McKinsey&Company

Tech for Good: smoothing disruption, improving well-being

SPE MASTERCLASS

MAY 2019

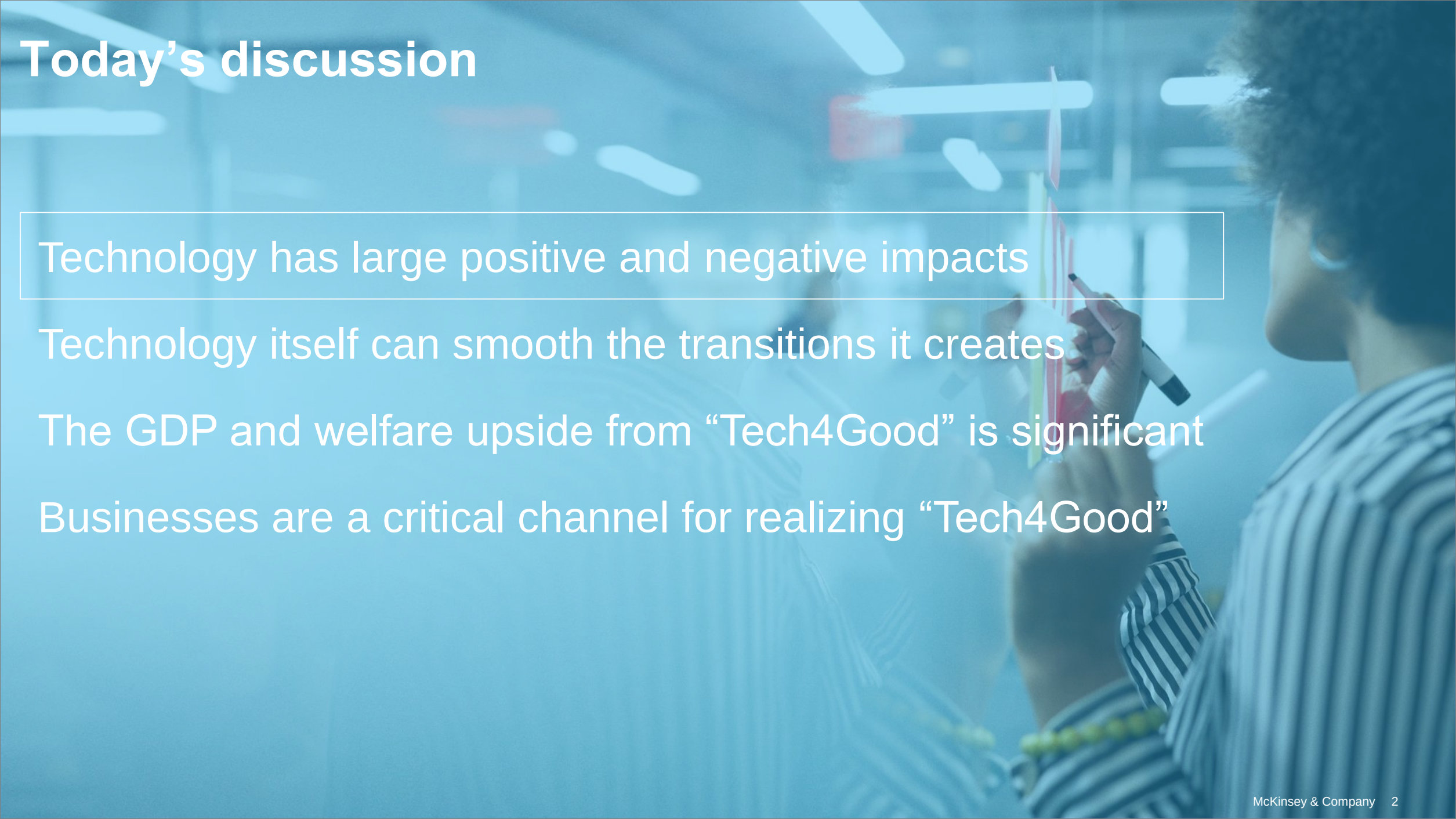
Today’s discussion

Technology has large positive and negative impacts

Technology itself can smooth the transitions it creates

The GDP and welfare upside from “Tech4Good” is significant

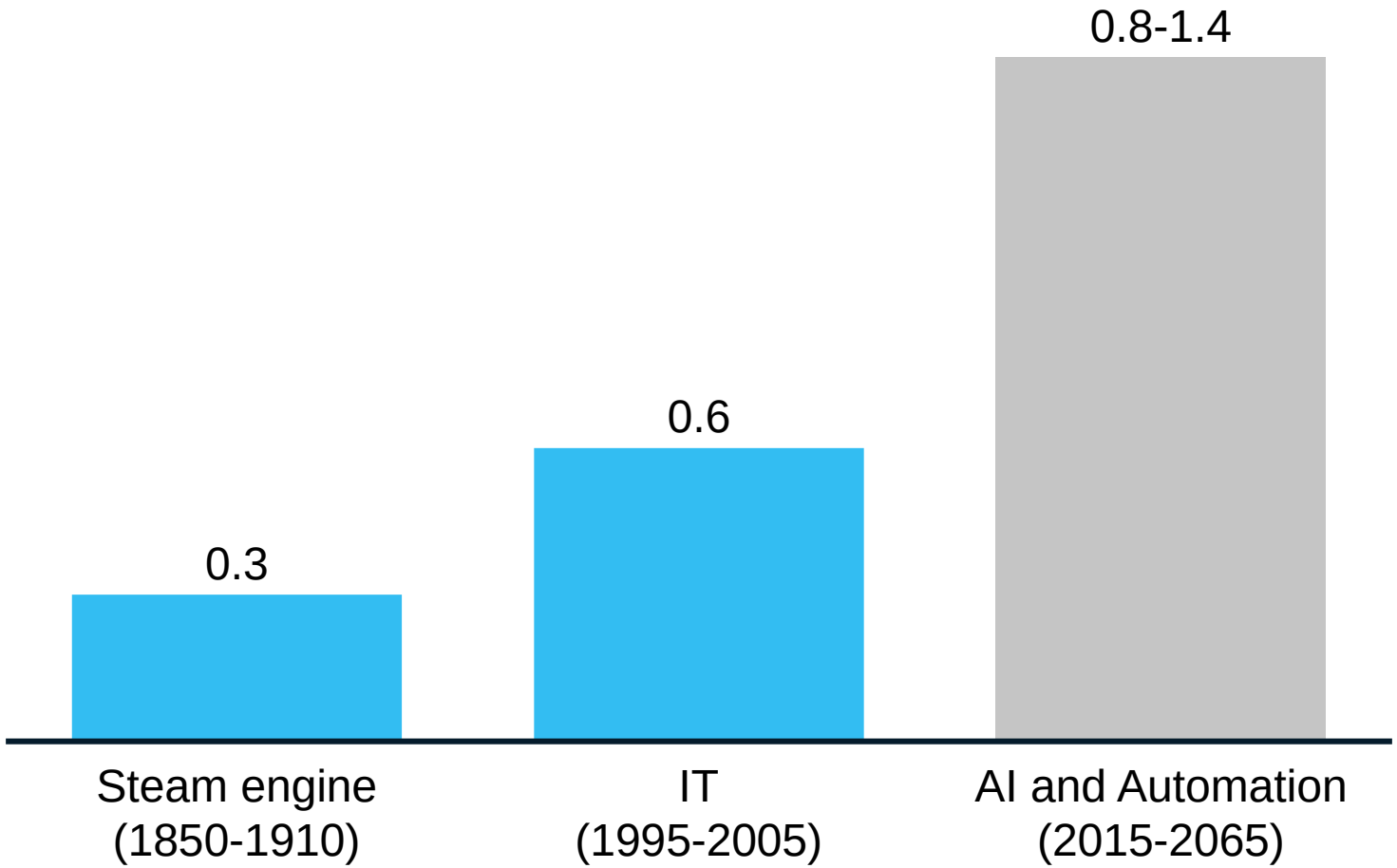
Businesses are a critical channel for realizing “Tech4Good”



Technology: a promising future …

Labour productivity growth due to technology

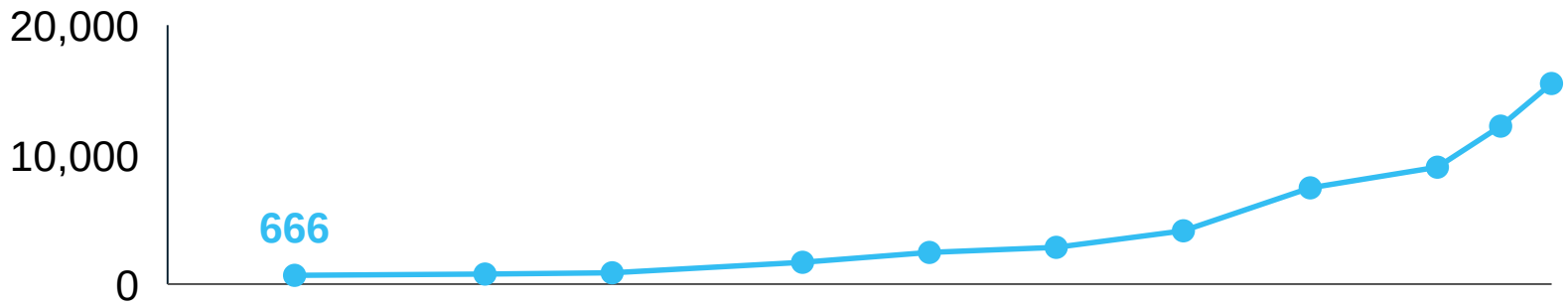
CAGR, %



SOURCE: O*NET; Eurostat; McKinsey Global Institute analysis

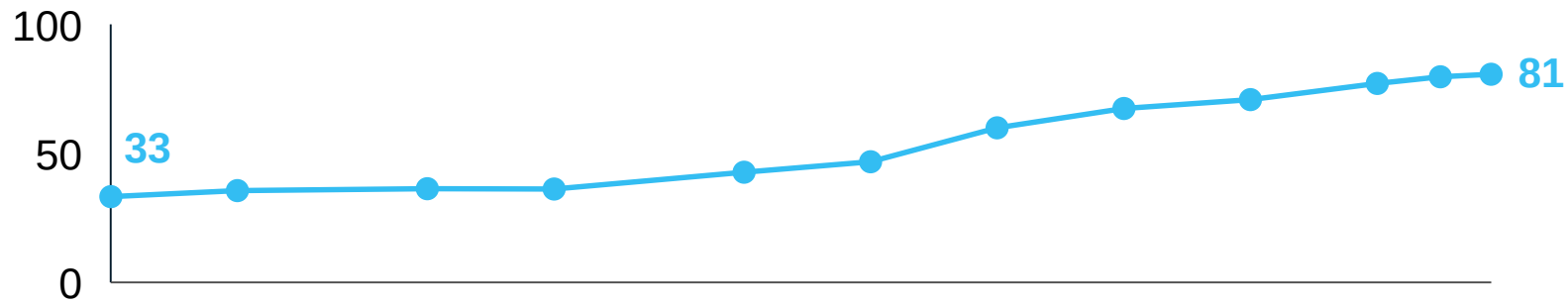
Technology has had significant positive impacts on, and beyond, GDP

GDP per capita
Global, $, 2011 prices



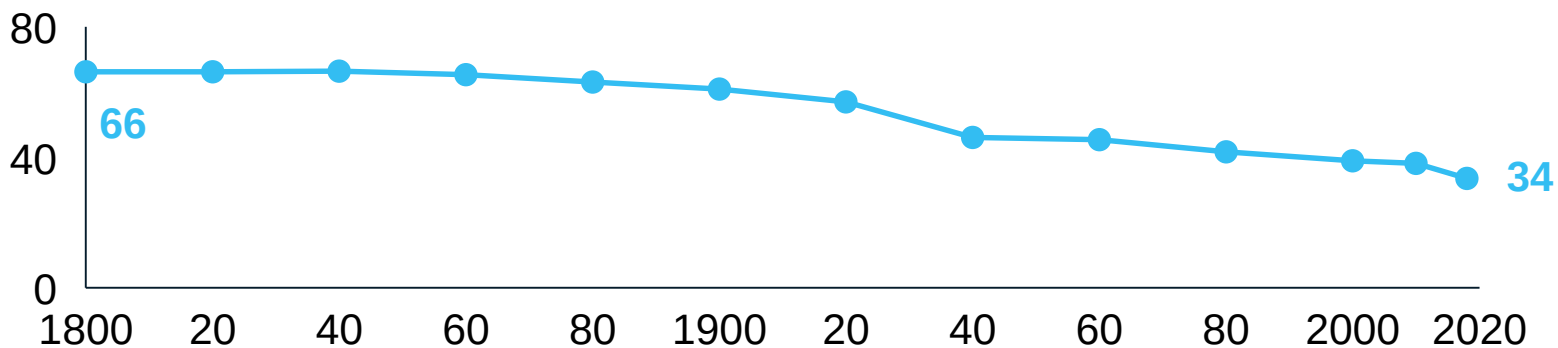
23x

Life expectancy
Europe, years



+245%

Number of hours worked per week
OECD countries



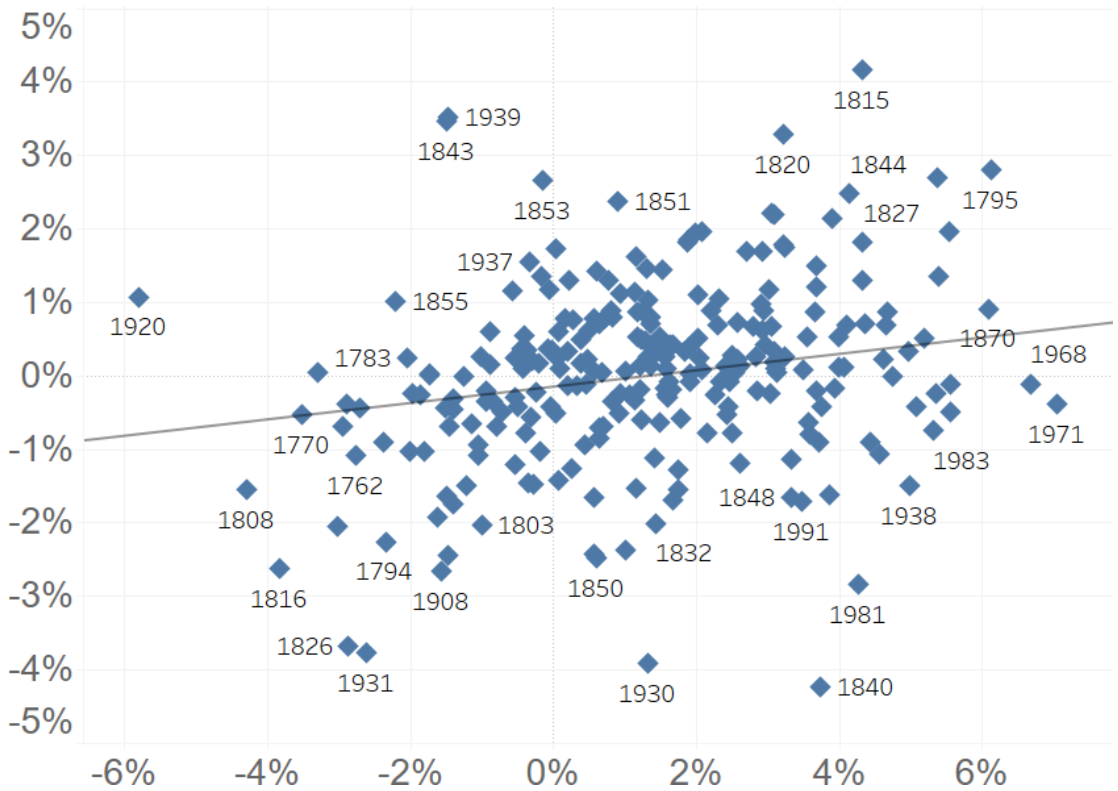
-49%

Aggregate figures hide significant local and sectoral transitions

Productivity and employment in the UK, 1760-2016[1]

Employment rate change

Year on year change, % of total workforce



Productivity growth

Year on year change, %

Productivity and employment in 180 sector/region combinations in the UK, 1997-2016[2]

Employment change

Year on year change in total employment, %

Productivity growth

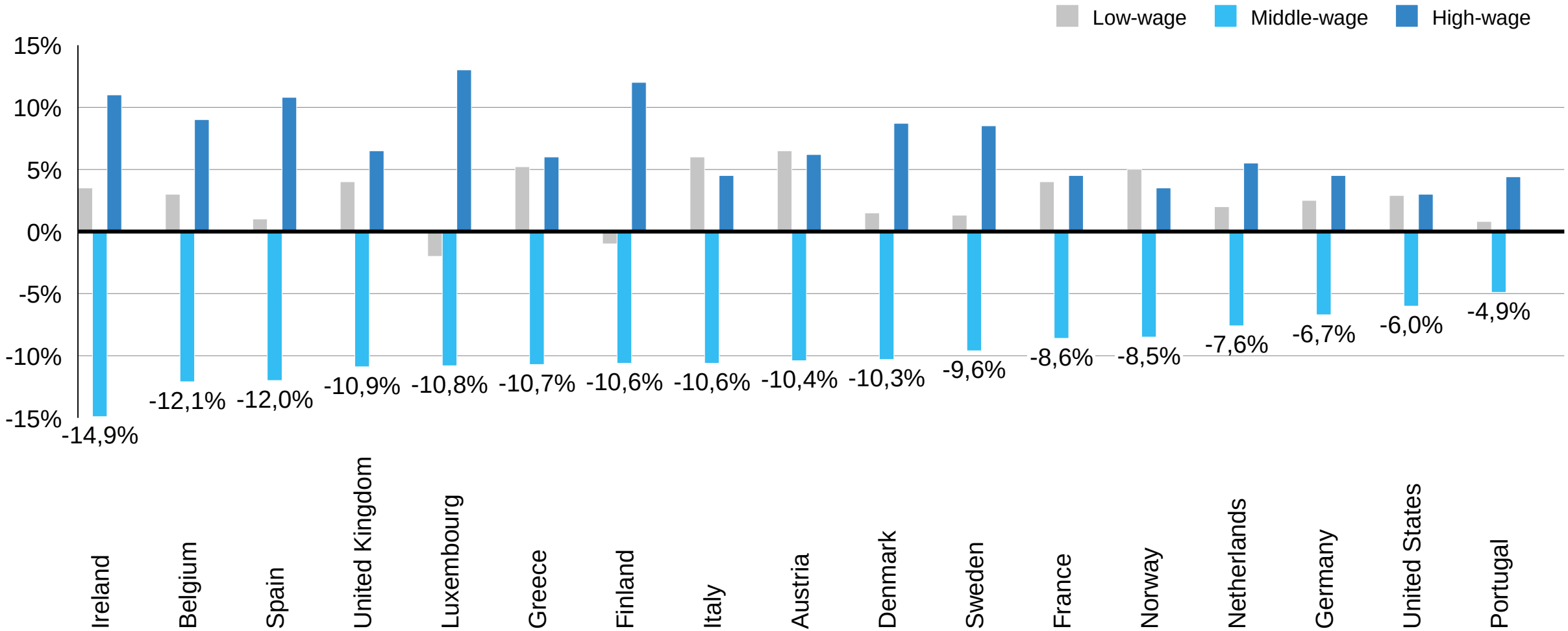
Year on year change in gross value added per job, %

1 Excludes the outlier year of 1921 (productivity growth of 6%, change in employment rate of -9%) to make graph more readable
2 Excludes real estate sector
SOURCE: Bank of England; ONS; McKinsey Global Institute analysis

Since the early 1990s, the share of middle-wage occupations has declined

Change in employment shares of low-, middle-, and high-wage occupations 1993-2010,

%

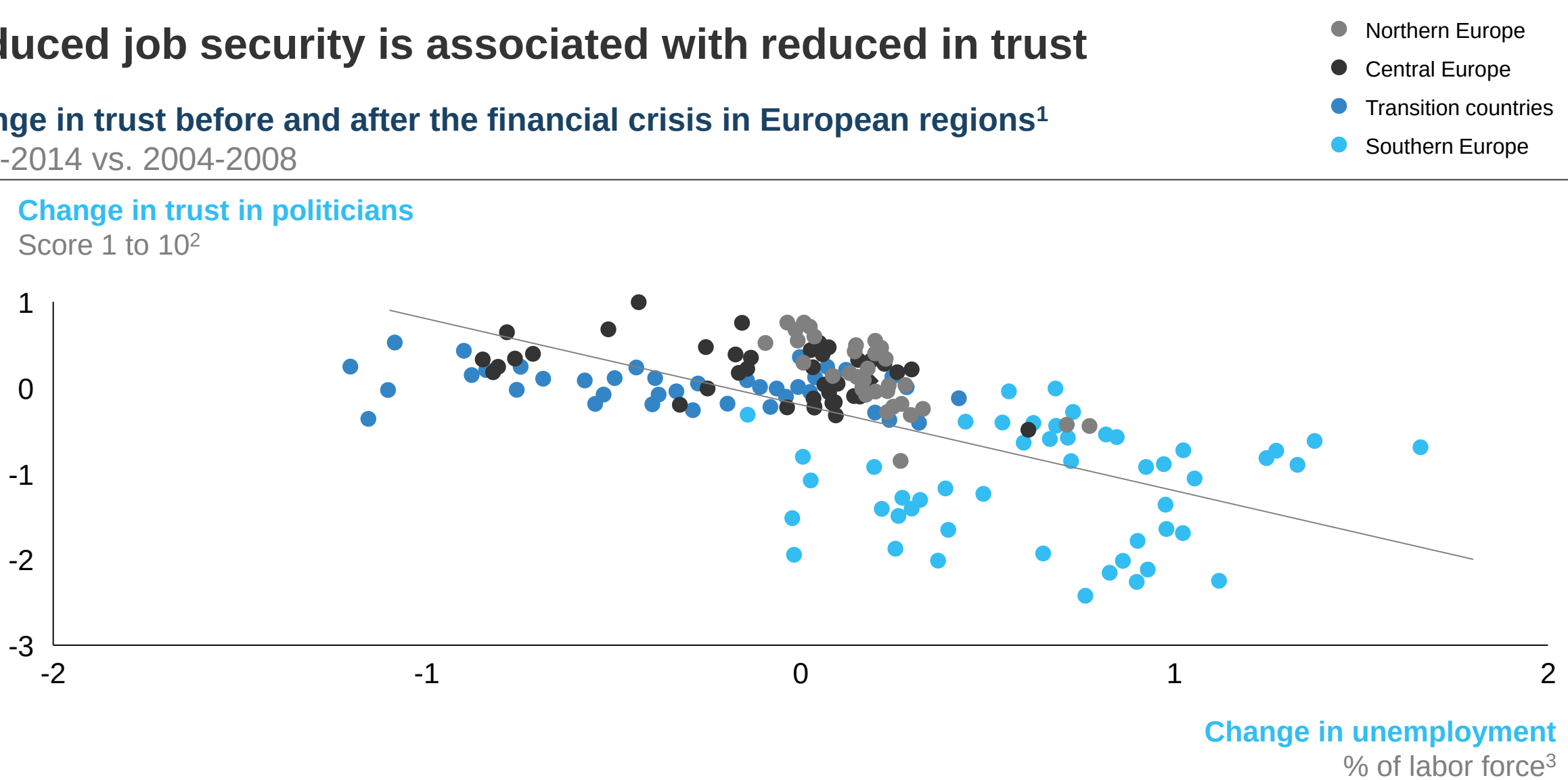


SOURCE: Maarten Goos, Alan Manning, and Anna Salomons. Job Polarization in Europe. The American Economic Review Papers and Proceedings, May 2009; McKinsey Global Institute analysis

Reduced job security is associated with reduced in trust

Change in trust before and after the financial crisis in European regions[1]

2010-2014 vs. 2004-2008



1 Data cover 215 NUTS2 regions in Denmark, Finland, Iceland, Ireland, Sweden, the United Kingdom (Northern Europe); Cyprus, Greece, Italy, Portugal, Spain (Southern Europe); Austria, Belgium, France, Germany, Netherlands, Switzerland (Central Europe); Bulgaria, Czech Republic, Estonia, Hungary, Poland, Romania, Slovakia and Slovenia (Transition countries).

2 Trust is defined by an independent variable measured by the European Social Survey, which scores trust on a 0-10 scale based on the following question: "… please tell me on a score of 0-10 how much you personally trust each of the institutions I read out. 0 means you do not trust an institution at all, and 10 means you have complete trust. Firstly... [institution tested for]"

3 Unemployment rate is measured by Eurostat, and measures the number of people unemployed as a percentage of the labor force

SOURCE: Algan, Yann and Guriev, Sergei and Papaioannou, Elias and Passari, Evgenia, "The European Trust Crisis and the Rise of Populism," CEPR Discussion Papers, 2017; European Social Survey; Eurostat; McKinsey Global Institute analysis

Technology is everywhere and continues to expand its presence

2.5B

Smart-phones in the world

2.3B

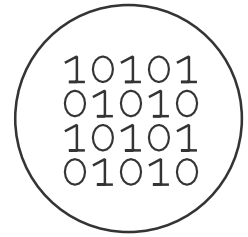
Active social media users globally

51%

of payments made digitally

47%

Penetration of mobile internet, will become 61% by 2025



>90%

of internet data was generated over the last 2 years, and is expected to grow

>5x

by 2025

>2M

Industrial robots, will grow to >4M by 2025

9.1B

Connected IoT devices, expected to reach >25B by 2025

SOURCE: Why digital strategies fail. McKinsey and Company, March 2018; GSMA (2019); IDC; McKinsey Global Institute analysis

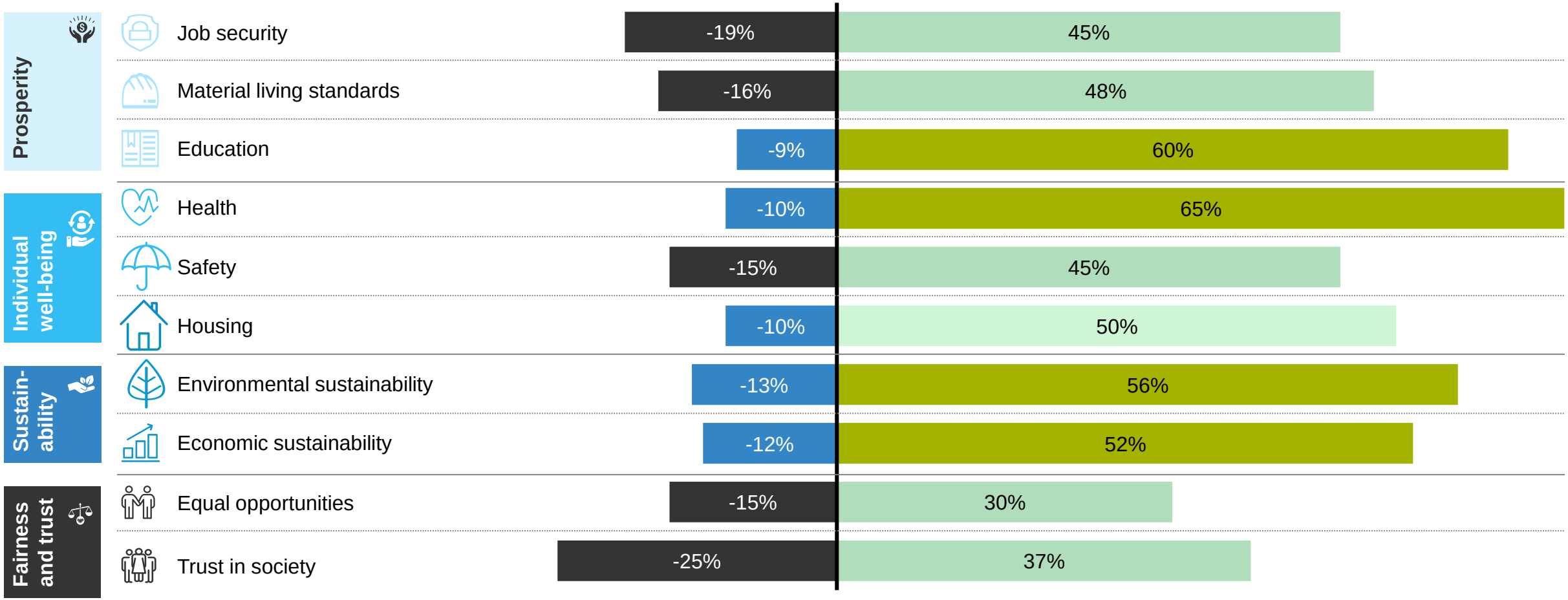
People's expectations are broadly positive, but with concerns around jobs, wages, safety, equality and trust

EU-28

Negative impact: <-15%, -15%-0
Positive impact: 0-50%, >50%

Well-being factors

15 years from now, what impact do you think science and technological innovation will have on the following areas …?

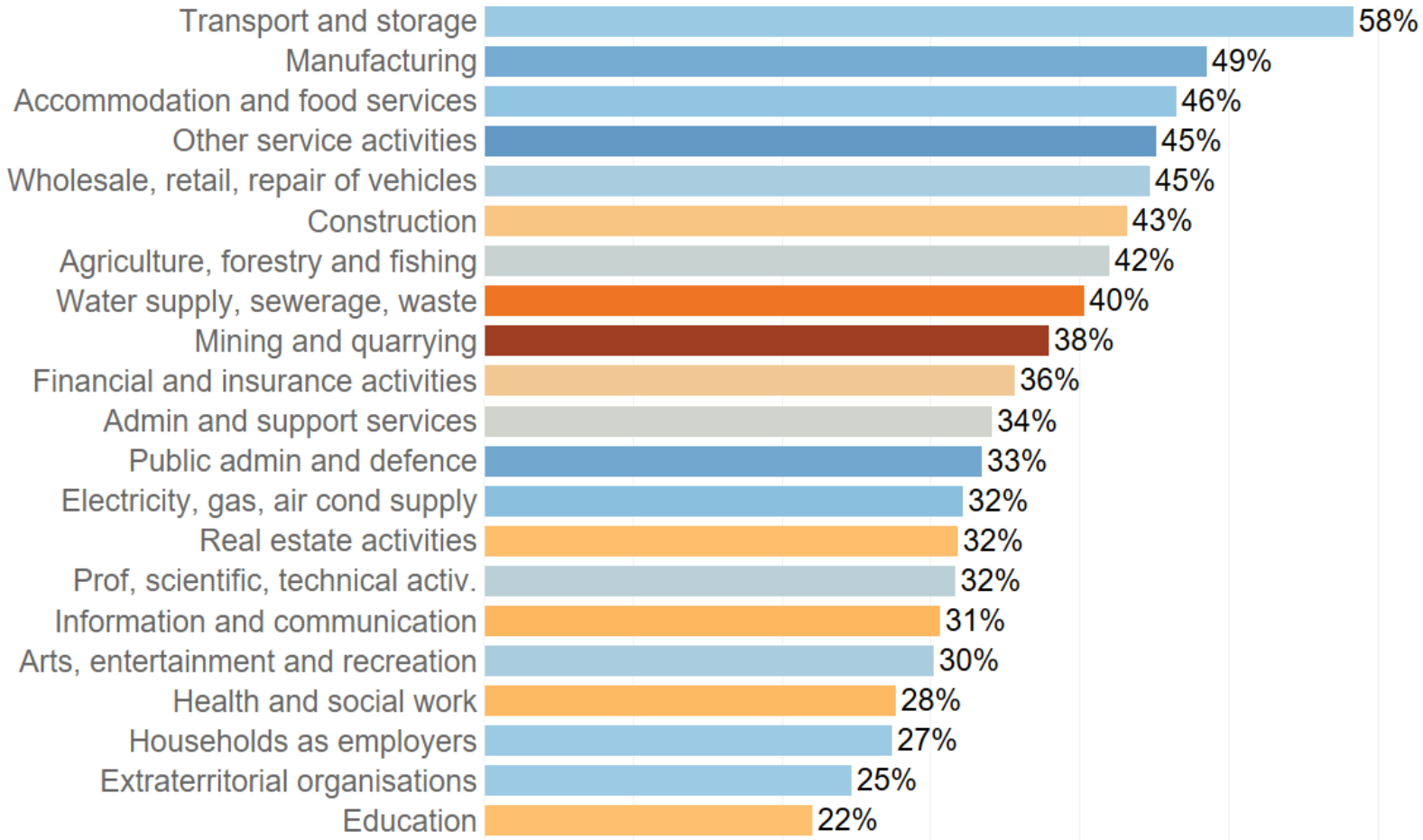


SOURCE: Special Eurobarometer 419, Public perception of science research and innovation (EU28), 2014; McKinsey Global Institute analysis

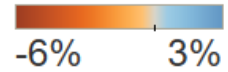
In the UK, around 40% of all hours worked today could be automated using existing technology

Automation potential by sector in the UK, 2017

Percent[1]



Annual productivity growth 2007-17

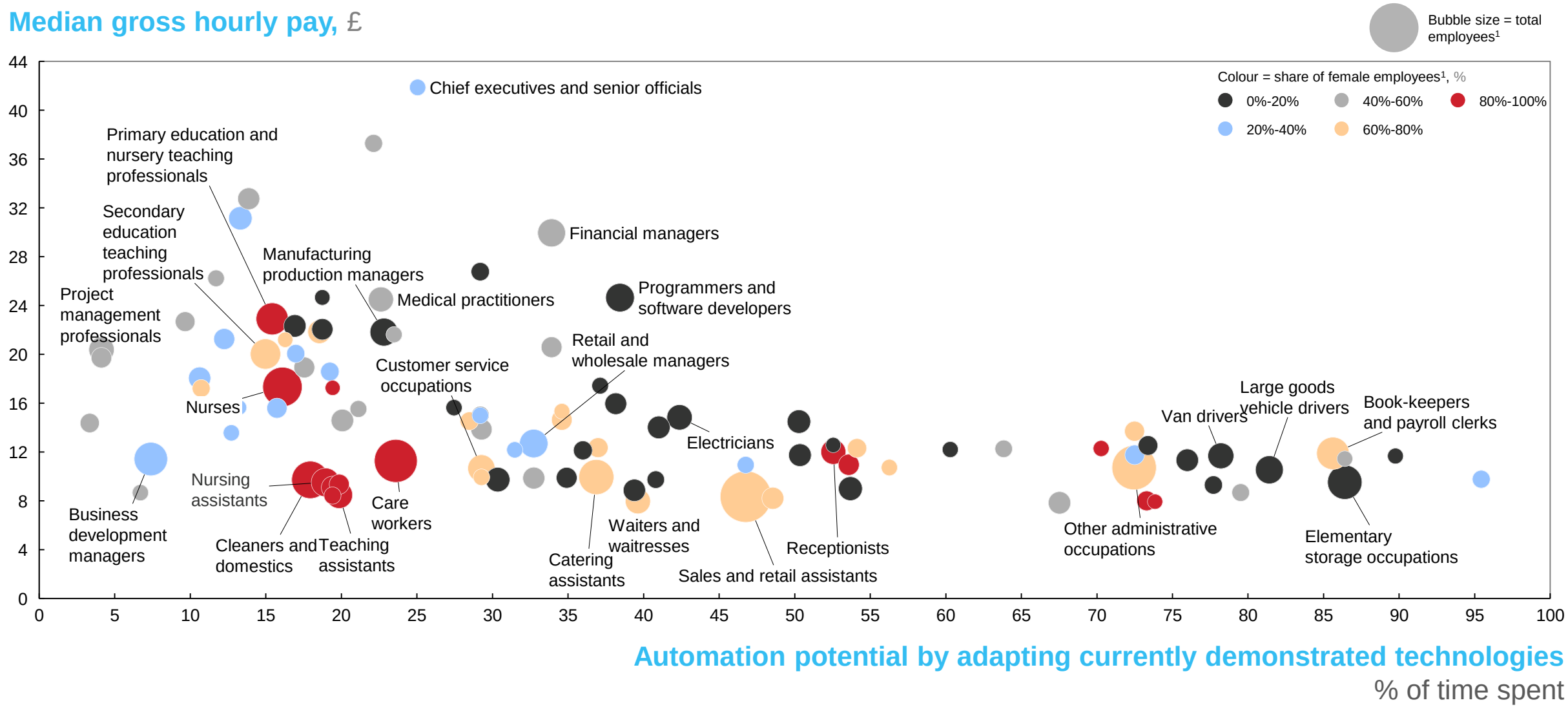


1 Percent of hours worked that could be automatable using today's technology; based on analysis of 2000 tasks across 800 occupations and distribution of occupations across sectors

SOURCE: O*NET; ONS; McKinsey Global Institute analysis

Some low and middle wage occupations are highly automatable

UK occupations by automation potential, wage, size and gender balance, 2018



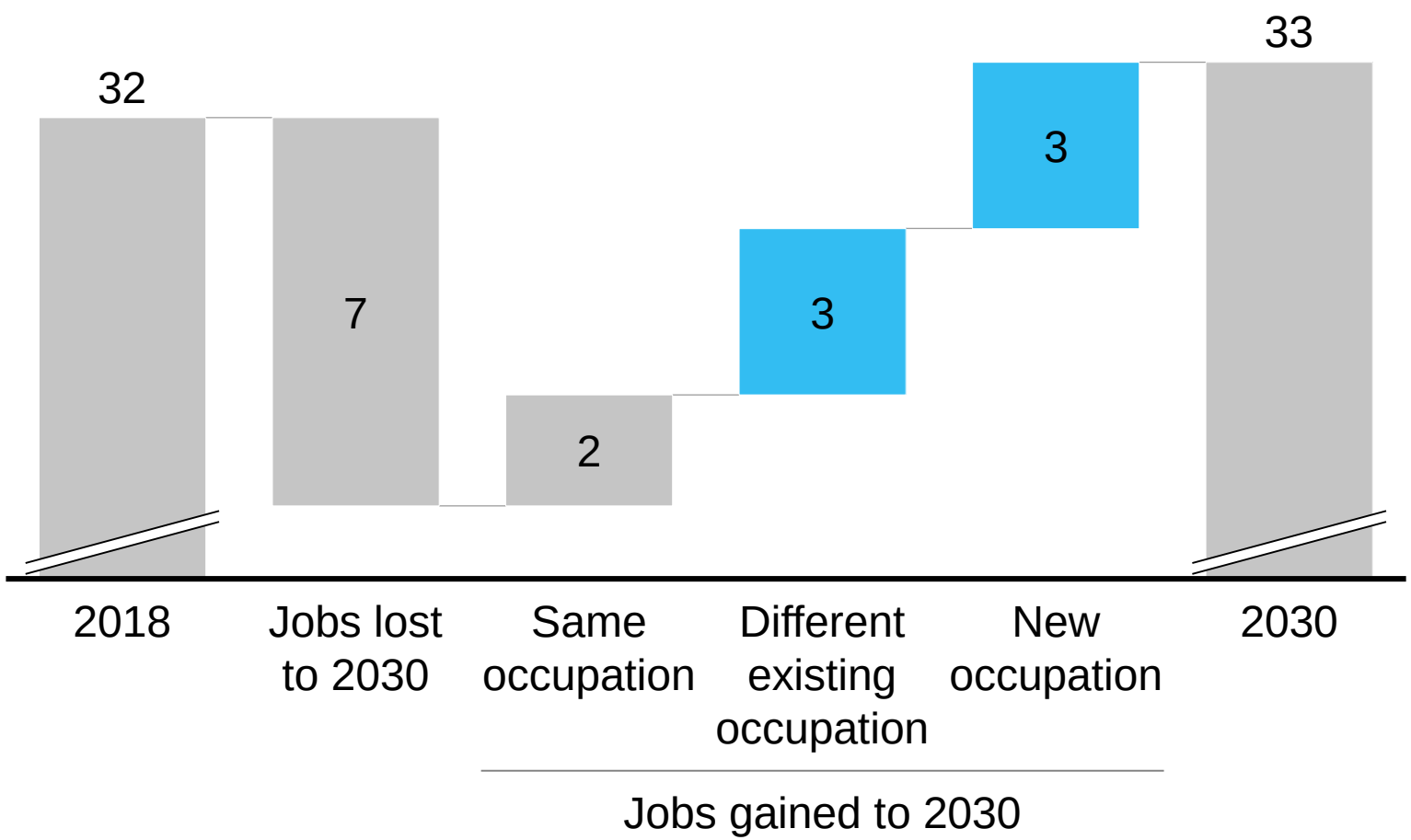
1 Q2 2018; not seasonally adjusted; includes part-time and self-employed people; top 100 occupations by employment, representing 70% of employees, shown

SOURCE: McKinsey Global Institute automation model; ONS; McKinsey analysis

In the UK, 6 to 9 million people will likely need to change occupation by 2030 to meet labour market demands

Evolution of employment in the UK, 2018-2030

Millions of jobs; midpoint automation scenario



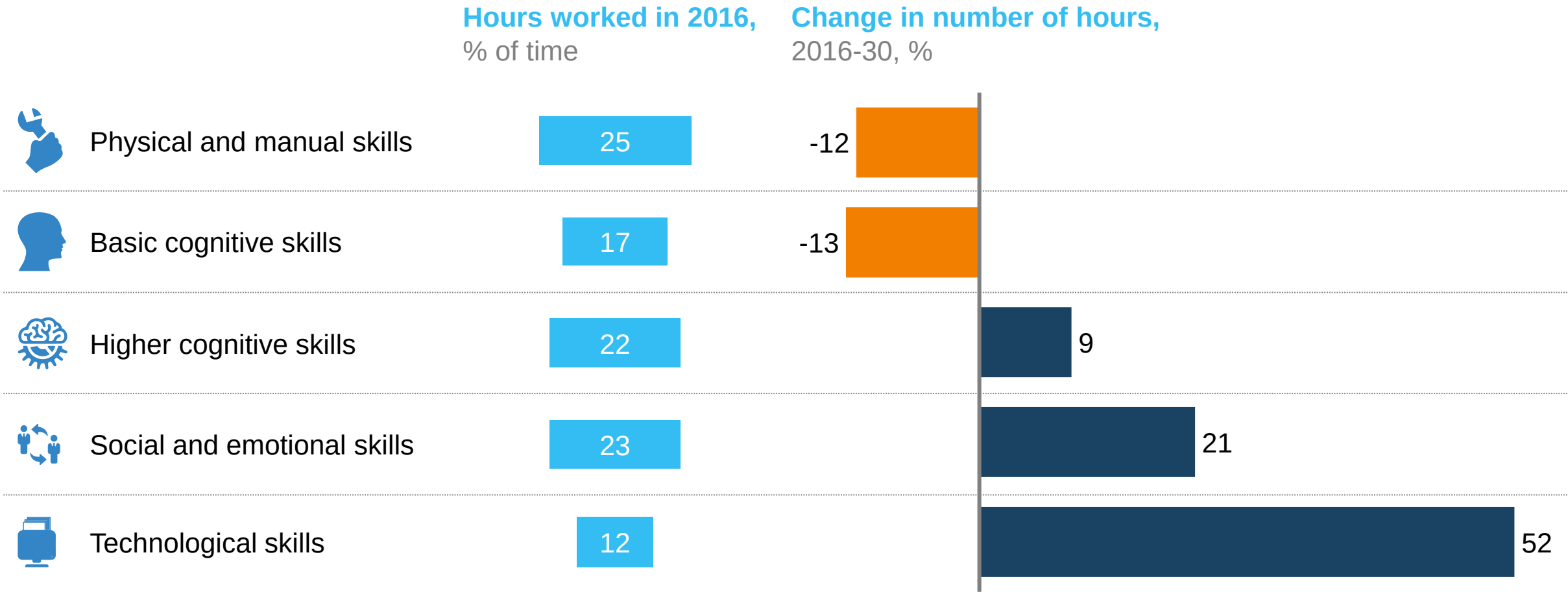
6-9[1] million people may need to transition to new occupations by 2030

1. Upper end of range refers to fast adoption scenario

SOURCE: McKinsey Global Institute "Jobs lost, jobs gained" model; McKinsey analysis

There will be a fundamental shift in the types of skills that will be in demand in the future

Demand for skills by type in the UK



SOURCE: ONS; McKinsey Global Institute analysis

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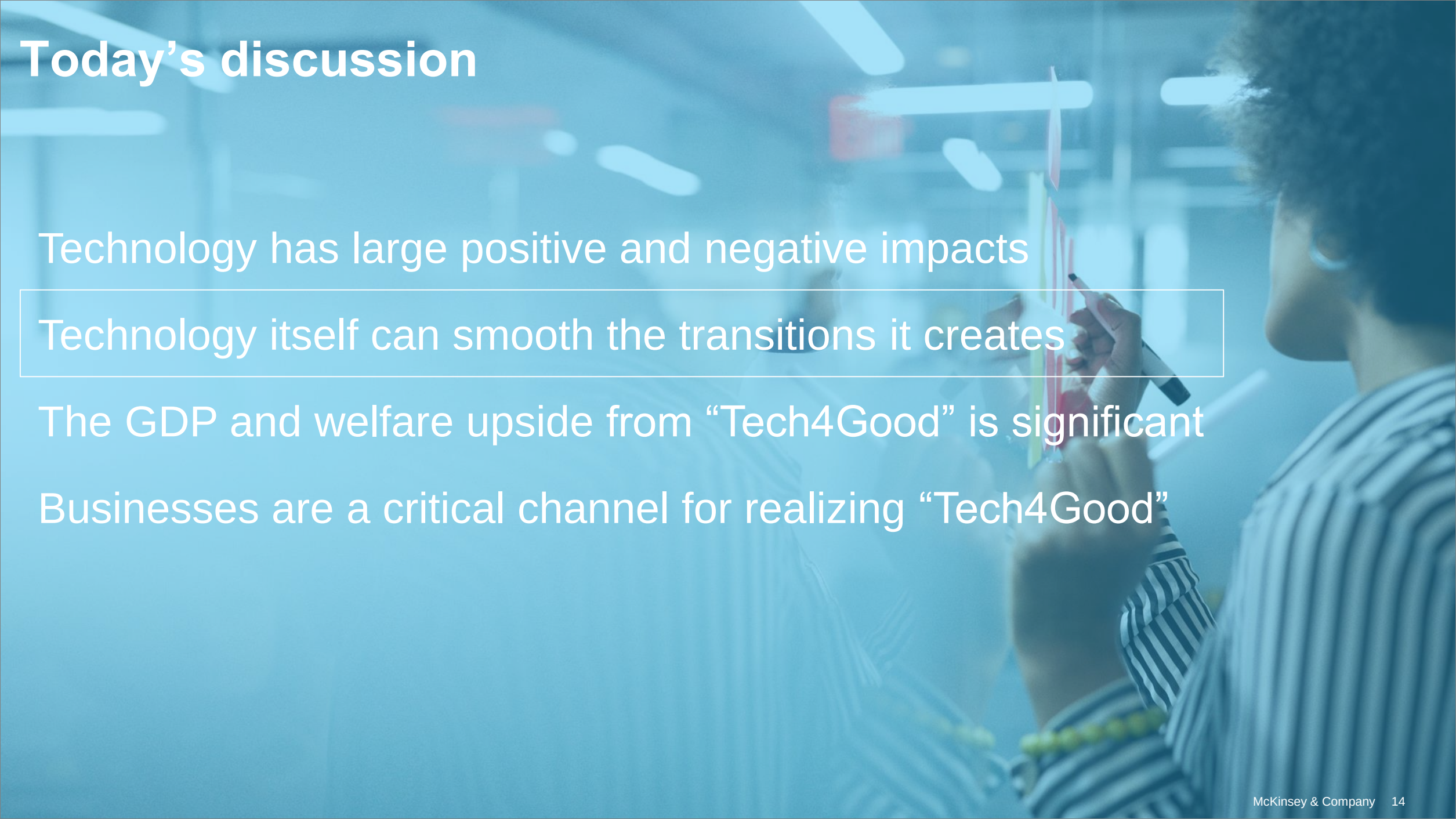
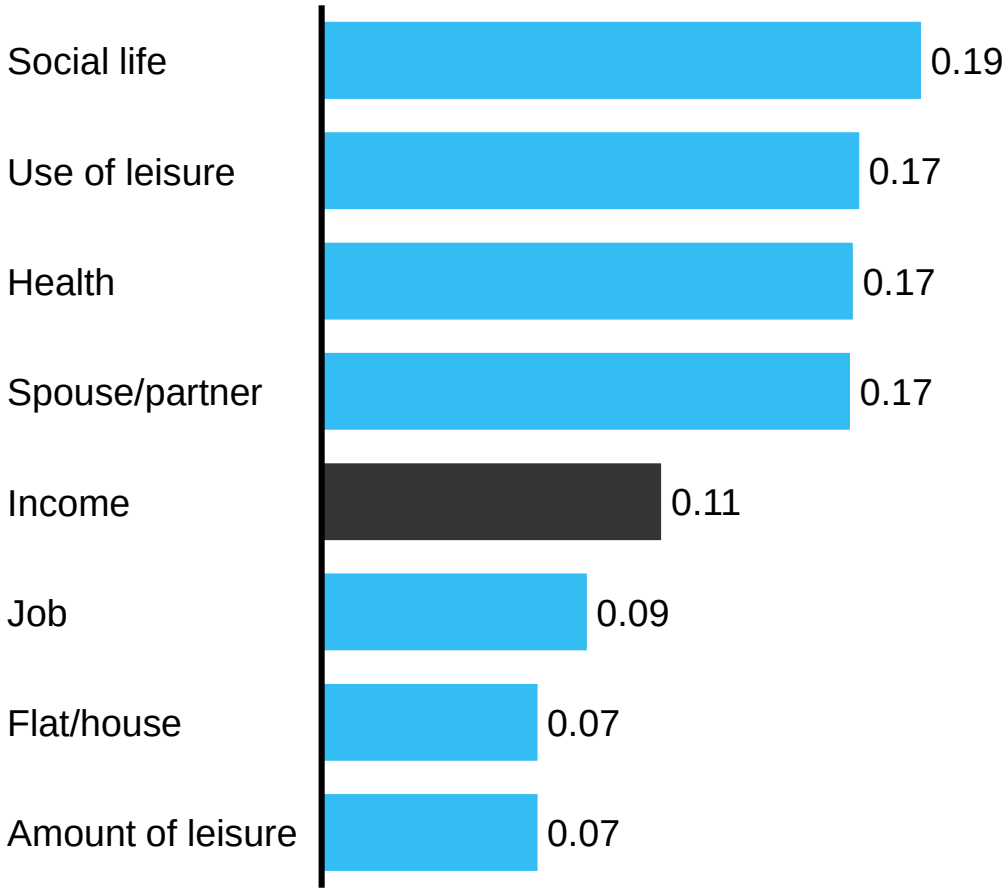


Many factors besides income contribute to individuals' well-being

Factors affecting individual well-being in the UK

Increase in self-reported life satisfaction on a scale from 0 to 10 for a unit increase in each factor



Determinants of life satisfaction at age 34

Bubble size = partial correlation coefficient

SOURCE: British Household Panel Survey 1996-2009; British Cohort Study; Measuring wellbeing and cost-effectiveness analysis: Using subjective wellbeing, What Works Centre for Wellbeing, Discussion paper 1, Richard Layard, December 2016; McKinsey Global Institute analysis

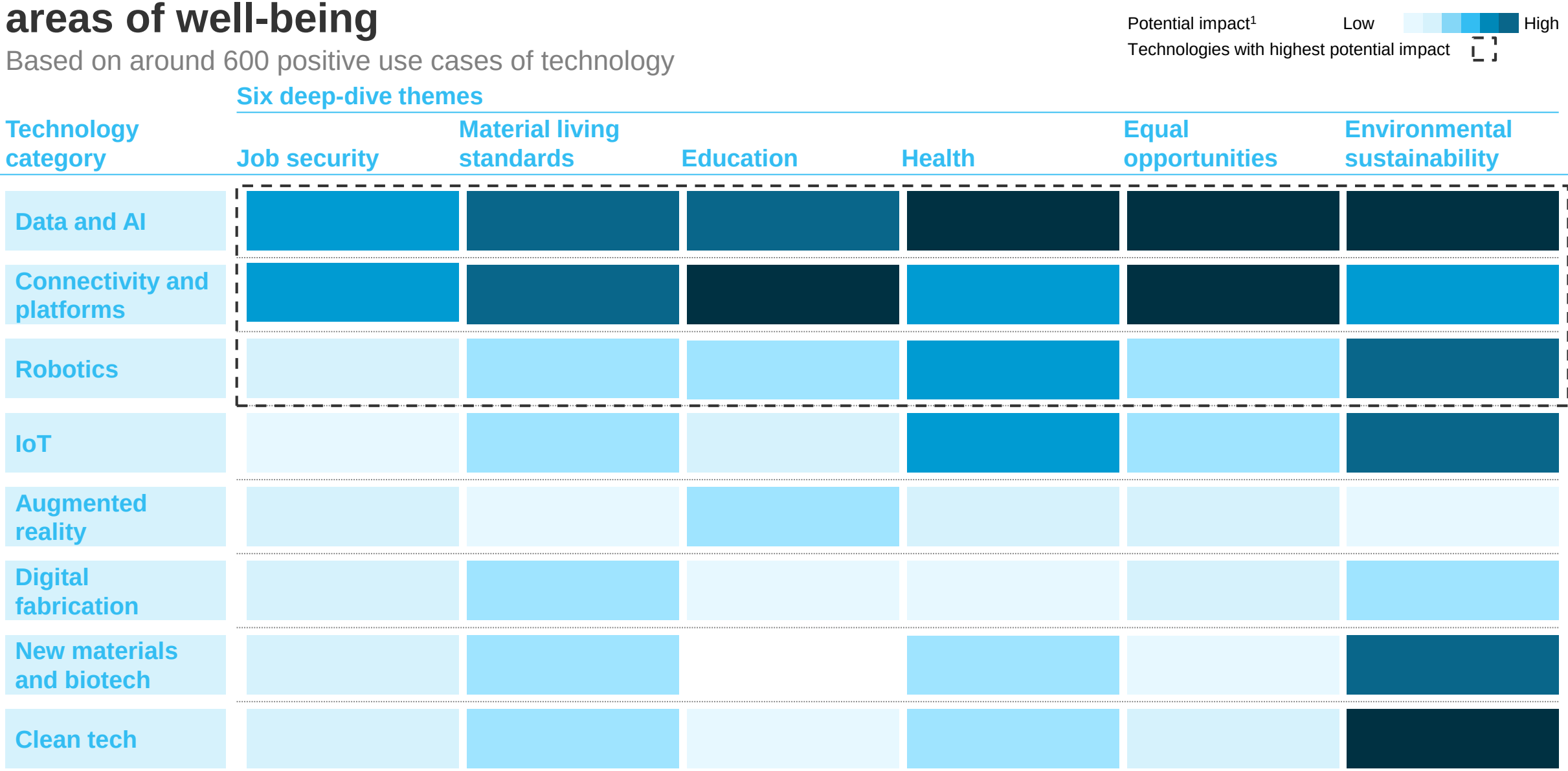
The MGI study considered ten well-being factors, through two analytical lenses

Group	Factor	Sub-factors	Covered in thematic deep dives	Explicitly included in welfare model
Prosperity	Job security	Risk of unemployment, job stability, job quality	✓	✓
	Material living standards	Wages, purchasing power, leisure, inequality, wealth	✓	✓
	Education	Quantity, quality and accessibility of education	✓	
Individual well-being	Health	Life expectancy, physical and mental health	✓	✓
	Safety and housing	Personal, material and cyber-security, quality and affordability of housing		
	Social connectedness	Quality and number of relationships, community, social capital		
Sustainability	Environmental sustainability	Climate change, pollution, waste, biodiversity, natural capital	✓	
	Economic sustainability	Long-term tangible, human, and knowledge/intellectual capital		
Fairness and trust	Equal opportunities	Social mobility, inclusiveness, equal access to services	✓	
	Trust in society	Trust in actors in society, privacy, institutional capital		

SOURCE: United Nations' Sustainable Development Goals; OECD's Better Life Index; Human Development Index; New Zealand Living Standards Framework; Joseph E. Stiglitz, Amartya Sen, and Jean-Paul Fitoussi, Report by the Commission on the Measurement of Economic Performance and Social Progress, 2009; Michael E. Porter and Scott Stern, Social progress index, Social Progress Imperative, 2017; Ed Diener et al. "Social well-being: Research and policy recommendations," in John F. Helliwell, Richard Layard, and Jeffrey D. Sachs (eds.), Global Happiness Policy Report: 2018, Global Council for Happiness and Well-being, 2018; Kirk Hamilton and Cameron Hepburn, National Wealth: What is Missing, Why it Matters, Oxford Scholarship Online, October 2017; McKinsey Global Institute analysis

Three digital technology categories have significant potential to improve key areas of well-being

Based on around 600 positive use cases of technology



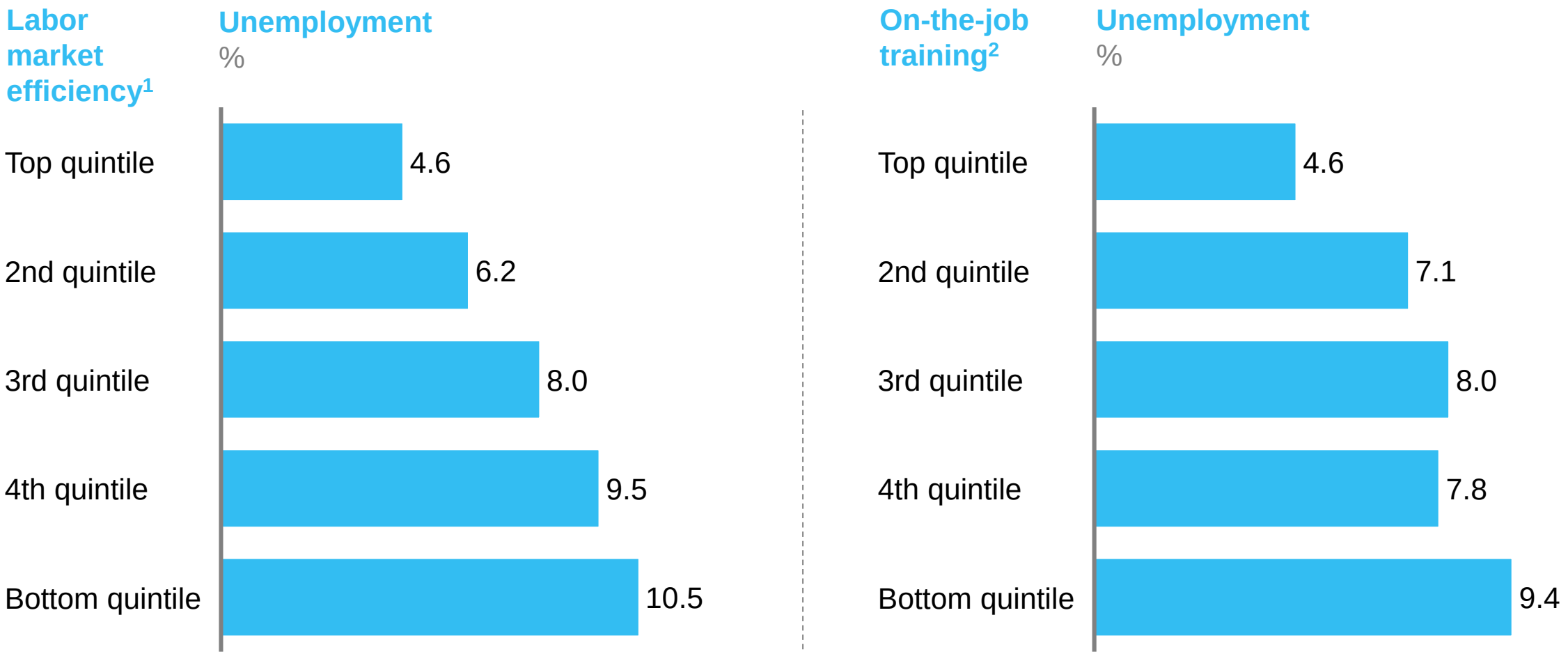
1 Potential impact assessed as relative number and impact of use cases; use cases involving several technology categories counted in each relevant category

SOURCE: McKinsey Global Institute Technology for Good use case library; McKinsey Global Institute analysis

Labor market flexibility and adult training are linked to lower unemployment

Harmonized unemployment rate in OECD countries, 2007-2017

Average unemployment rate in each quintile, % of workforce



1 World Economic Forum labor market efficiency indicator
2 World Economic Forum on-the-job training indicator

SOURCE: World Economic Forum Competitiveness Index 2017-18; OECD; McKinsey Global Institute analysis

Many independent workers use digital platforms to earn income

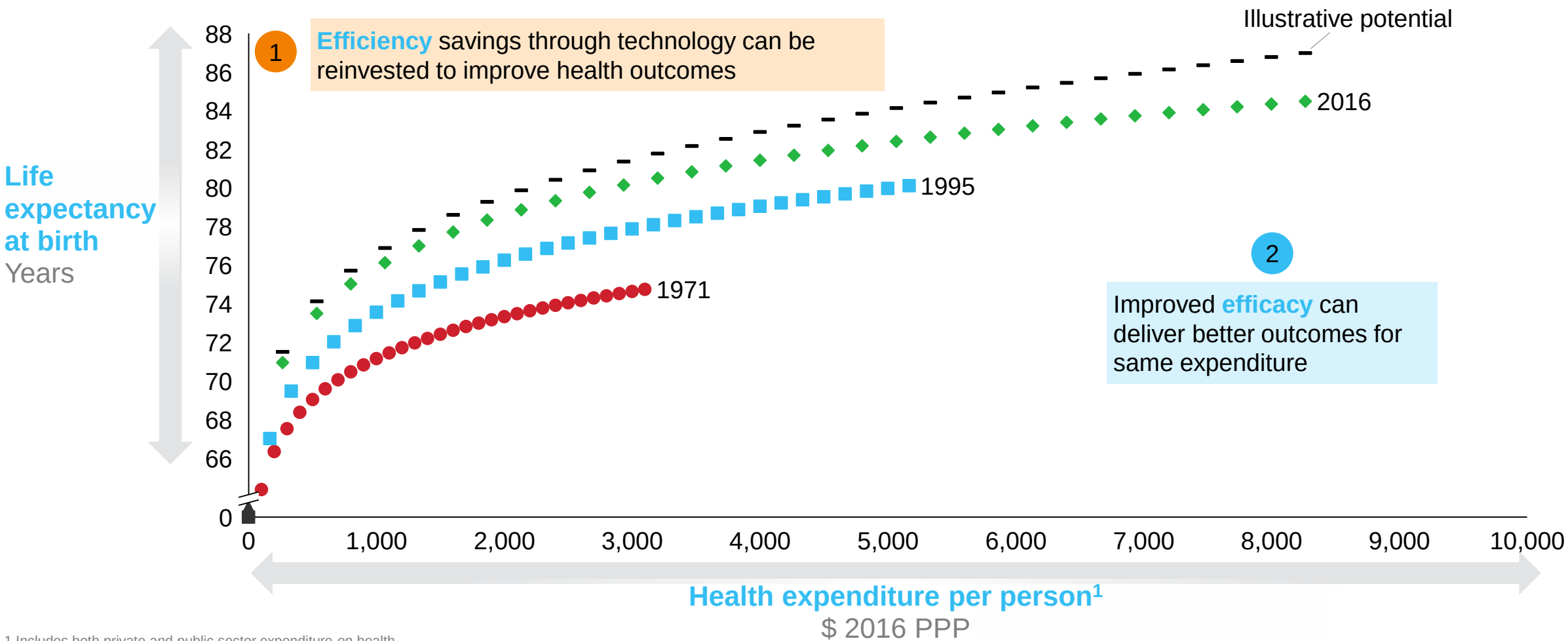
Responses to MGI survey
United States and EU-15

	Population	Share that have earned income from a digital platform, %	Example platforms
All independent workers	162 million	15	▪ Freelance Physician ▪ Deliveroo
Independent workers who provide labor	150 million	6	▪ TaskRabbit ▪ Uber ▪ Upwork
Independent workers who sell goods	21 million	63	▪ Etsy ▪ eBay
Independent workers who lease assets	8 million	36	▪ Airbnb ▪ Boatsetter ▪ Getaround ▪ BlaBlaCar

1 EU-15 based on population-weighted extrapolation from five countries surveyed: United Kingdom, Germany, France, Spain, Sweden.
NOTE: Survey was run in 2016; An individual may participate in multiple forms of independent earning. Therefore the three categories sum to greater than the total population of independent workers.
SOURCE: Independent work: Choice, necessity, and the gig economy, MGI, October 2016; McKinsey Global Institute analysis

Technology has the potential to enhance health through both efficiency and effectiveness

Historical relationship between health expenditure and outcomes in OECD countries[2], 1971-2016



1 Includes both private and public sector expenditure on health
2 Lines shown represent power curves with best fit; R2 is 0.47, 0.70 and 0.62 for 1971, 1995 and 2016 respectively

SOURCE: OECD; McKinsey Global Institute analysis

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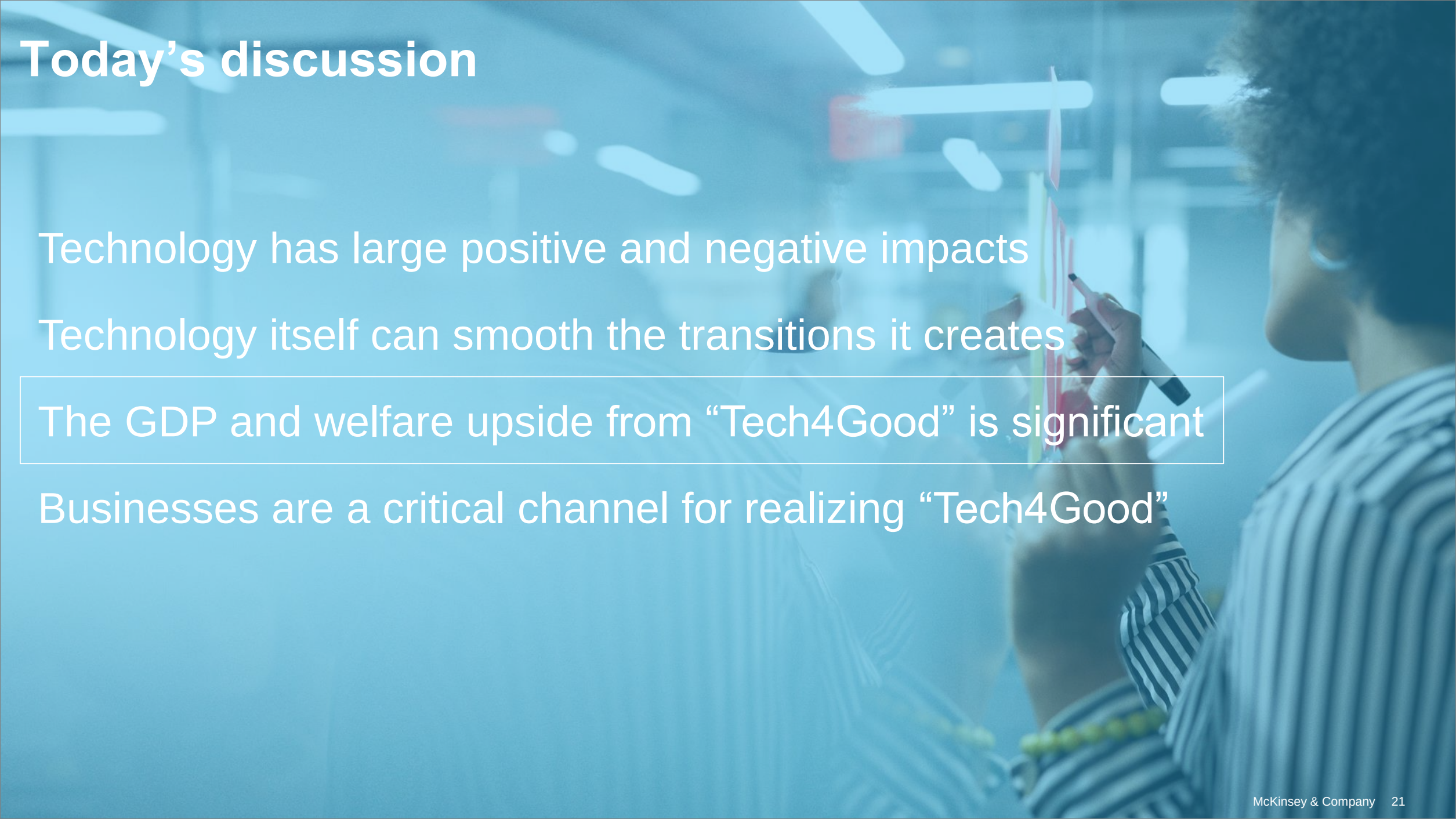
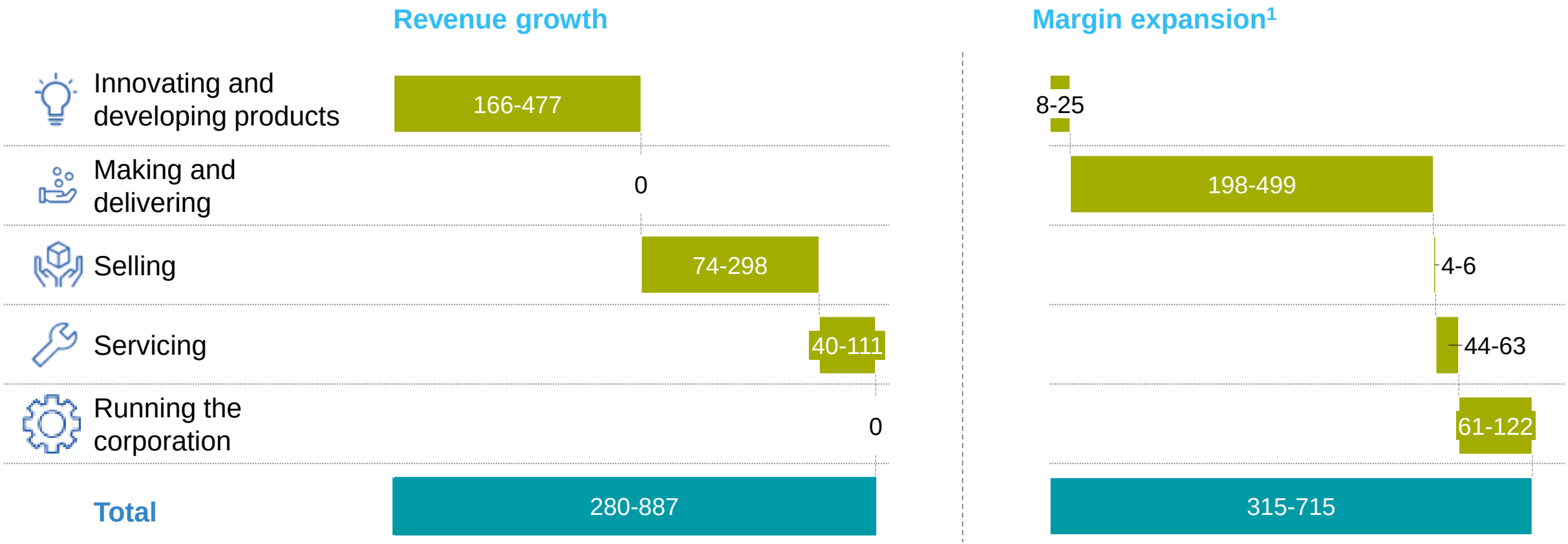


Labour substitution is only part of the overall business case for innovating and adopting new technologies

Impact of digital transformation in the global manufacturing sector

$ billions



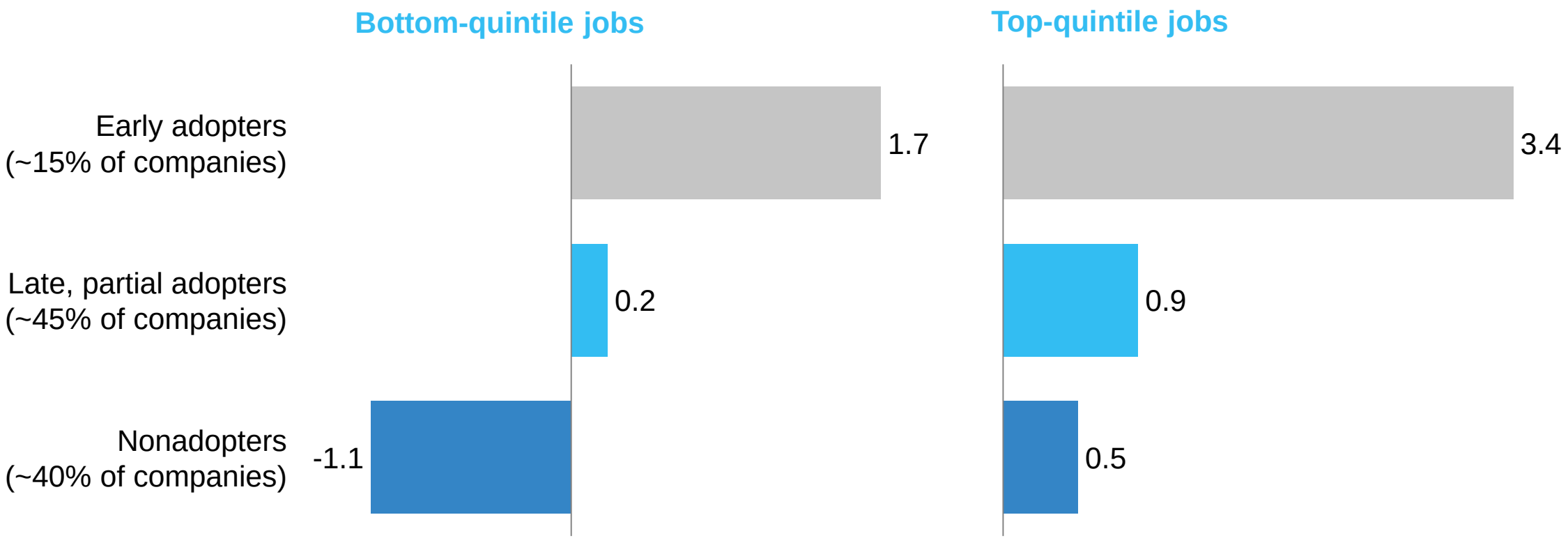
1 Cost reduction through productivity improvements and efficiency gains

SOURCE: McKinsey analysis

Automation and AI will put pressure on wages for people with low skills and those working for slow adopting companies

Effects of AI adoption on real wage growth, EU-28, high adoption scenario

Estimated incremental annual real wage growth, %, 2017–30



SOURCE: O*NET; Eurostat; McKinsey Global Institute analysis

To analyse the welfare impacts of technology transitions we looked at four scenarios

Proactive management

Slow managed transition

- Businesses focus on cost-reduction through task automation and substituting labor for machines
- Governments and businesses support worker transitions to less routine and higher-skilled roles
- Lower level of disruption to labour market, resulting in less need for proactive management

Tech for better lives

- Businesses focus on new product / market innovation and human-centered deployment of technology
- Governments support innovation and diffusion through R&D, and the adoption of technologies in public services, including in health
- Firms and governments collaboratively ease labor market transitions through technology-enabled reskilling, talent matching, and enhanced mobility

Focus on cost reduction and labour substitution

Focus on innovation and augmentation

Low growth, low welfare

- Governments scale back R&D investment and slow down adoption of technology in public services
- Business innovation slows down due to higher costs and lower returns on investment
- Businesses focus on cost-reduction through task automation and substituting labor for machines
- Only a low level of proactive management is required as disruption to labor markets is more limited

High growth, low welfare

- Businesses focus on innovation, but put limited effort into reskilling and human-centered technology
- Governments support innovation through R&D, but with slower adoption of technologies in public services, including in health
- Firms and governments do not proactively manage skills or labor transitions, resulting in skills gaps and greater labor market disruption

Reactive management

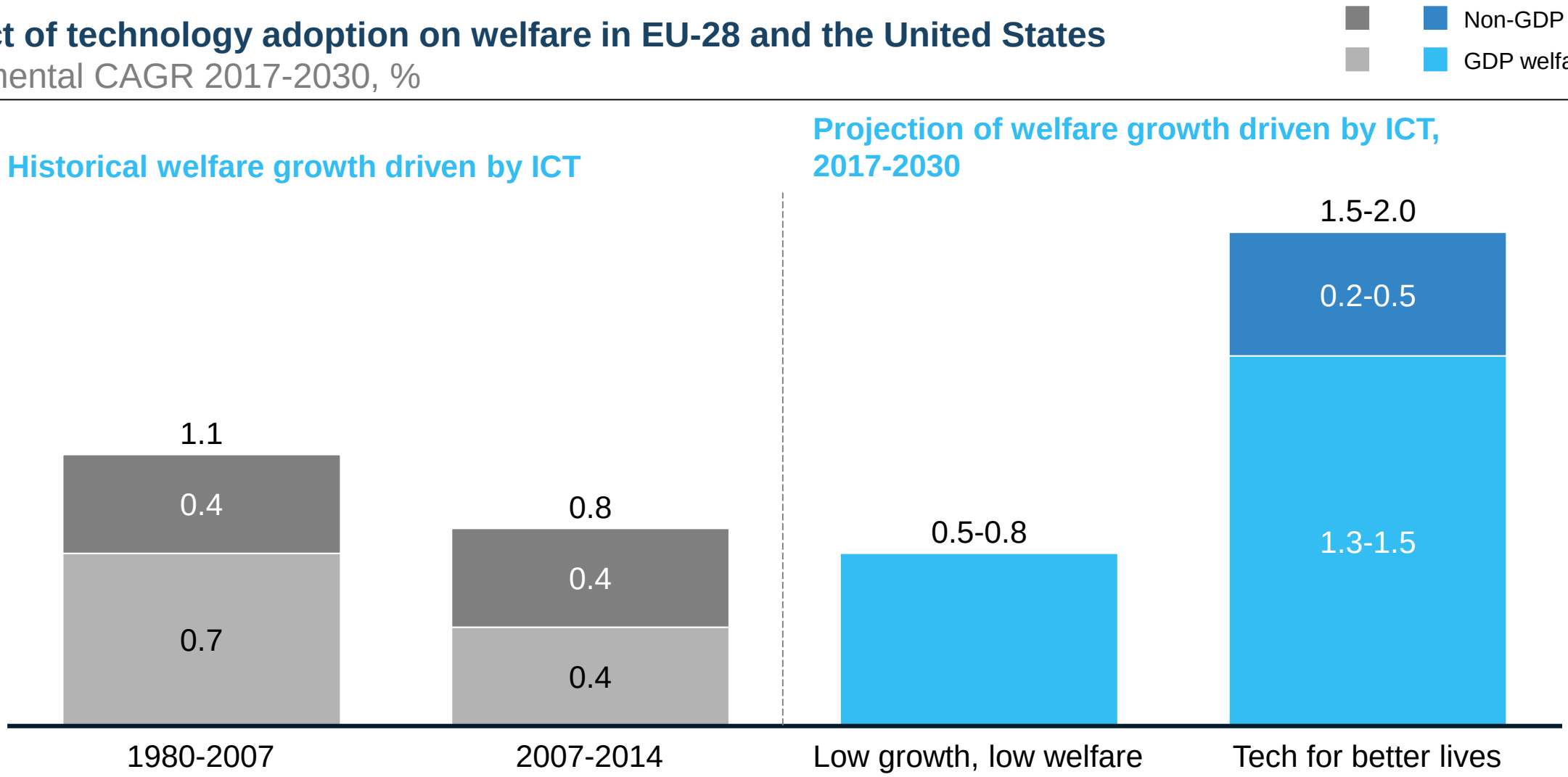
SOURCE: McKinsey Global Institute analysis

How we manage tech will determine how welfare may unfold

SIMULATION

Impact of technology adoption on welfare in EU-28 and the United States

Incremental CAGR 2017-2030, %



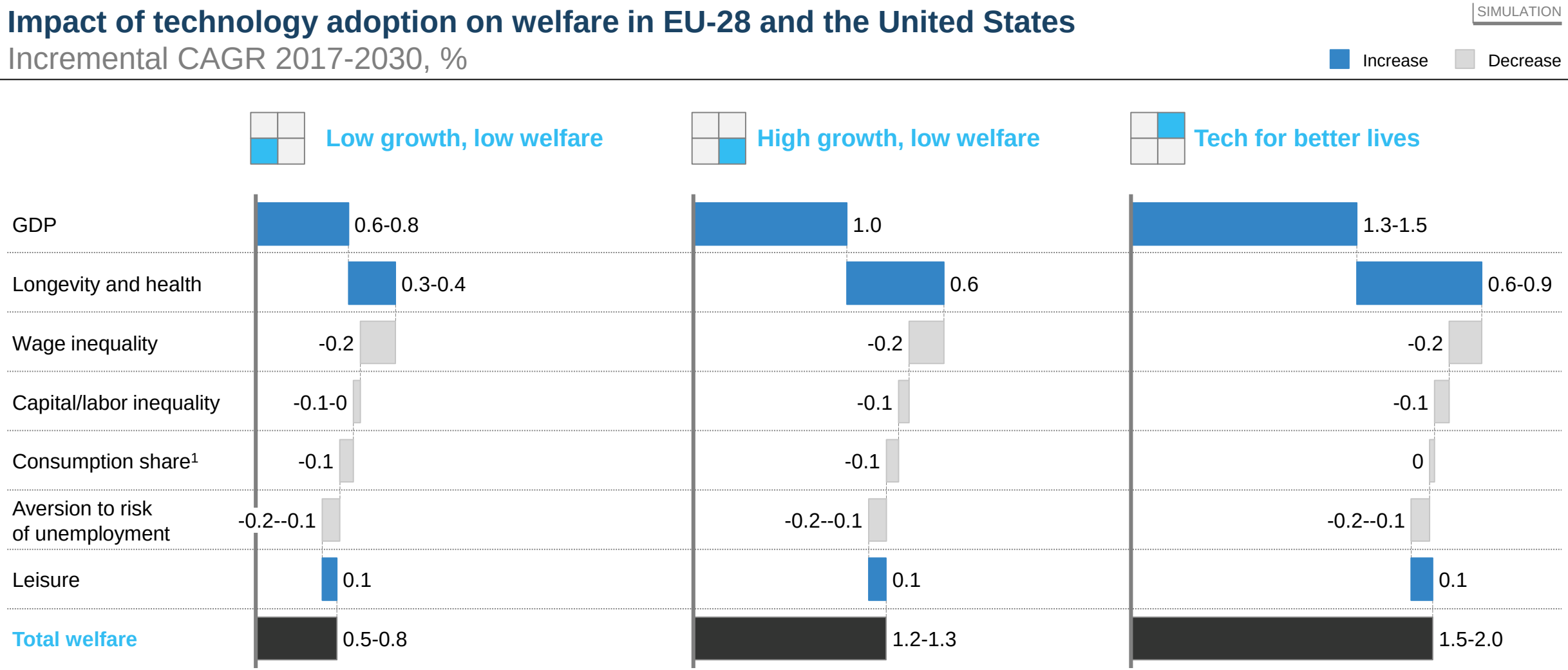
NOTE: GDP and non-GDP CAGRs as not additive and their sum may not equal to the CAGR of total welfare

Technology's net welfare impact contains positive and negative components

Impact of technology adoption on welfare in EU-28 and the United States

Incremental CAGR 2017-2030, %

SIMULATION



1 Change in ratio of consumption to GDP due to changes in unemployment

NOTE: Numbers are simulated figures to provide directional perspectives rather than forecasts. Figures may not sum to 100% because of rounding.

SOURCE: McKinsey Global Institute analysis

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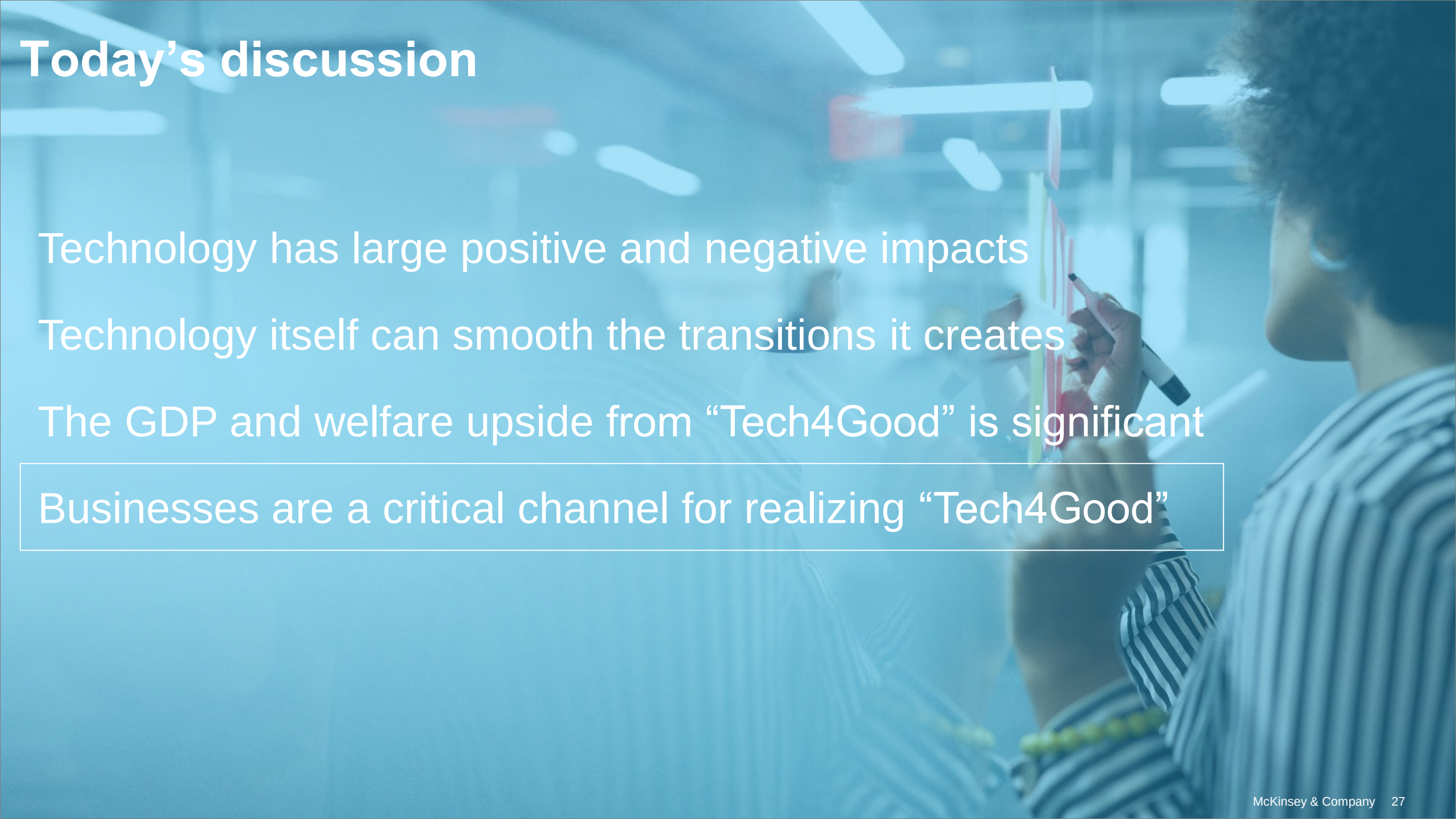


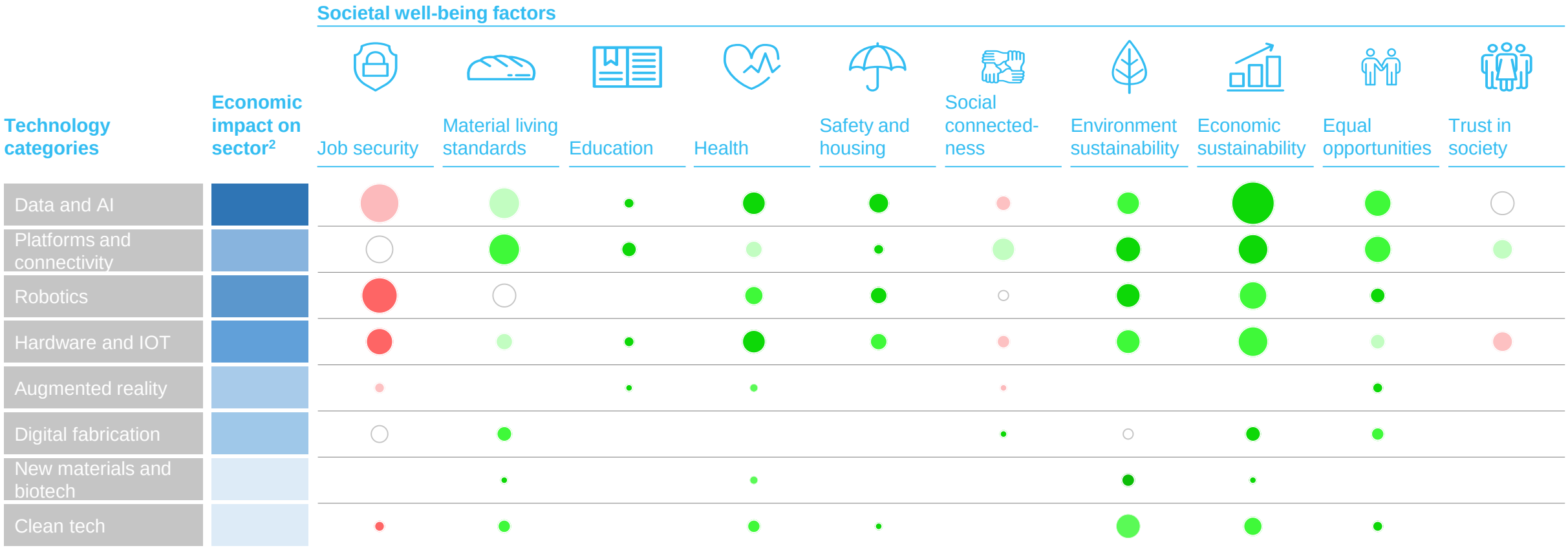
Adoption of frontier technologies can contribute both to firm profitability and societal well-being

Economic impact: Low — High

Impact on well-being factors: High negative — High positive

Number of use cases: Low — High

Retail example,
based on around 600 positive use cases



NOTE: Estimated economic impact based on expert interviews, previous MGI reports, and press research; Bubble sizes and colors based on McKinsey Global Institute proprietary use cases library (~600 use cases in May 2019)

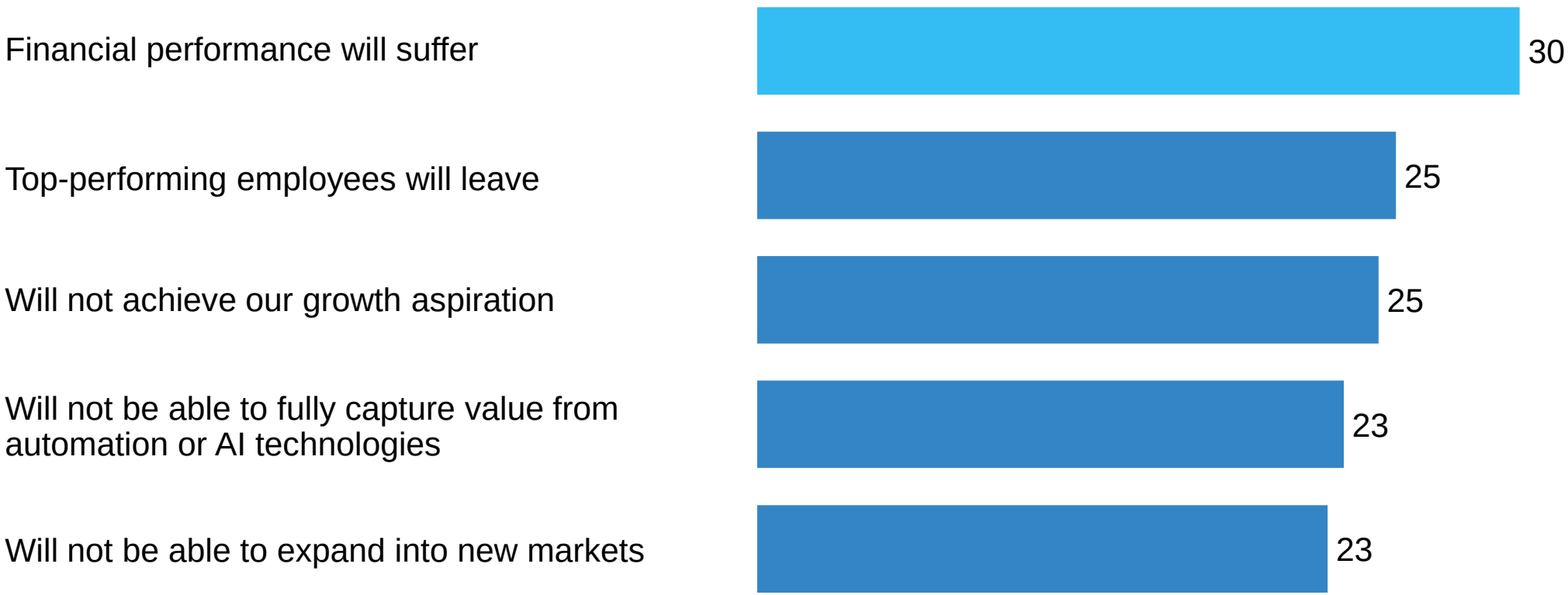
SOURCE: McKinsey Global Institute analysis, expert interviews

Companies fear that their financial performance will suffer if their workforce does not acquire the skills needed

Based on McKinsey Global Institute workforce skills executive survey, March 2018

% of respondents, up to 3 responses

Q: What do you expect to be repercussions of your organization not being able to get skills you need?



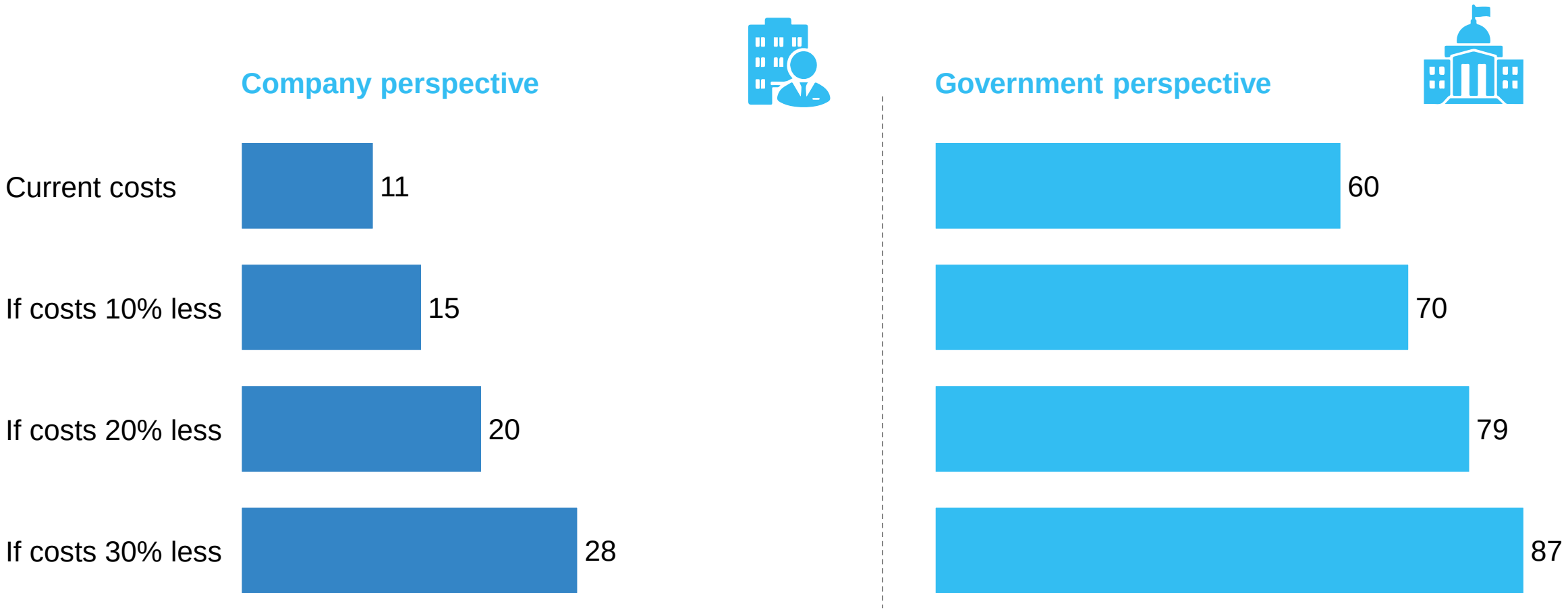
NOTE: Based on results of March 2018 survey of 3,031 business leaders in Canada, France, Germany, Italy, Spain, United Kingdom, and the United States.

SOURCE: McKinsey Global Institute workforce skills executive survey, March 2018; McKinsey Global Institute analysis

Only the minority of retraining pathways show a positive return on investment at the company level

Retraining pathways with positive net present value

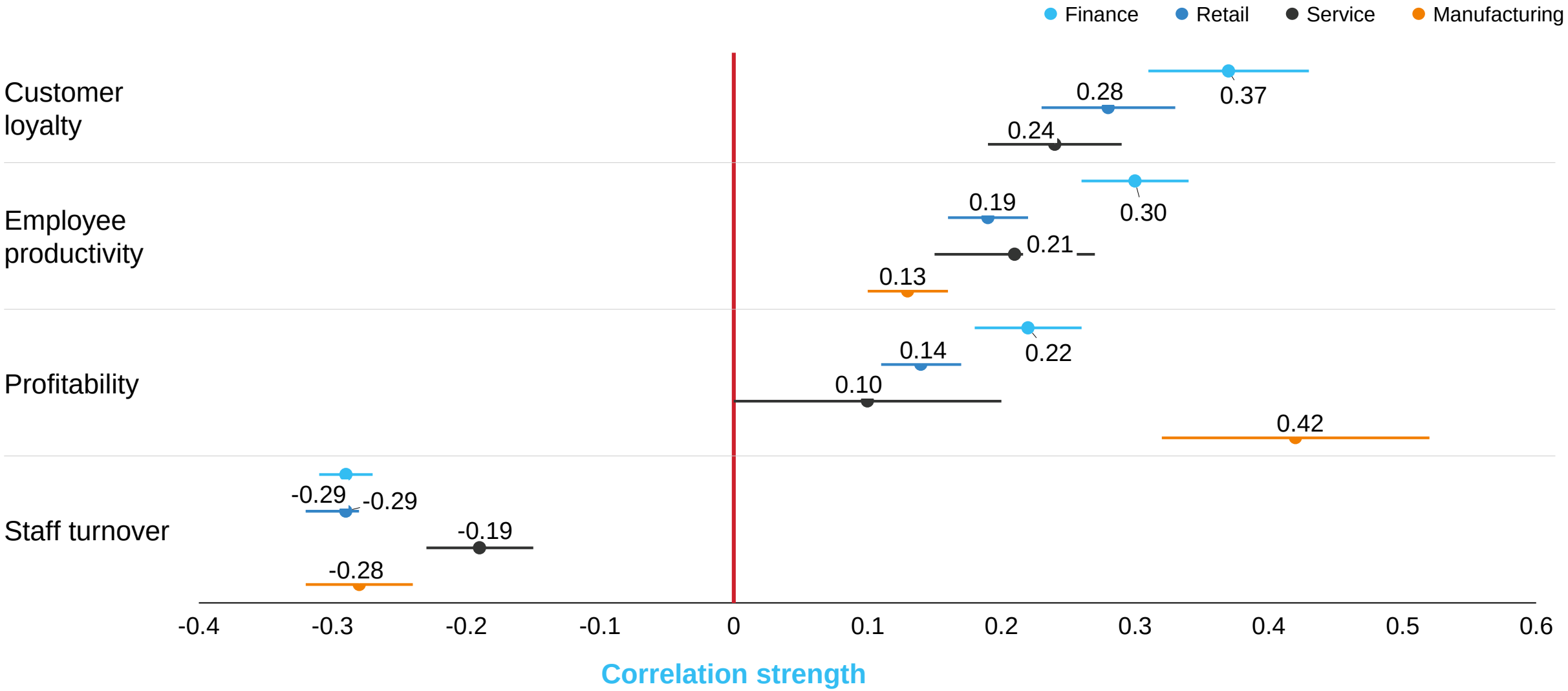
%



SOURCE: World Economic Forum, “Towards a reskilling revolution”, 2019; Gutierrez, K., “Getting Buy-In for eLearning: A 3-Step Process”

Companies would appear to have an incentive to create ‘good jobs’

Employee satisfaction and firm performance



SOURCE: Employee wellbeing, productivity, and firm performance: Evidence from 1.8 million employees, Christian Krekel, George Ward, Jan-Emmanuel De Neve, April 2019

- Enable R&D, innovation and augmentation
- Ensure reskilling and labour market fluidity
- Prioritize “win-win-win” technology adoption
- Diffuse “tech for good” in public services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Thank you!
You can download all MGI research at:
https://www.mckinsey.com/mgi/overview