

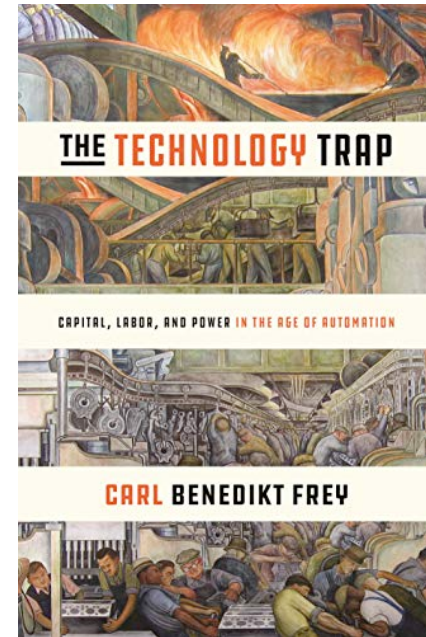
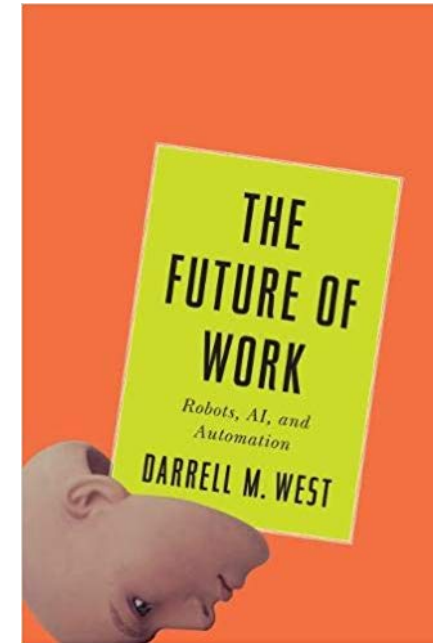
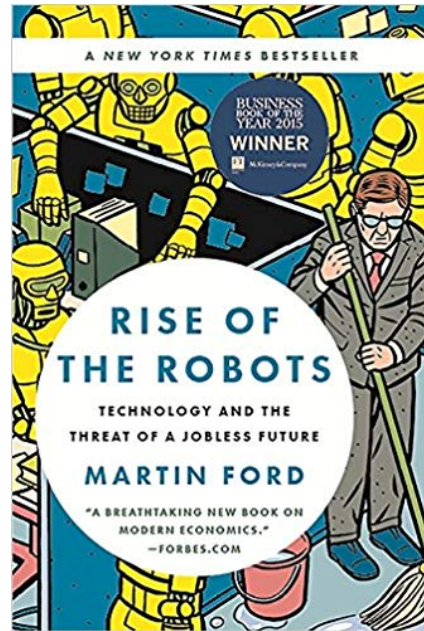
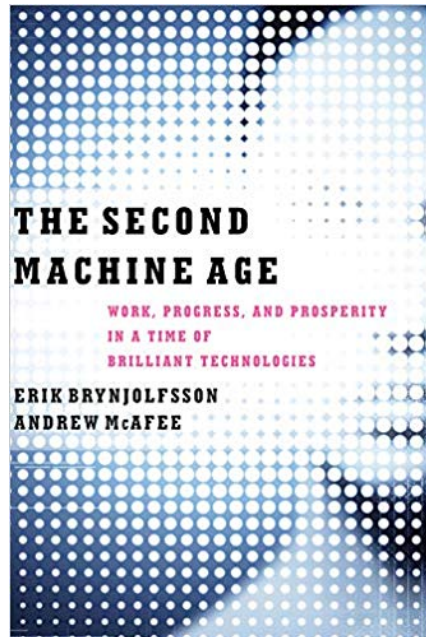
The Future of Work and Jobs

Pramod P. Khargonekar
University of California, Irvine

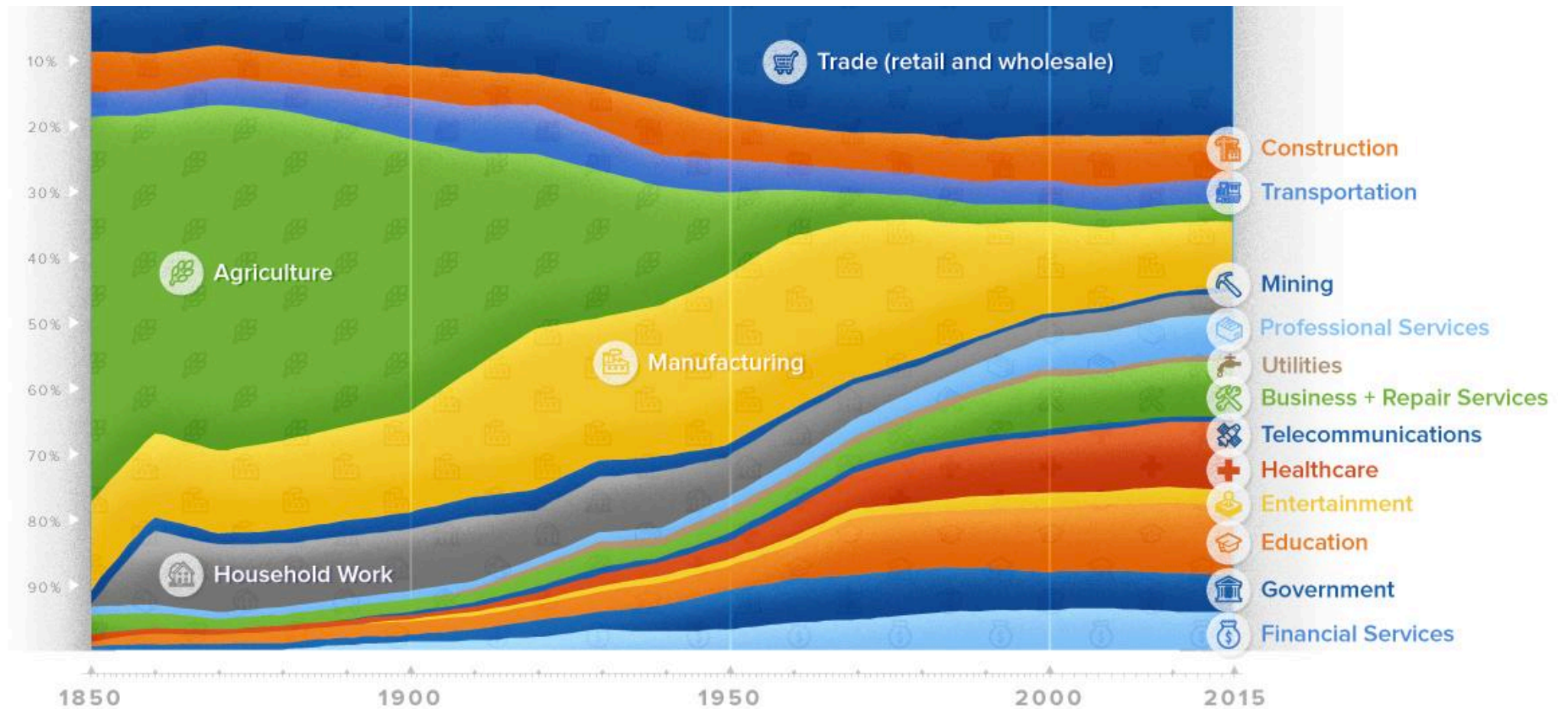


"UCI is No. 1 UC choice for California's college-bound high school graduates."

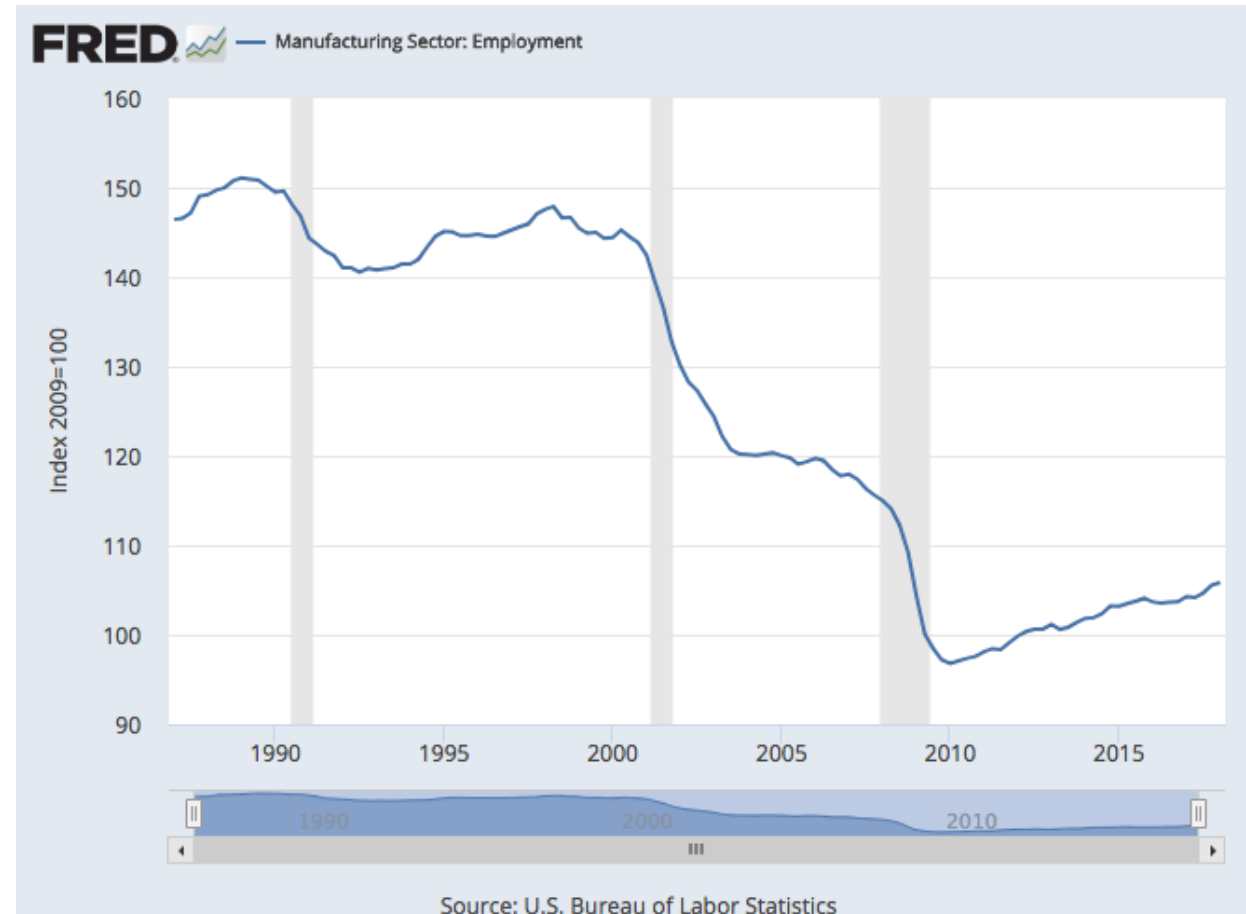
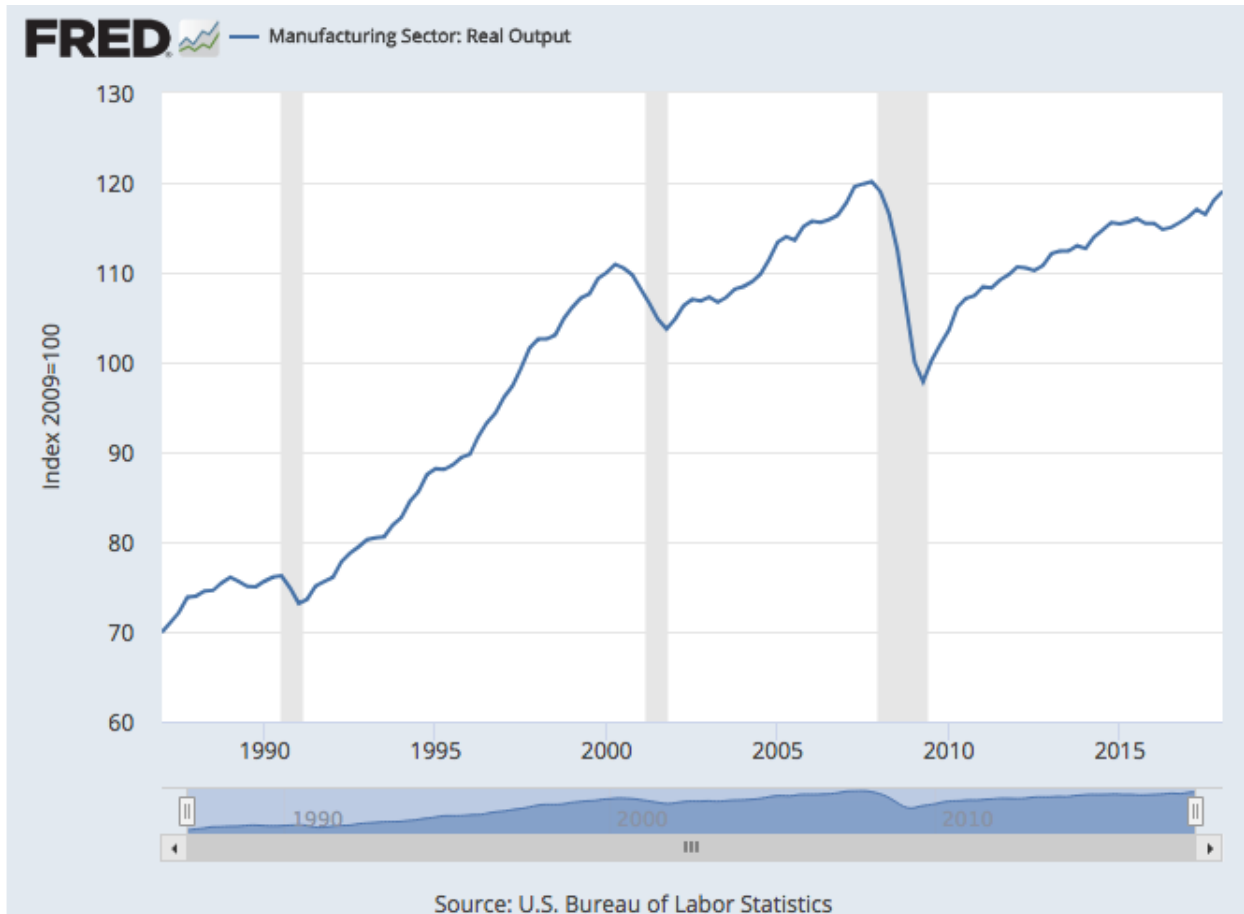
What does the Future Hold?



How will this Pattern Evolve in the Coming Decades?



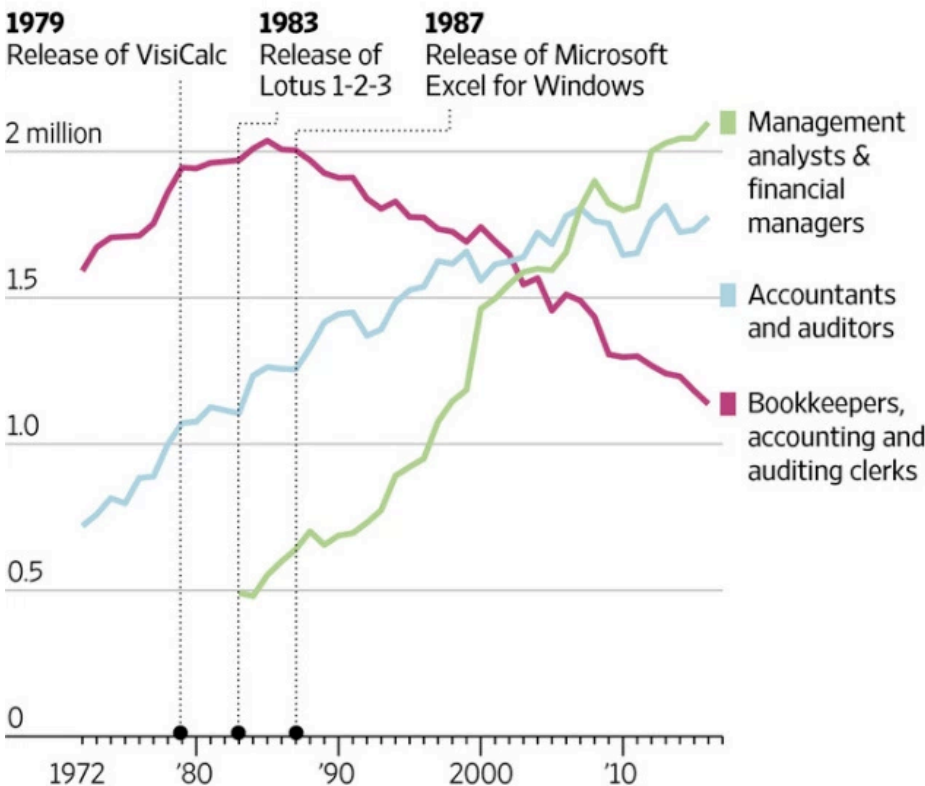
US Manufacturing: Large Growth in Output at Much Lower Employment



Personal Computers, Spreadsheet Software, and Routine Work

The Spreadsheet Apocalypse, Revisited

Jobs in bookkeeping plummeted after the introduction of spreadsheet software, but jobs in accounting and analysis took off.



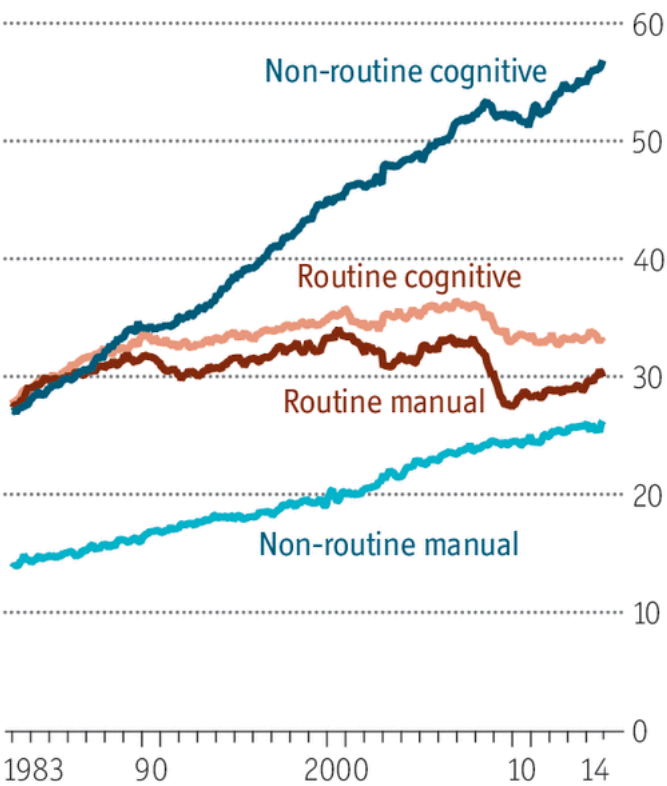
Notes: There is no data for 1982. Changes in occupational definitions in 1983, 2000 and 2011 mean that data is not strictly comparable across time. There was no category for management analysts or financial managers prior to 1983.
Source: Bureau of Labor Statistics

THE WALL STREET JOURNAL.

Source: WSJ

Think

United States employment, by type of work, m



Sources: US Population Survey; Federal Reserve Bank of St. Louis

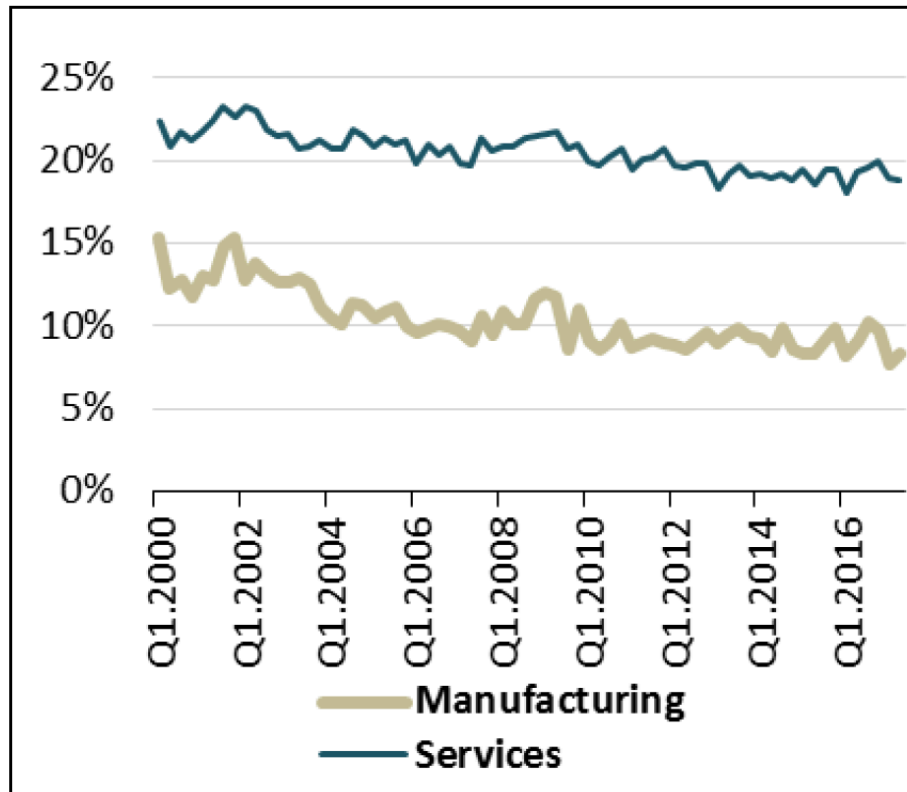
Economist.com

Source: Economist

Majority of Jobs Losses and Gains Come from Existing Companies

Figure 8. Jobs Created by Establishment Openings

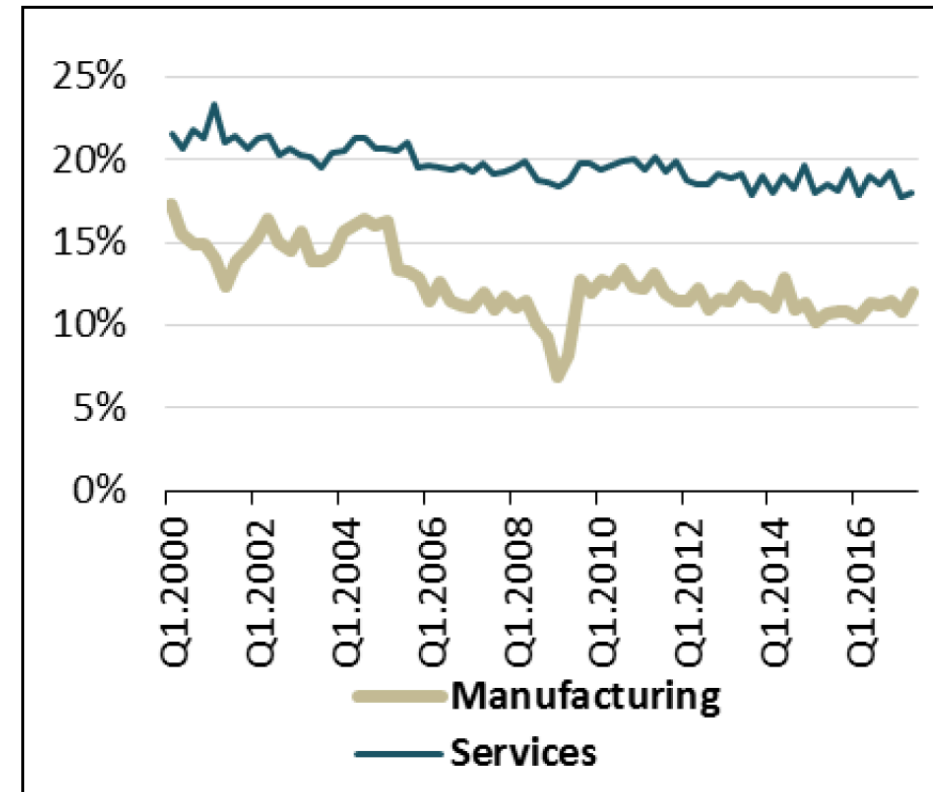
Percentage of new jobs



Source: Bureau of Labor Statistics.

Figure 9. Jobs Lost Due to Establishment Closings

Percentage of jobs lost



Source: Bureau of Labor Statistics.

Automation and Work

- Displacement of jobs
- Changes in the composition of tasks in jobs
- New tasks, jobs, work, economic sectors
- Worker productivity
- Economy and society



Strengthening
University-Industry
Partnerships

Levels of Analysis and Action

- Individual
- Firm
- Community and Region
- Government
- Civil Society
- Global Community

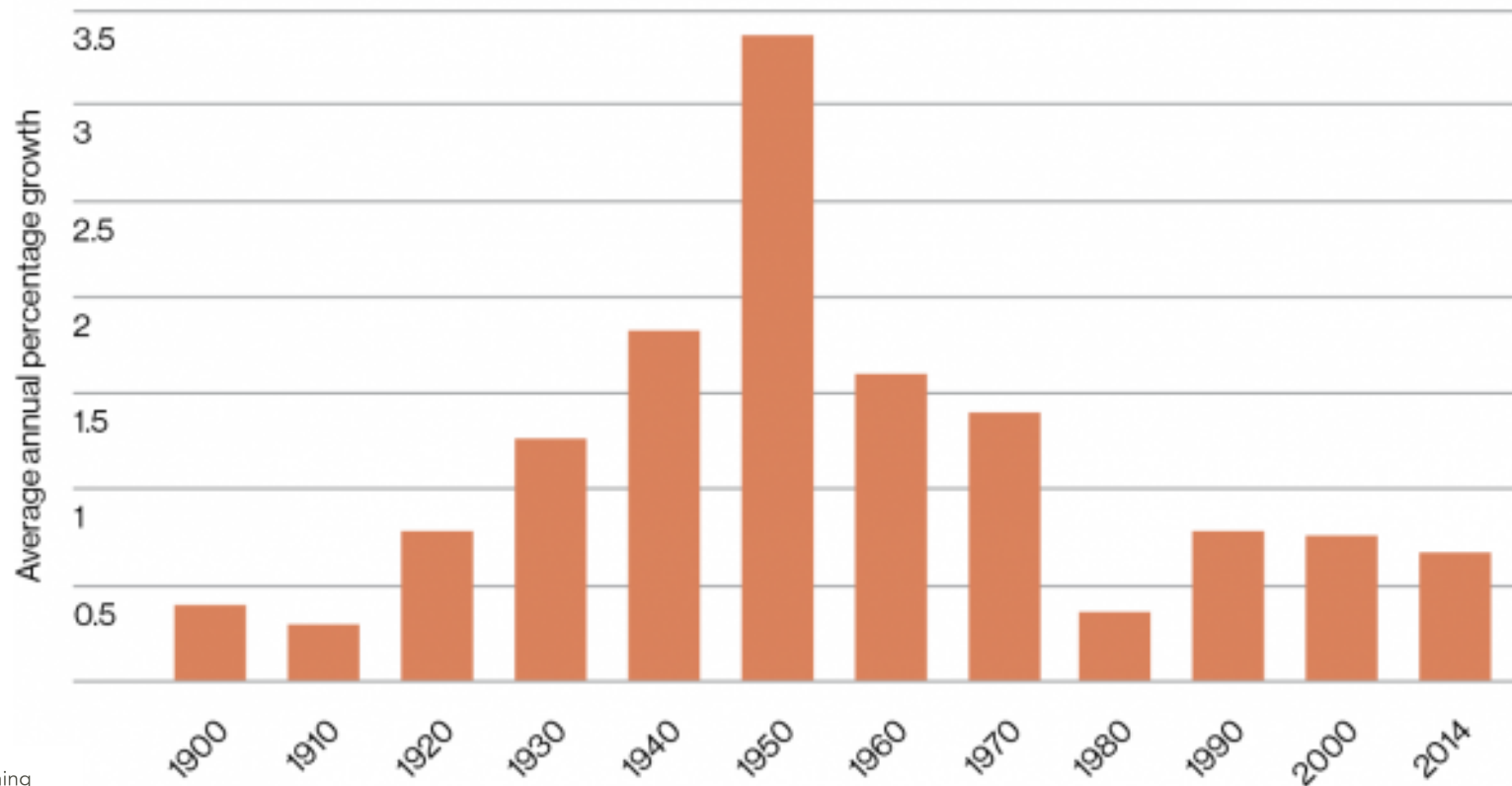


Strengthening
University-Industry
Partnerships

Innovation and Productivity Growth

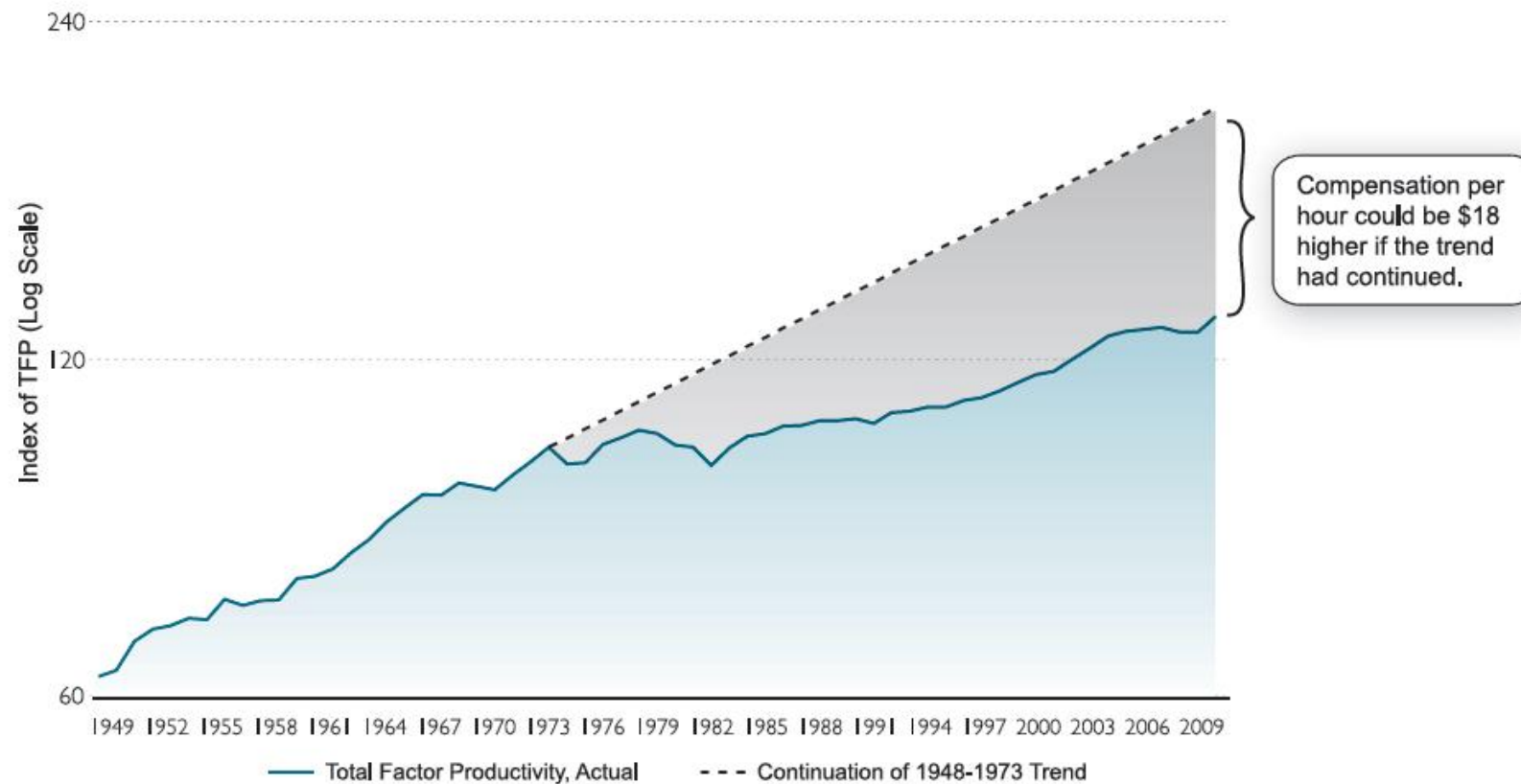
Peak Innovation

Total factor productivity measures innovation. It peaked in the 1940s and was strong through 1970. Each bar shows a 10-year average prior to the year shown (2014 bar is for 2001–2014).



TFP Growth Slowdown has Material Impact

FIGURE 7.
Total Factor Productivity



Source: BLS and Hamilton Project Calculations.

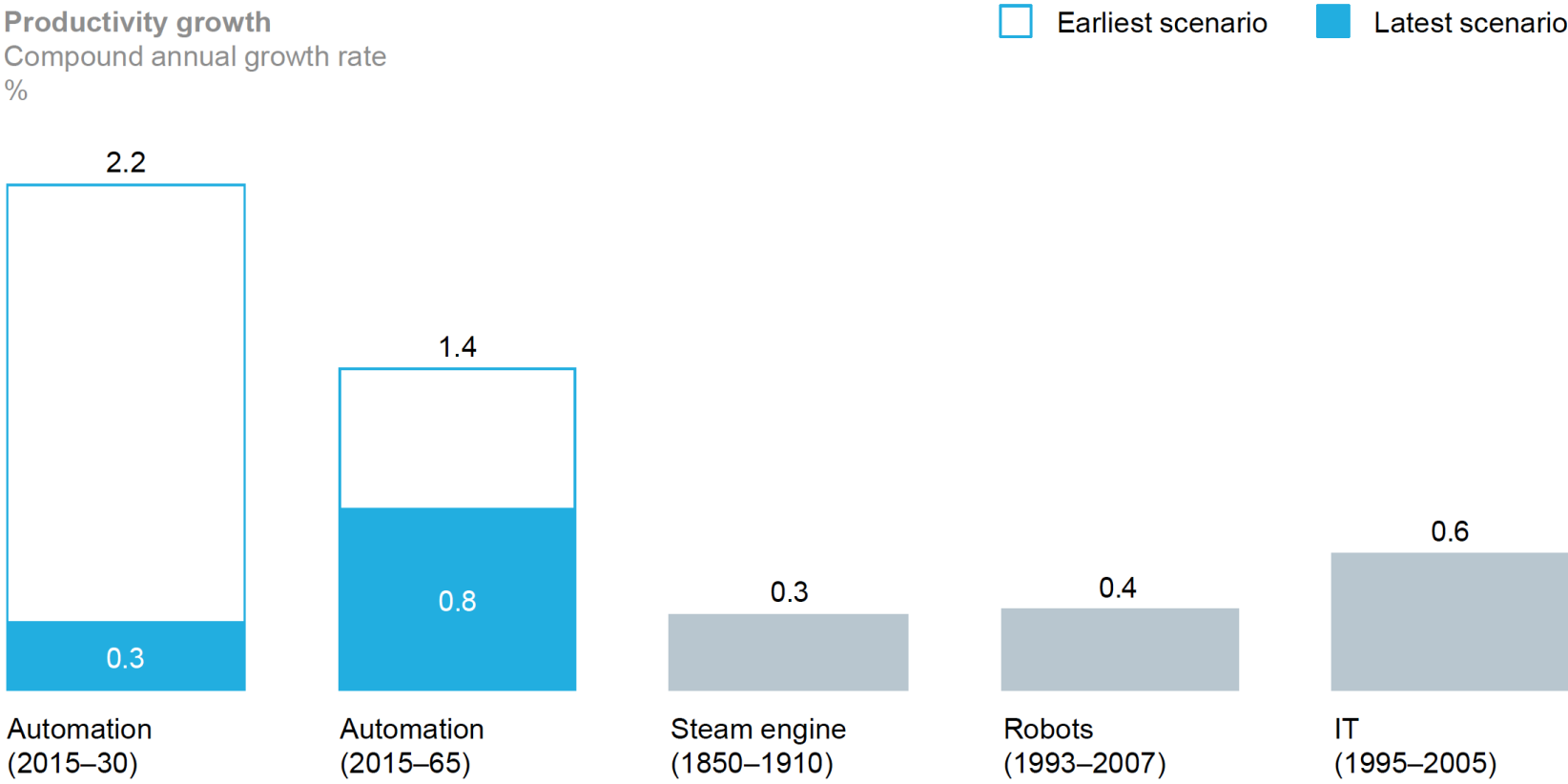
“Productivity isn't everything, but, in the long run, it is almost everything. A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker.”

Paul Krugman

Automation has Potential to Boost Productivity and Growth

Exhibit 28

Automation of existing activities could increase productivity at magnitudes similar to other major technologies



“In order to make the most of the potential offered by automation and, at the same time, manage its consequences on companies, national economies, and workers around the world, policy makers, business leaders, and men and women everywhere will need to think through the implications that these new technologies will bring and prepare for significant changes..”

McKinsey Global Institute, 2017

Geographic Stratification of Benefits from Innovation

The New York Times

Rise of superstar cities

Concentration of venture capital

Benefits from agglomeration

Will these trends get even more extreme with the acceleration of ML and AI?

Why Midsize Cities Struggle to Catch Up to Superstar Cities

For decades, smaller metropolitan areas closed the income gap with bigger, richer ones, but no longer. So places like Winston-Salem, N.C., are trying to lay a new foundation for prosperity.

Source: NY Times, 7/16/2019

Most-digital metros

Degree of computerization of worker tasks

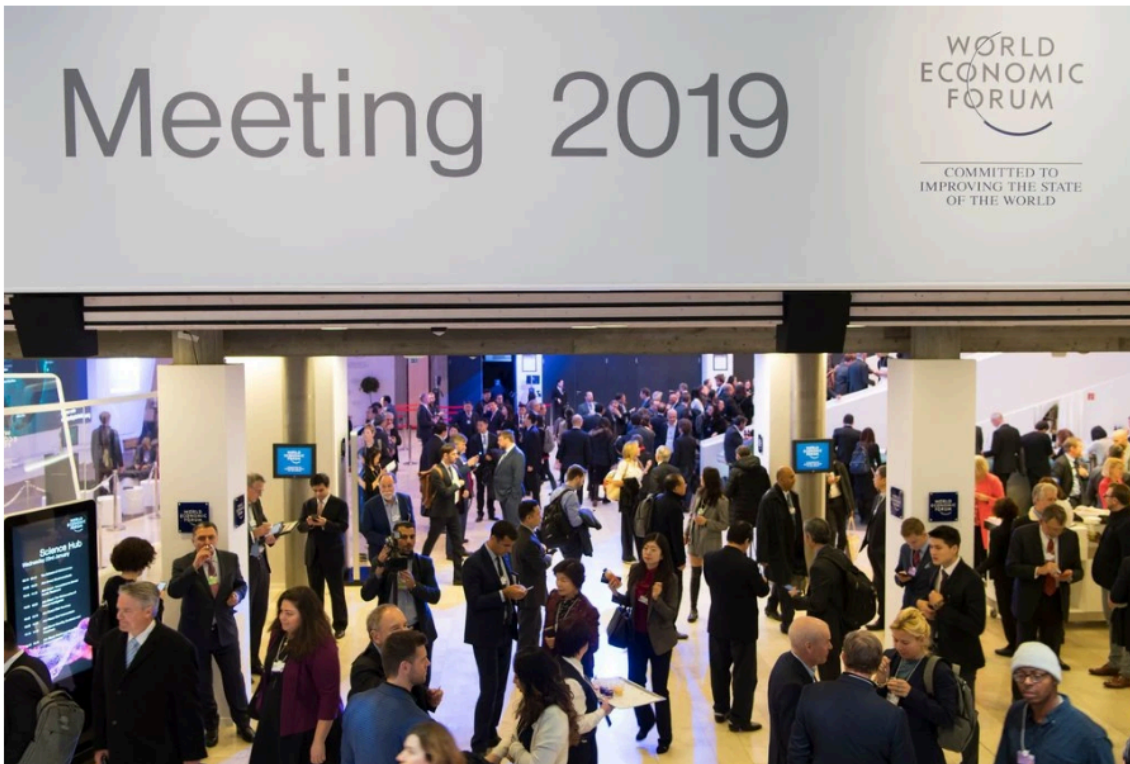


Note: Ranked by largest city in each metro area

Source: Brookings Institution of Labor Department data

THE SHIFT

The Hidden Automation Agenda of the Davos Elite



This year's World Economic Forum in Davos, Switzerland, where business leaders' public positions on automation's impact on workers did not match the views they shared privately.

Laurent Gillieron/EPA, via Shutterstock

“In Davos, executives tend to speak about automation as a natural phenomenon over which they have no control, like hurricanes or heat waves. They claim that if they don’t automate jobs as quickly as possible, their competitors will.”

Socially Responsible Automation*

Business Goals

Create new revenue streams & Good jobs

Enhance worker performance, skills, quality

Increase productivity, quality, accuracy

Drive cost efficiency

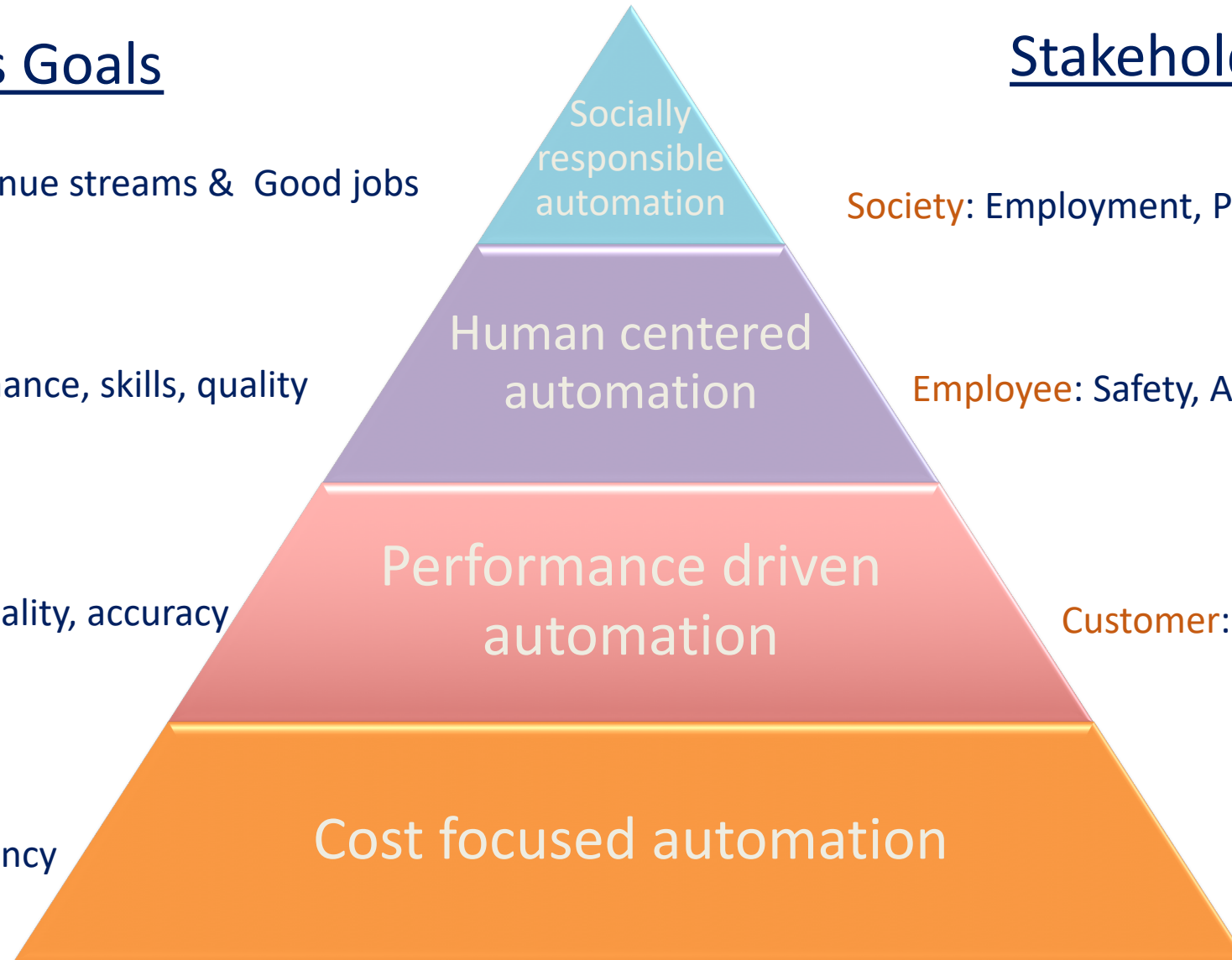
Stakeholder Values

Society: Employment, Prosperity, Opportunity

Employee: Safety, Autonomy, Achievement

Customer: Superior Offering, Service

Stockholder: Profit



Role of Universities and Industry

- How can new automation, machine learning and artificial intelligence technologies be developed to enhance human flourishing? Intelligence and Human Augmentation rather than Artificial Intelligence should be the goal.
- How should educational programs change to ensure graduates can adapt to the evolving changes in work and jobs?
- What new educational programs are needed? Worker reskilling is likely to be a major need.
- How can industry adopt “socially responsible automation”? Are there better alternatives?

THANK YOU!

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Strengthening
University-Industry
Partnerships