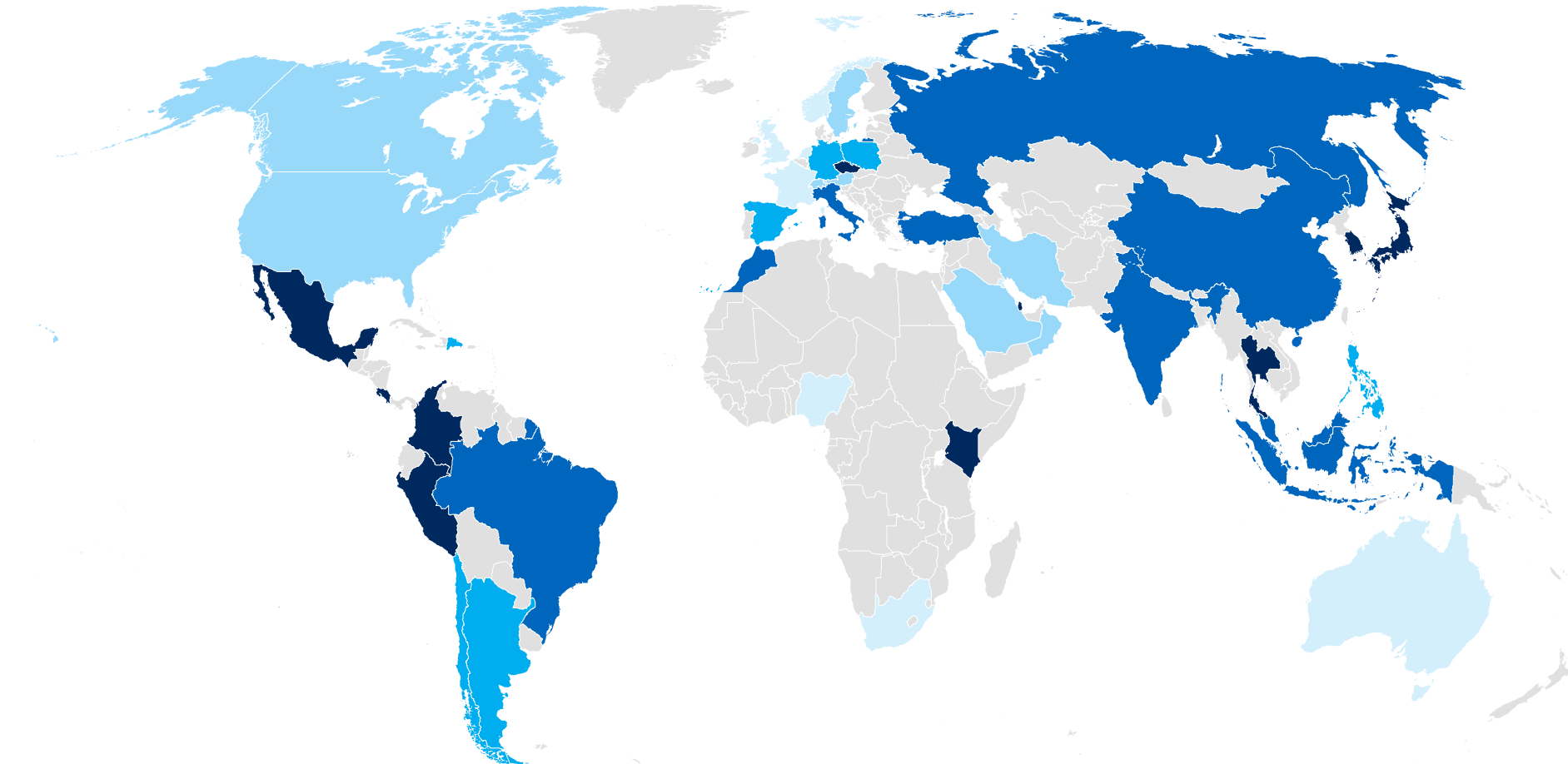
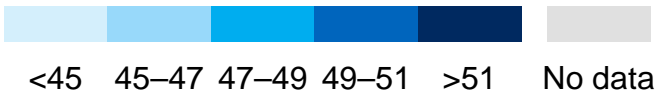
More will have portions of their tasks automated e.g.
60%
of occupations could have
30%
of tasks automated

All countries could be fundamentally impacted by automation

Automatability across economies

Employee weighted overall % of activities that can be automated

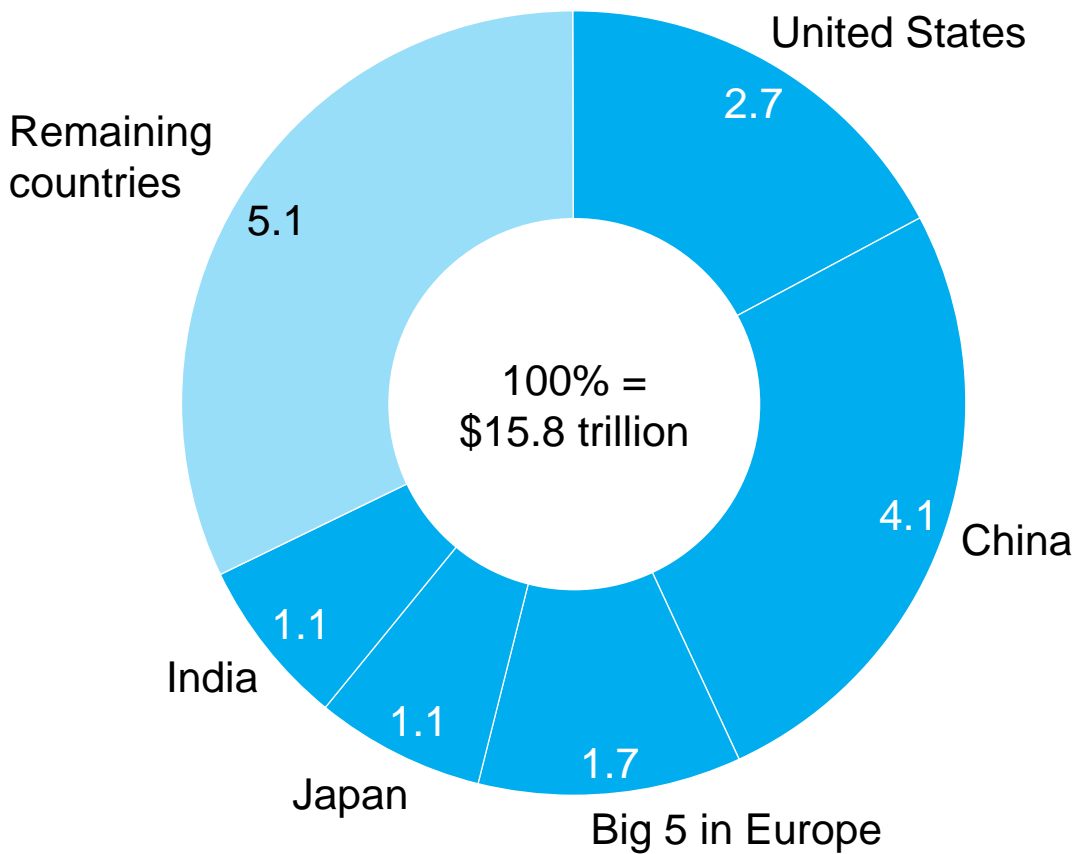
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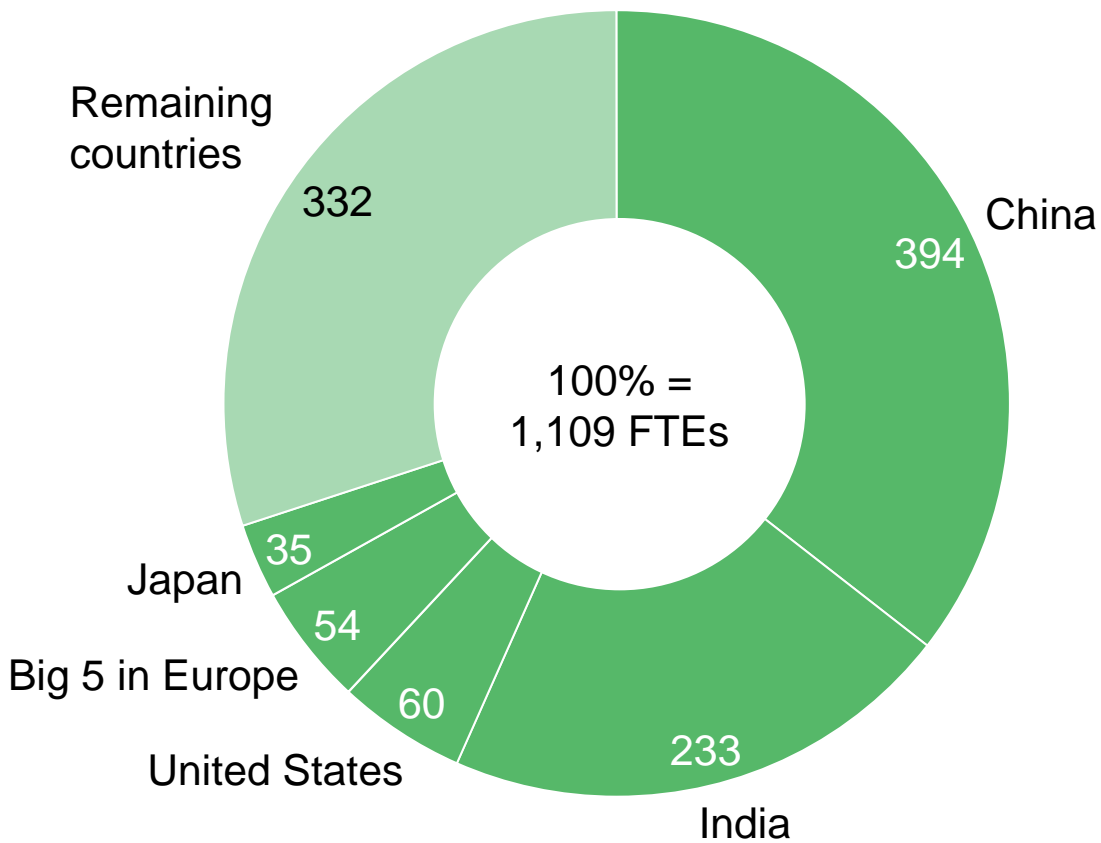
Technical automation potential concentrated in countries with large populations and/or high wages

Potential impact due to automation, adapting currently demonstrated technology (46 countries)

Wages associated with technically automatable activities
\$ trillion

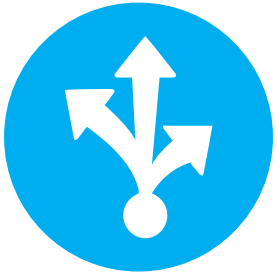


Labor associated with technically automatable activities
Million FTE



What factors affect the pace and extent of automation?

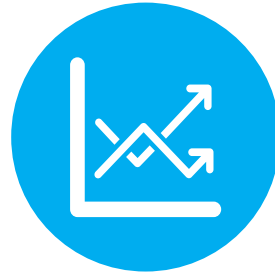
Five factors impact the pace and extent of automation



**Technical
progression**



**Cost of
developing
and
deploying**



**Cost of labor
and related
supply-demand
dynamics**



**Benefits
including and
beyond
labor
substitution**

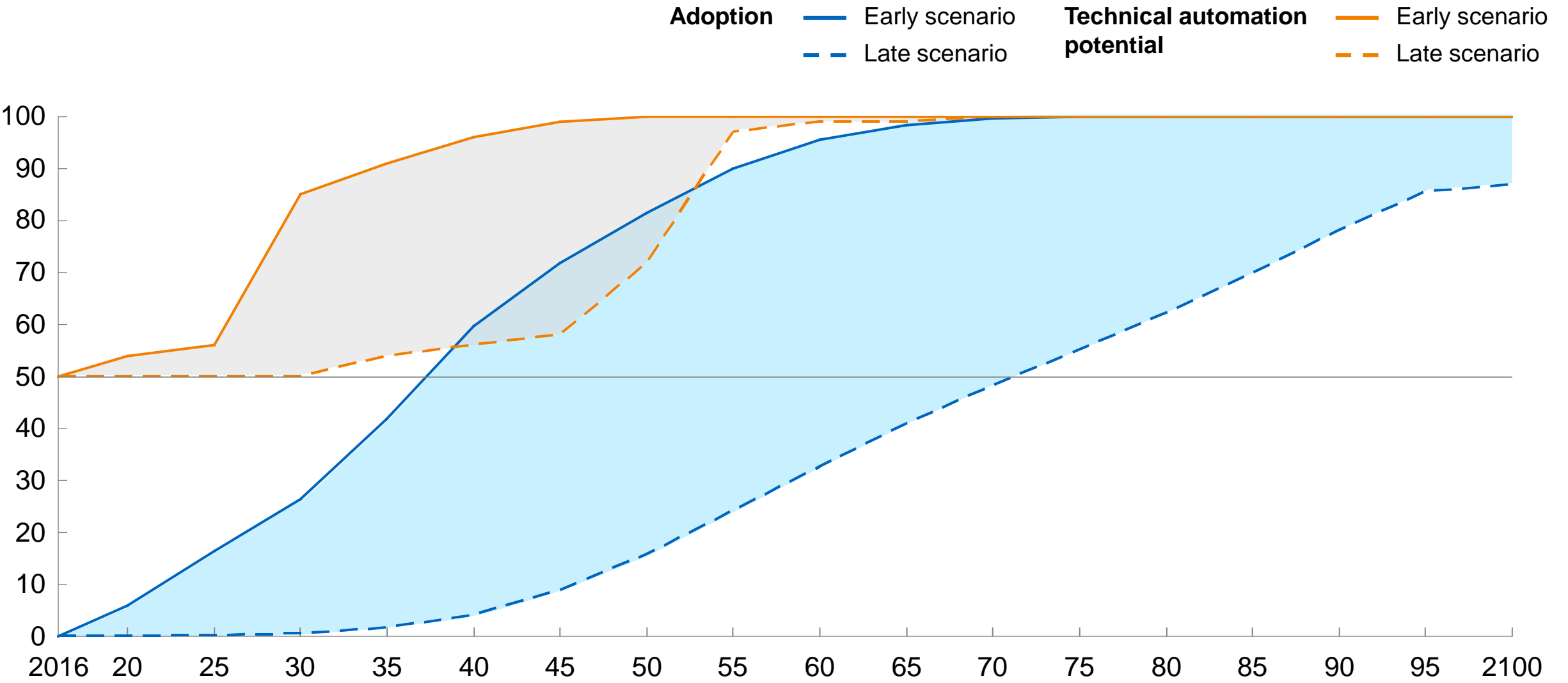


**Regulatory
and
social
acceptance**

Pace and extent of automation could play out over decades

Pace of the automation, Global

% of time spent on activities that will potentially be automated

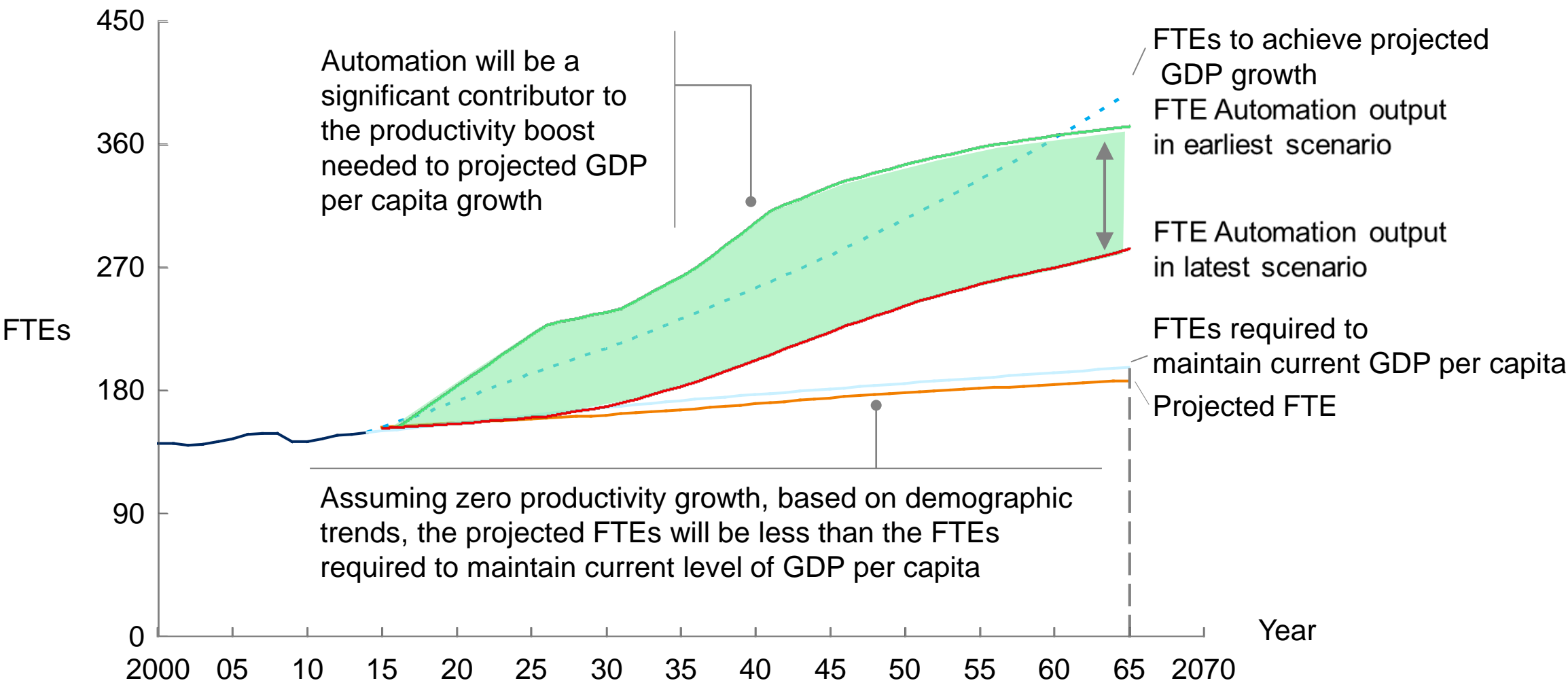


How will automation impact
productivity and economic growth?

Automation can contribute to growth in GDP per capita

FTE automation output (United States example, 2000-2065)

Millions



Benefits and challenges of automation

Benefits

For companies and users

- Better performance, outcomes, quality, speed
- Overcome human limits, Solve new problems, create new opportunities and innovations
- Improve safety, utility, quality of life

For economies

- Boost productivity growth GDP growth, and per capita GDP
- Counter aging or shrinking workforce
- Solve “moonshot” problems (e.g., climate)

Challenges

Social and economic

- Jobs and wages
- Skills and training
- Dislocation and transitions
- Acceptance and safety

Other Policy issues

- Transparency, openness and competition
- Cybersecurity
- Biases
- New capital-labor mix implications

Imperatives for all



Companies

- Embrace automation to capture the benefits
- Create jobs and reshape jobs to enable people to work with machines
- Play role in redeploying labor through retraining and skill-raising programs



Policymakers

- Support development of automation technologies
- Promote measures to raise skills and promote job creation
- Rethink incomes and social safety nets



Individuals

- Focus on acquiring skills throughout lifetime
- Make education and career choices, based on skills that will still be in demand in an automation world
- Become an AI scientist!

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