

Future Trends That Are Changing Everything





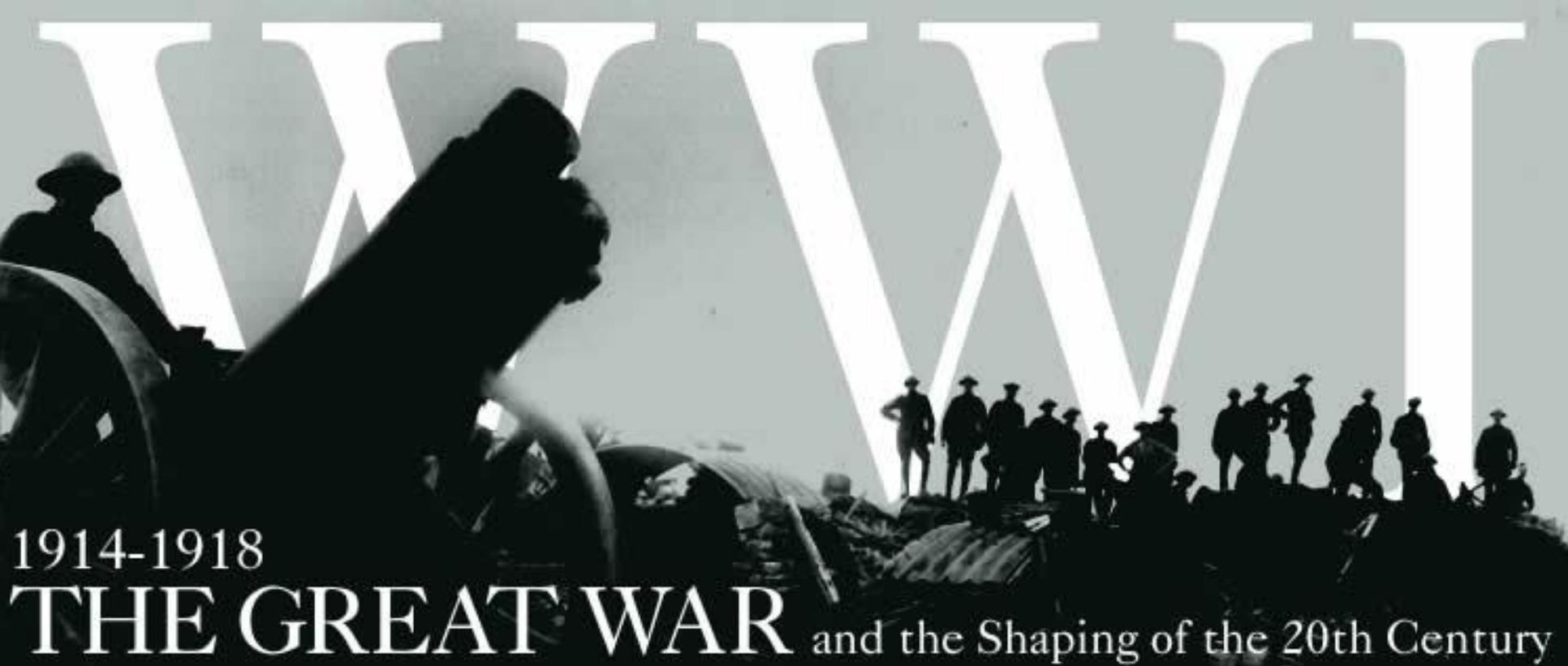
"Too often we enjoy
the comfort of
opinion without
the discomfort of
thought."

John F. Kennedy

I Have Nothing
Profound to
Say



Except, many of the things we
used to all know we knew, have
changed

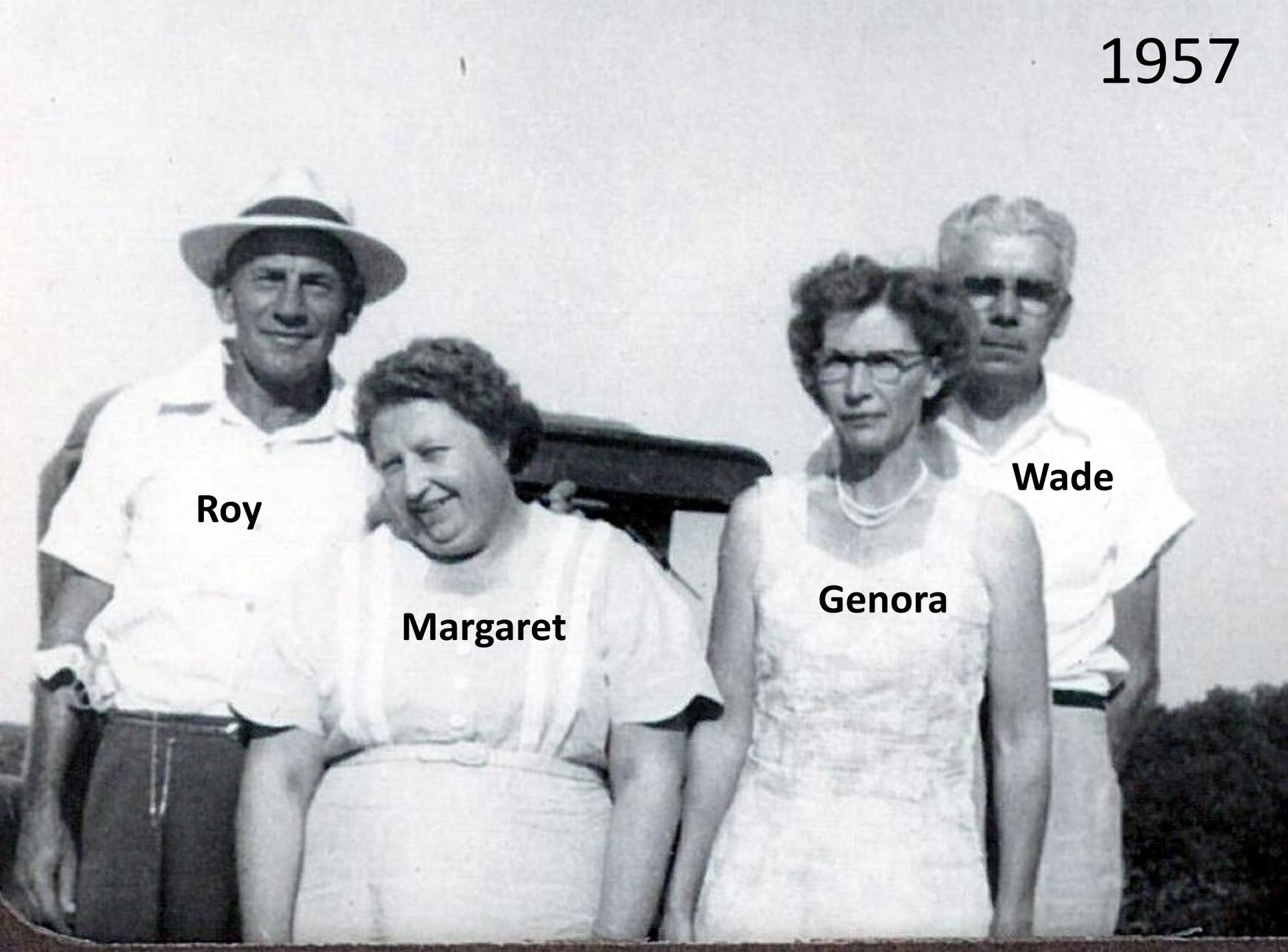


1914-1918

THE GREAT WAR and the Shaping of the 20th Century

- Rise of Nationalism and Xenophobia
- Technological Displacement of Workers
- Fracturing of Long-held Political Alliances and Trading Deals
- The Rise of Great City-States and the De-emphasis of Rural Areas
- Increased Communication Options that Spread Tribal Ideas

1957



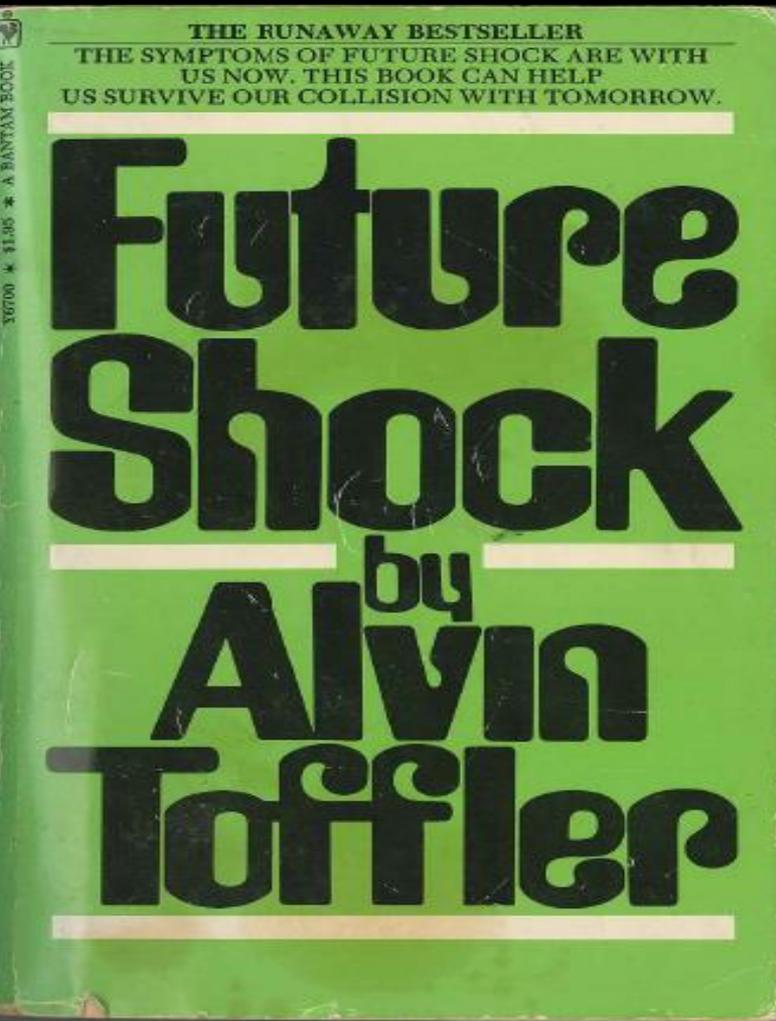
Roy

Margaret

Genora

Wade

In 1971, Alvin Toffler Wrote that the Pace of Change...



"Is the dizzying disorientation brought on by the premature arrival of the future, a product of the greatly accelerated rate of change in society."

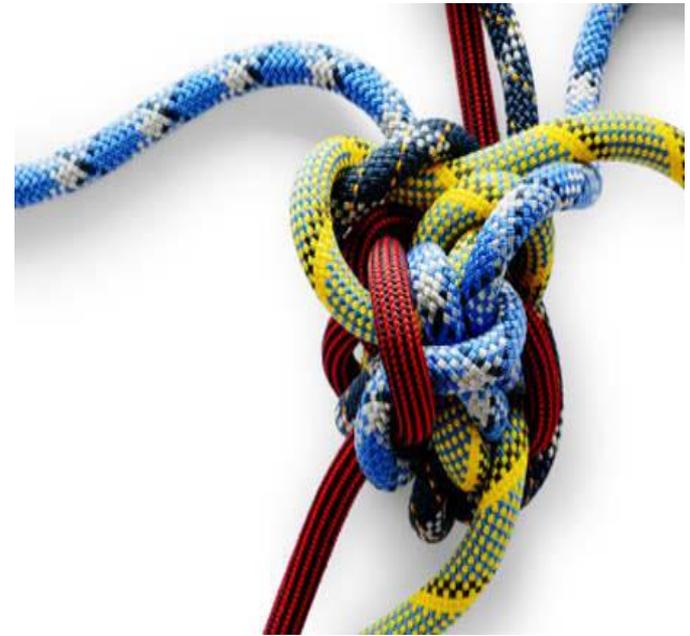
Complexity Paralysis



Trendspotting

**5 that are
“Conundrums”**

Complex or perplexing trends that generally have no clear solution.



#1- Ubiquitous Globalization and the Good and Bad That Comes With It



How the average American sees the World

A Stereotype Map





Global Unemployment Rates- 5 Years

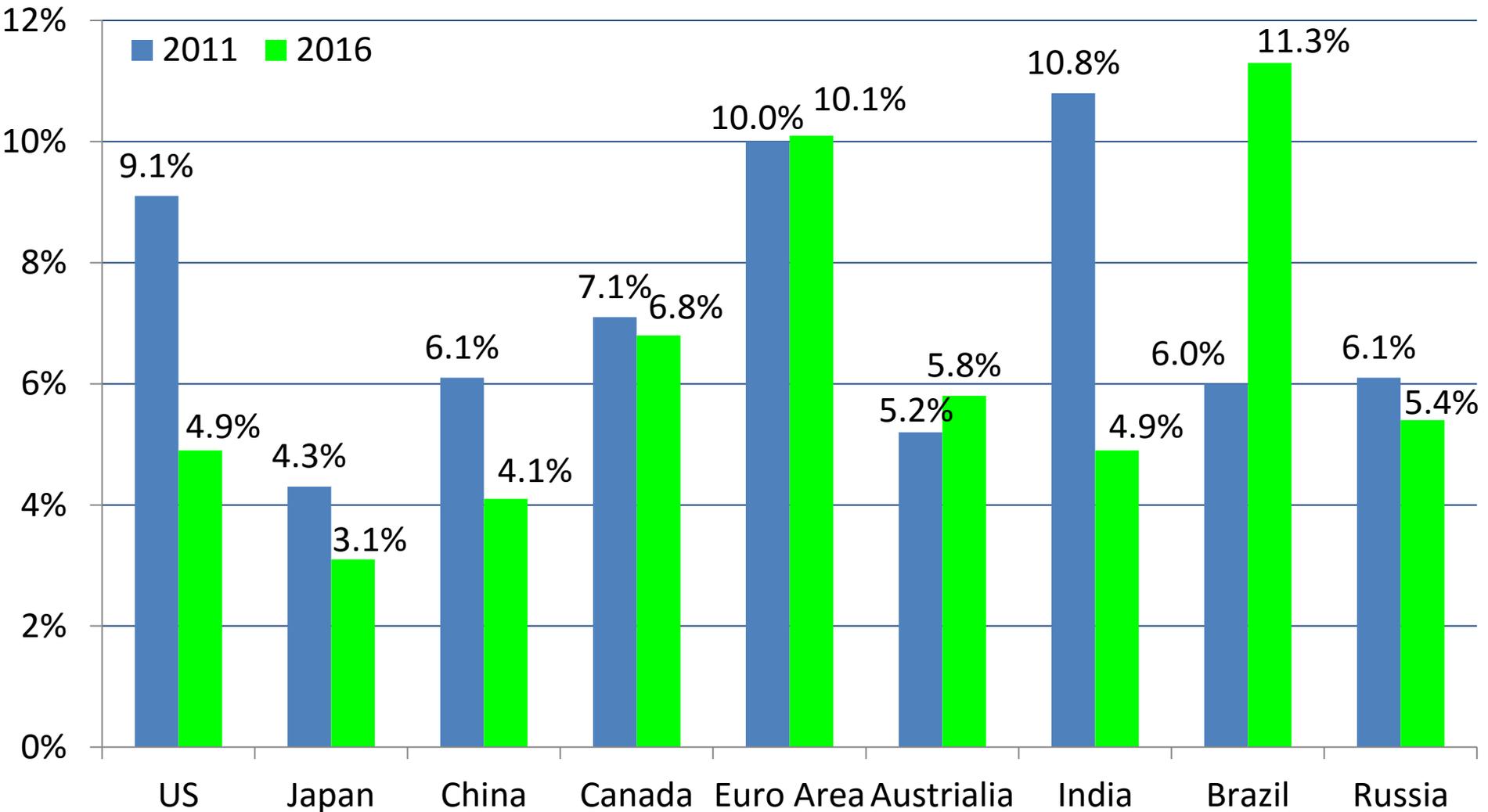
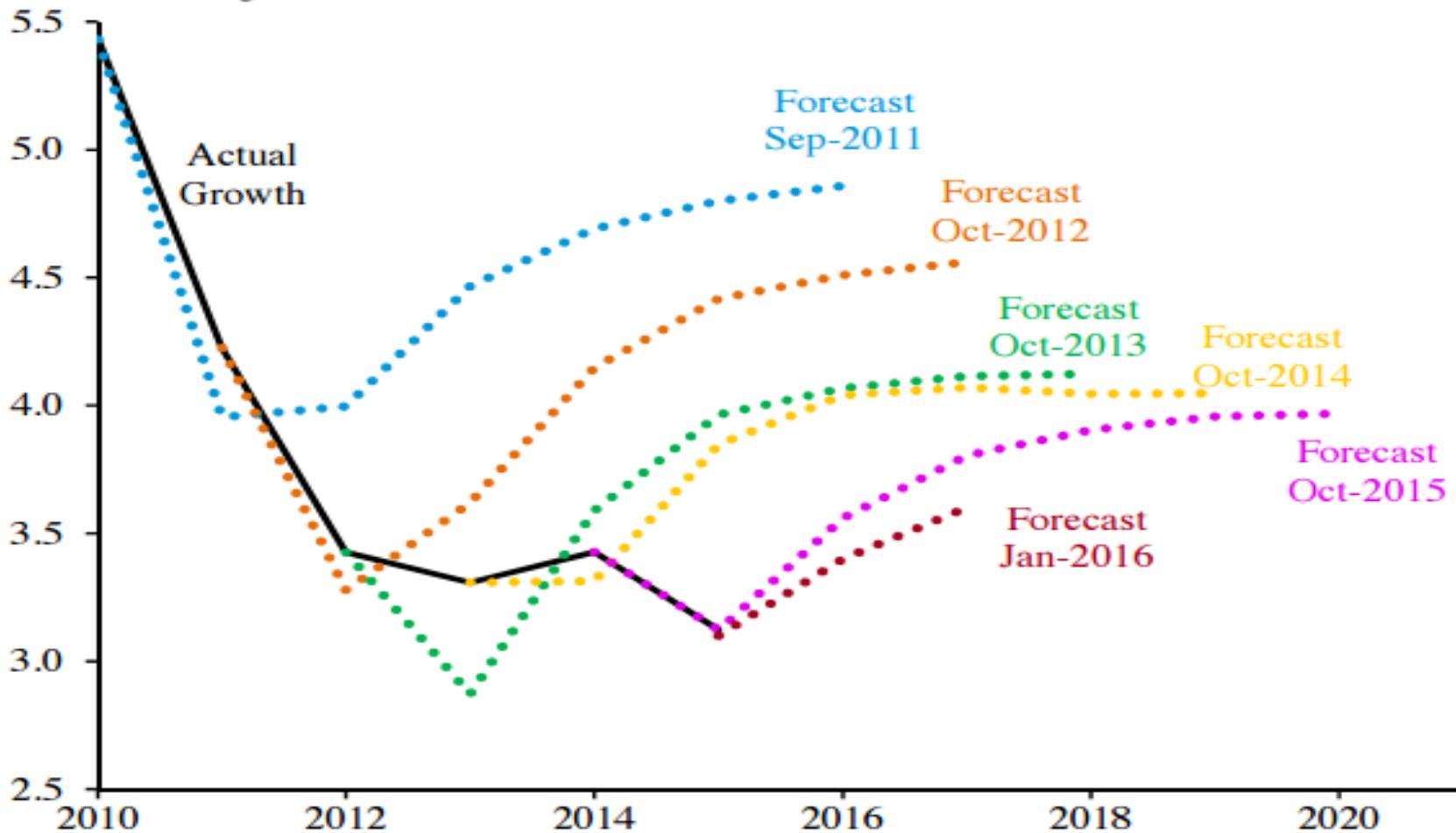


Figure 3-1

IMF World Real GDP Growth Forecast, 2010–2020

Percent Change, Year-over-Year



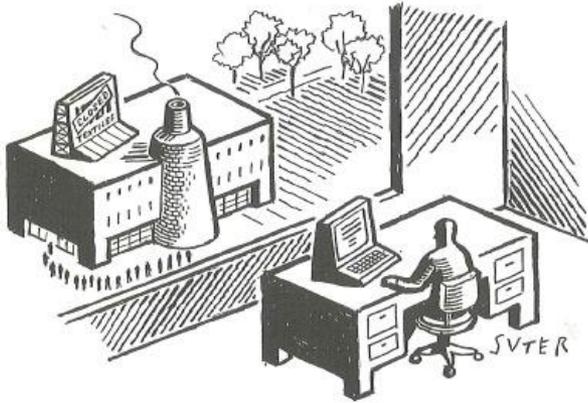
Source: International Monetary Fund (IMF).

#2- Accelerating Economic and Population Urbanization





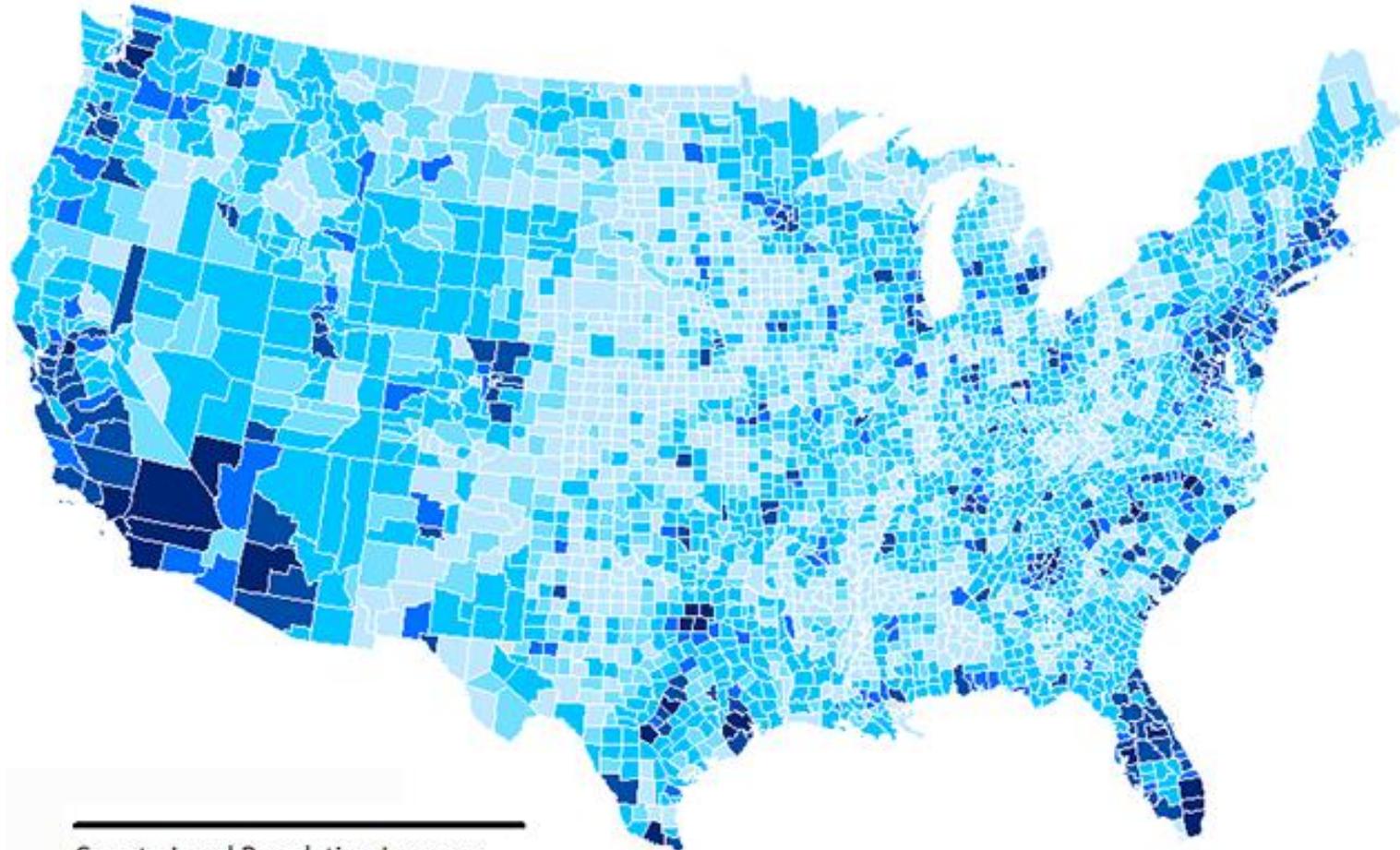
AFTER THE FACTORIES
CHANGING EMPLOYMENT PATTERNS
IN THE RURAL SOUTH



SOUTHERN GROWTH POLICIES BOARD
RESEARCH TRIANGLE PARK, NORTH CAROLINA

“What we begin to notice in 1983 was an alarming economic decline in the non-metropolitan South.”

County Population Growth, 2000 through July 2014

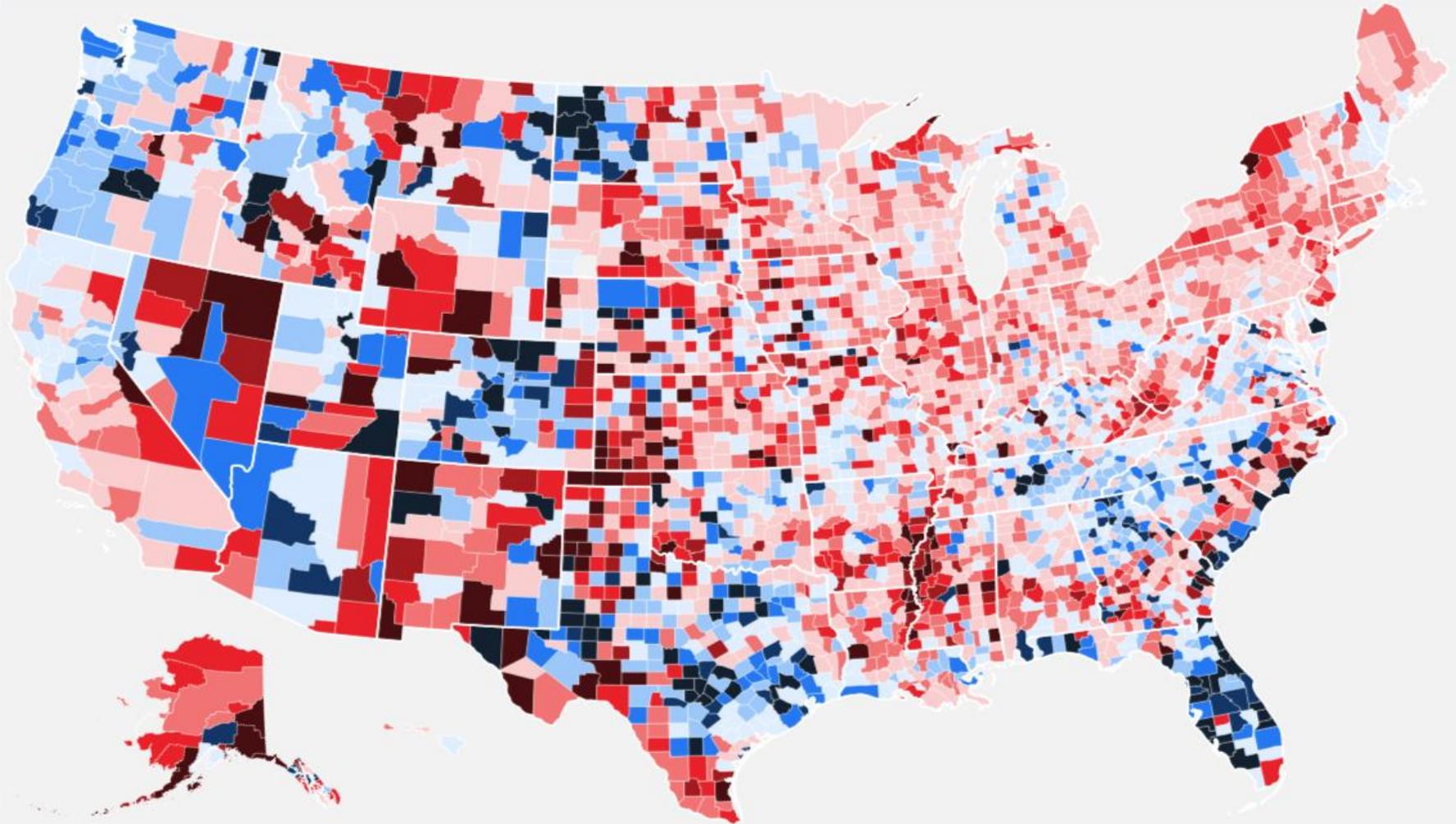


County-Level Population Increase

Population Growth, 2000 to 2014



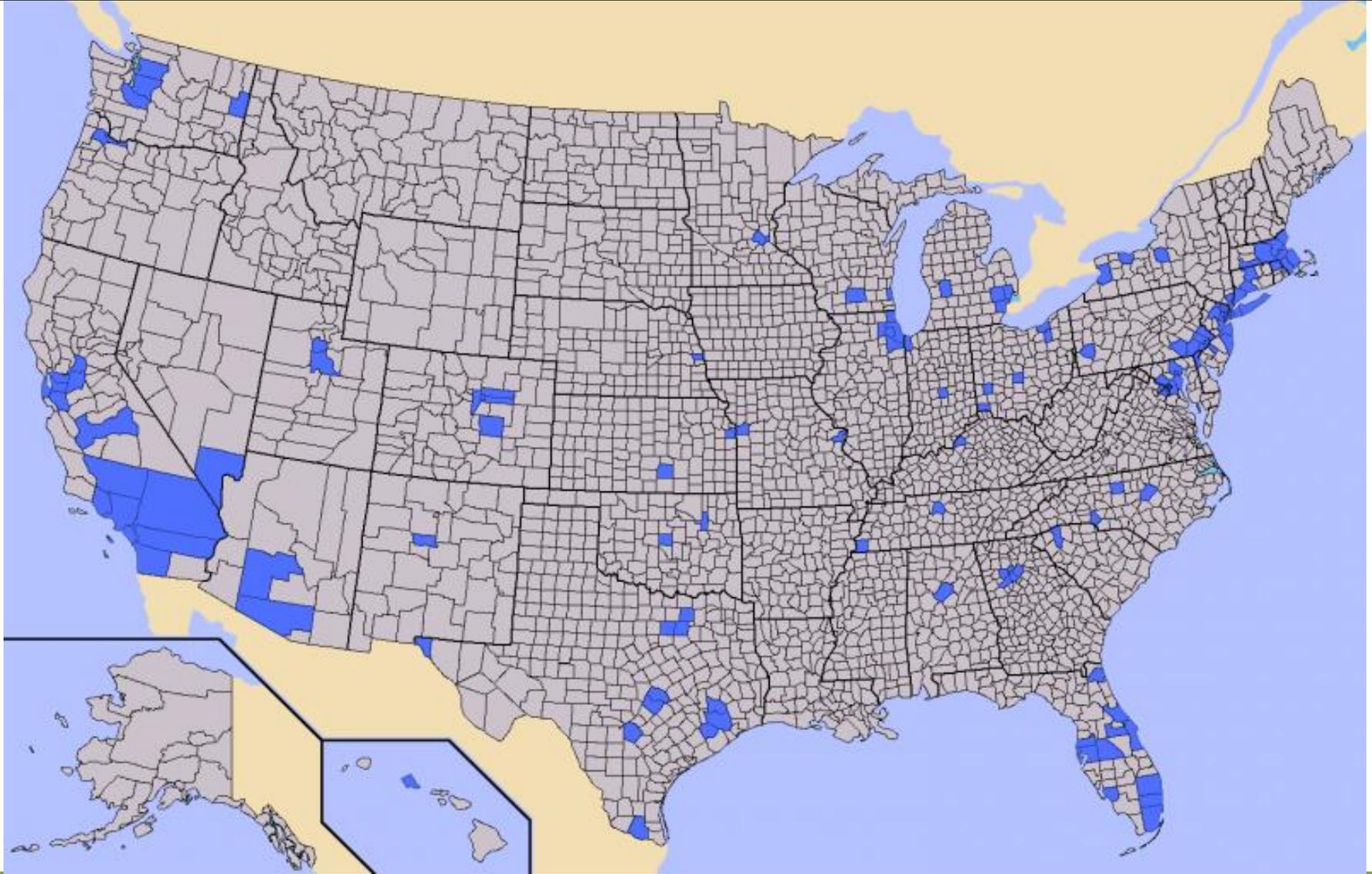
NET DOMESTIC MIGRATION, 2014-2015



NET DOMESTIC MIGRATION PER 1,000 2014 RESIDENTS

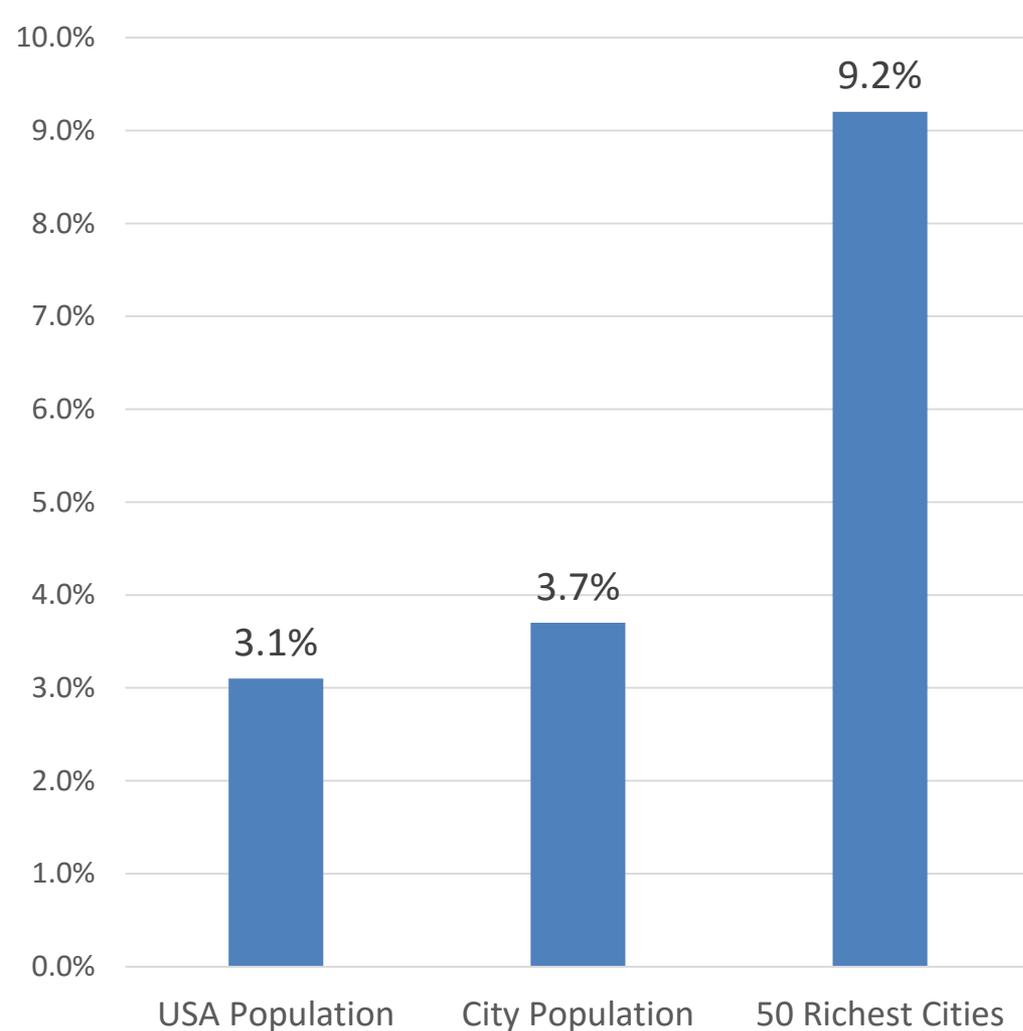


Half of the US Population Lives in these 146 Counties



The Great Divergence

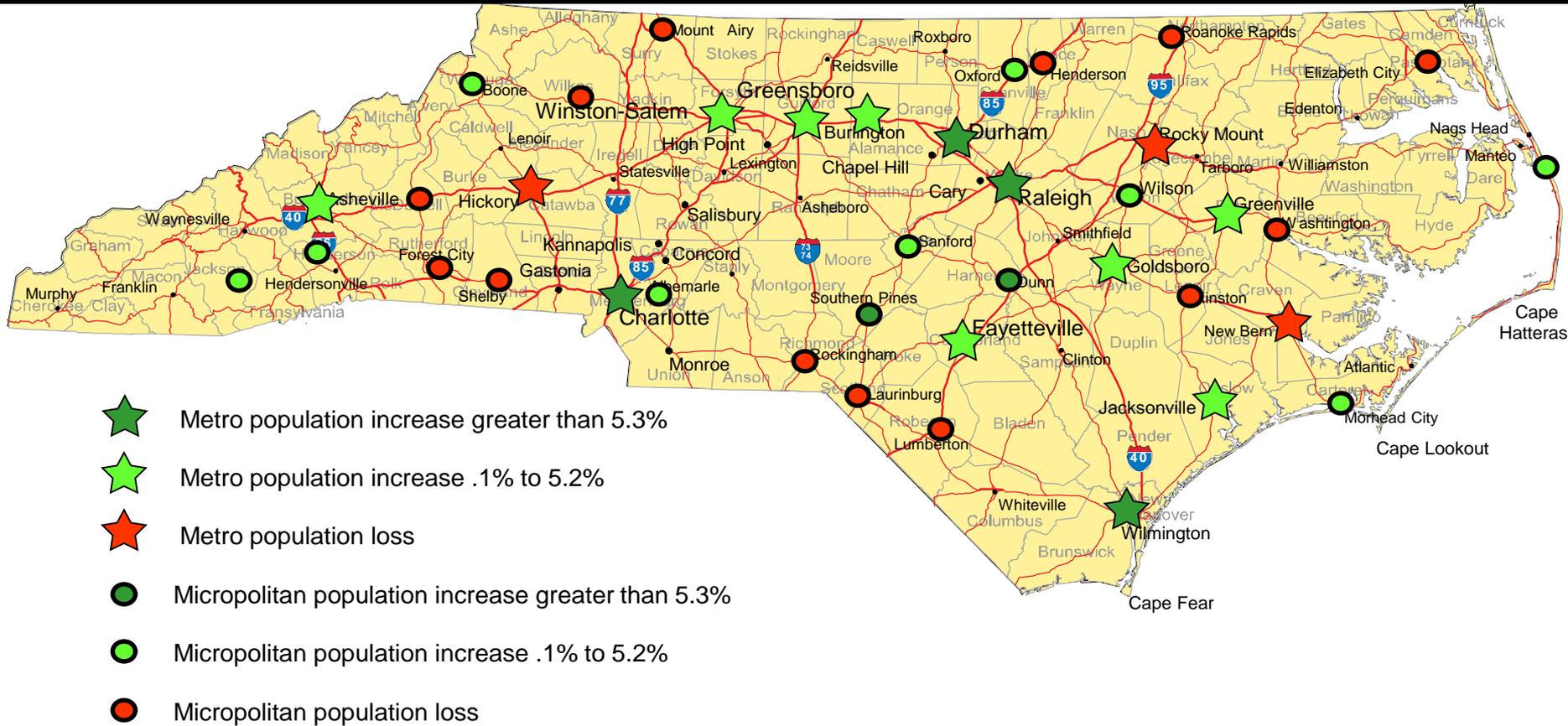
2010-2014 Population Growth



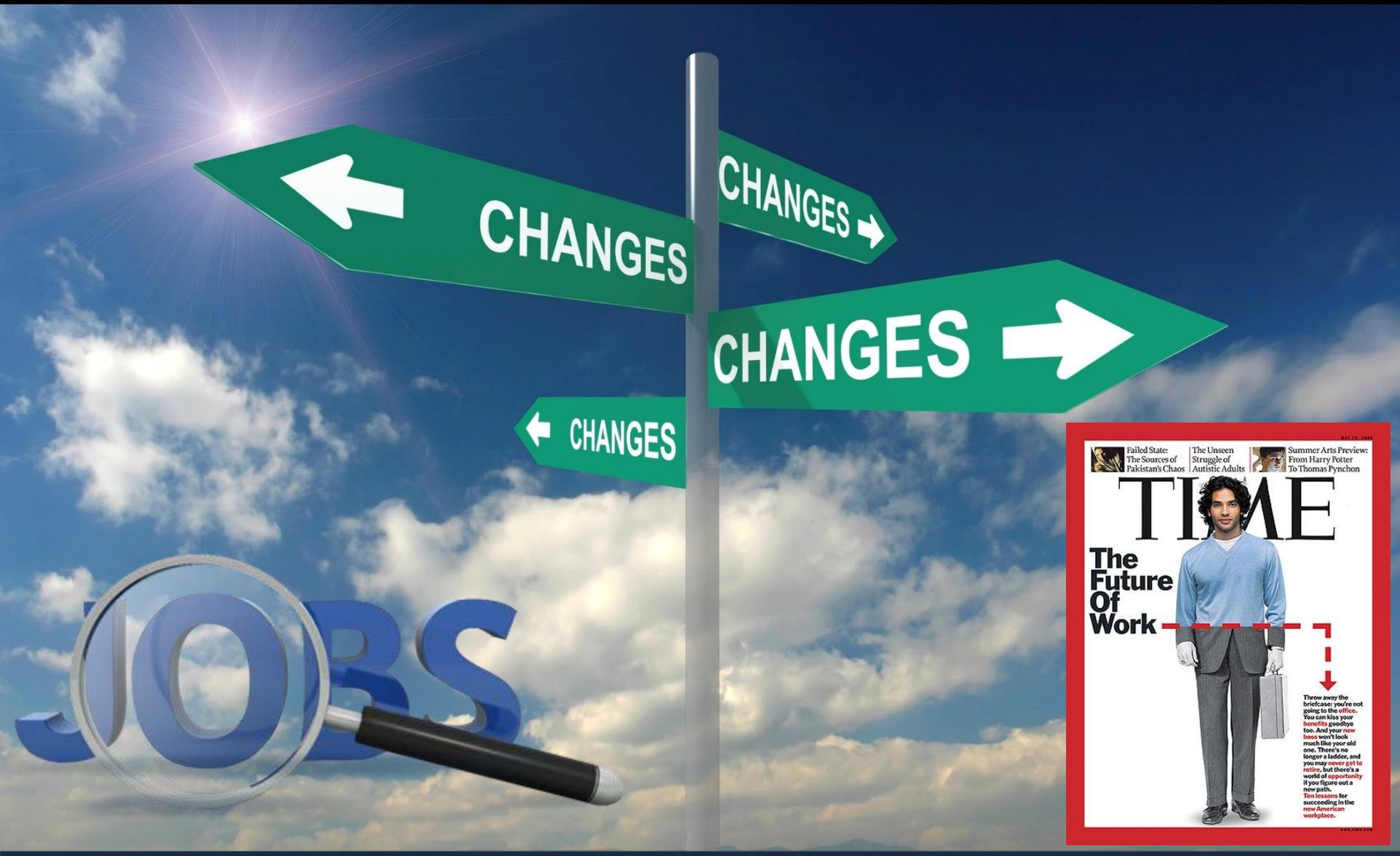
In 2013 Tyler Cowen, an economist at George Mason University, predicted in his book “Average is Over” that the fortunes of both people and places would become more polarized. Ambitious and talented workers, he argued, would want to work in a relatively small number of cities and regions.

North Carolina Change in Population Metro & Micropolitan Areas 2010 - 2015

North Carolina Average 5.3%



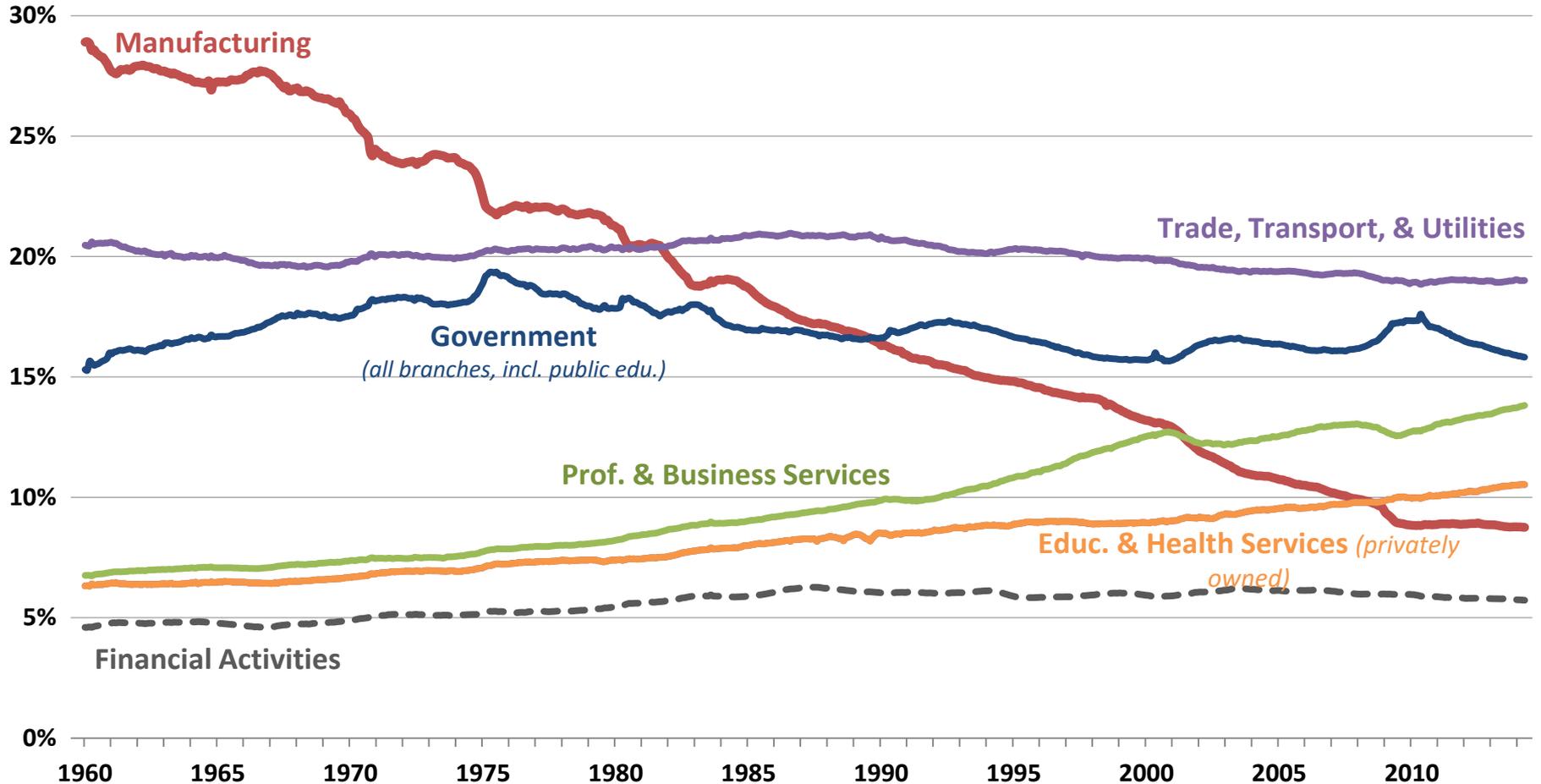
3 The Changing World of Work- Industry 4.0



INDUSTRY SHARE OF EMPLOYMENT

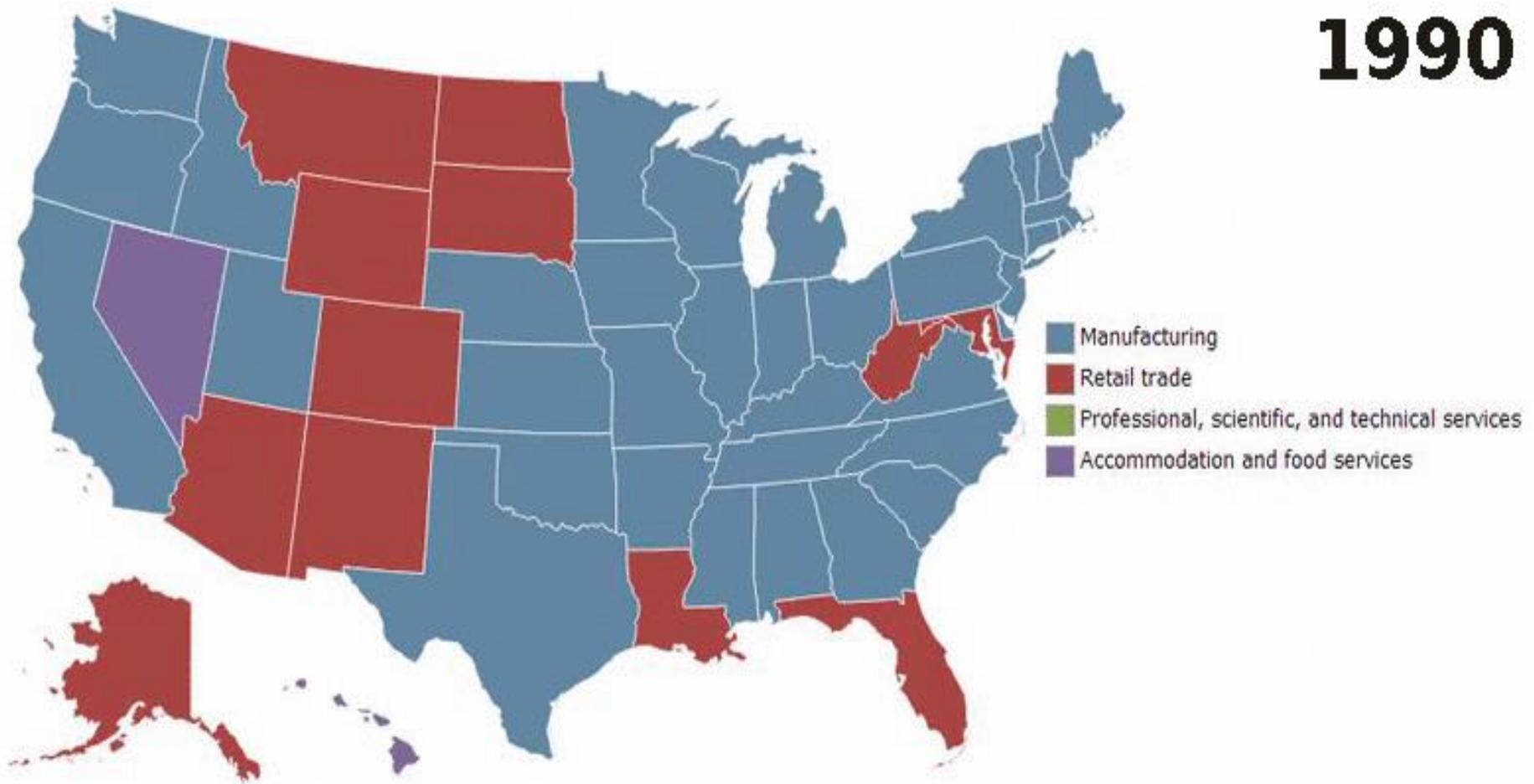
SHARE OF TOTAL US NONFARM EMPLOYMENT

Selected Sectors, 1960 to present (April 2014, prelim.)



The shift in the types of jobs has been swift and profound!

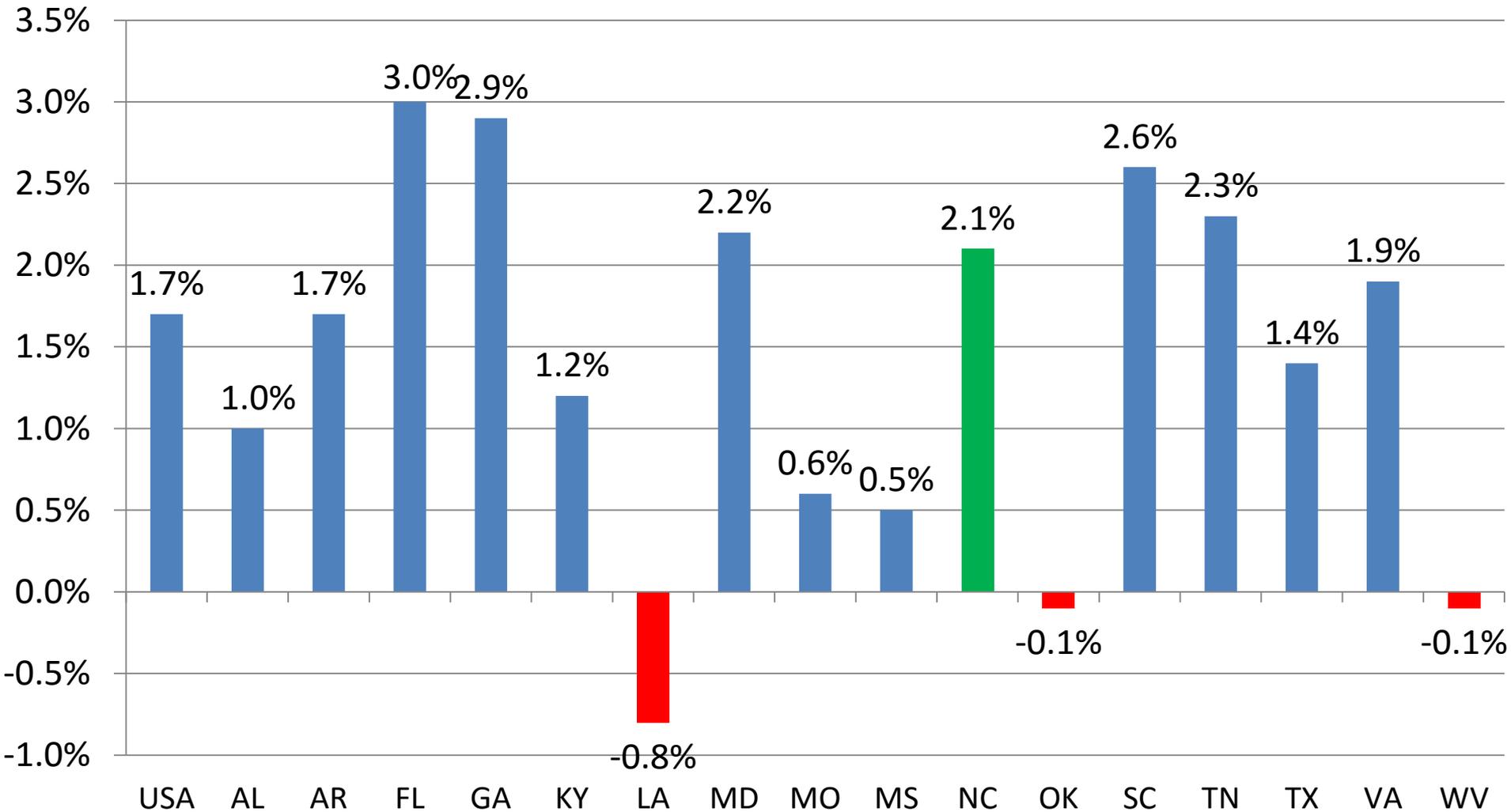
1990



Hover over a state to see information.
Source: U.S. Bureau of Labor Statistics.

Southern States 1-Year

Total Employment June 2015 to June 2016



Technologies to Watch for the Next-Generation Enterprise in 2016

Incremental

will drive significant improvement in existing infrastructure and processes

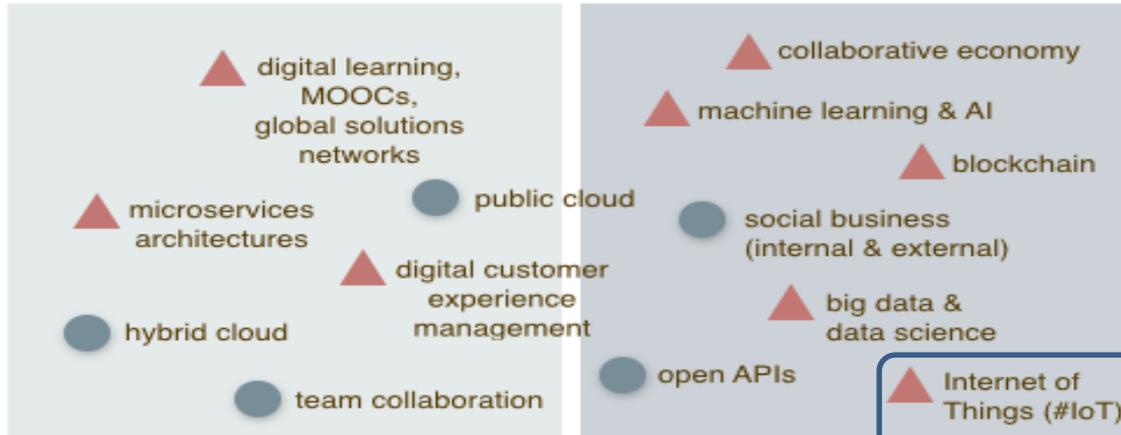
Disruptive

will create new markets and/or upend existing markets

Horizon

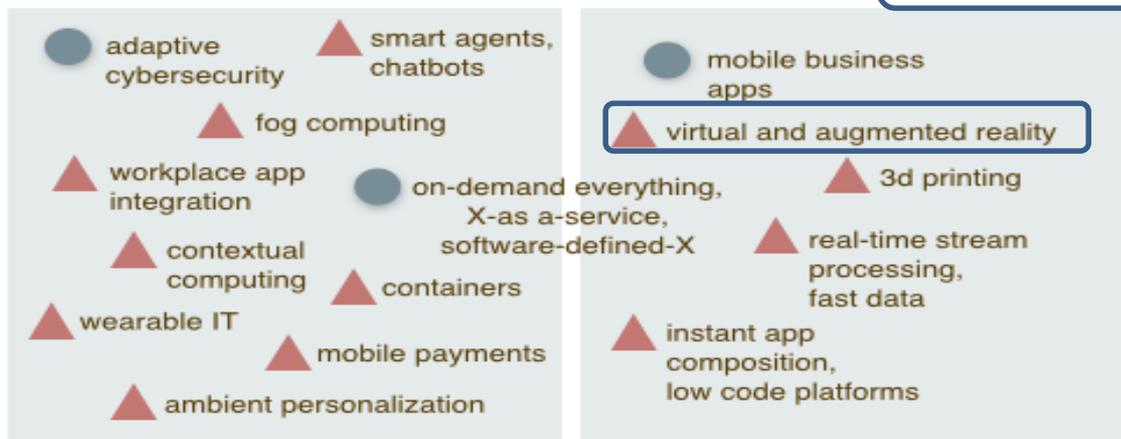
must track technology likely to enter enterprise watch list in 18-36 months

Strategic



- ▲ mind/machine interfaces
- ▲ cryptocurrencies
- ▲ prescriptive analytics
- ▲ emergent artificial intelligence
- ▲ seamless multi-cloud operations
- ▲ office robotics
- ▲ business drones
- ▲ intelligent vehicles
- ▲ smart advisors
- ▲ DNA computing
- ▲ quantum computing
- ▲ shared digital perception
- ▲ universal digital identities
- ▲ embeddables
- ▲ nanodevices
- ▲ bioprinting
- ▲ affective computing
- ▲ holographic projection

Tactical

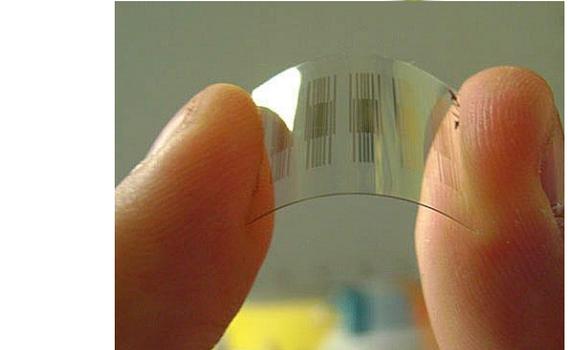


● = in or entering mainstream ▲ = still emerging

From <http://zdnet.com/blog/hinchcliffe> on by Dion Hinchcliffe

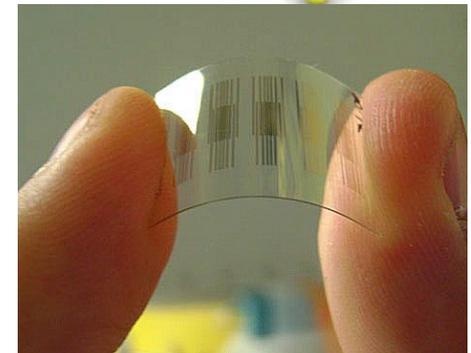
Top Emerging Technologies 2016

- 1) Nanosensors & the Io Nanothings
- 2) Next Generation Batteries
- 3) Blockchain (Bitcoin)
- 4) Two-Dimensional Materials
- 5) Autonomous Vehicles
- 6) Organs on Chips
- 7) Perovskite Solar Cells
- 8) Open AI Systems
- 9) Optogenetics
- 10) Systems Metabolic Engineering



Top Emerging Technologies 2016

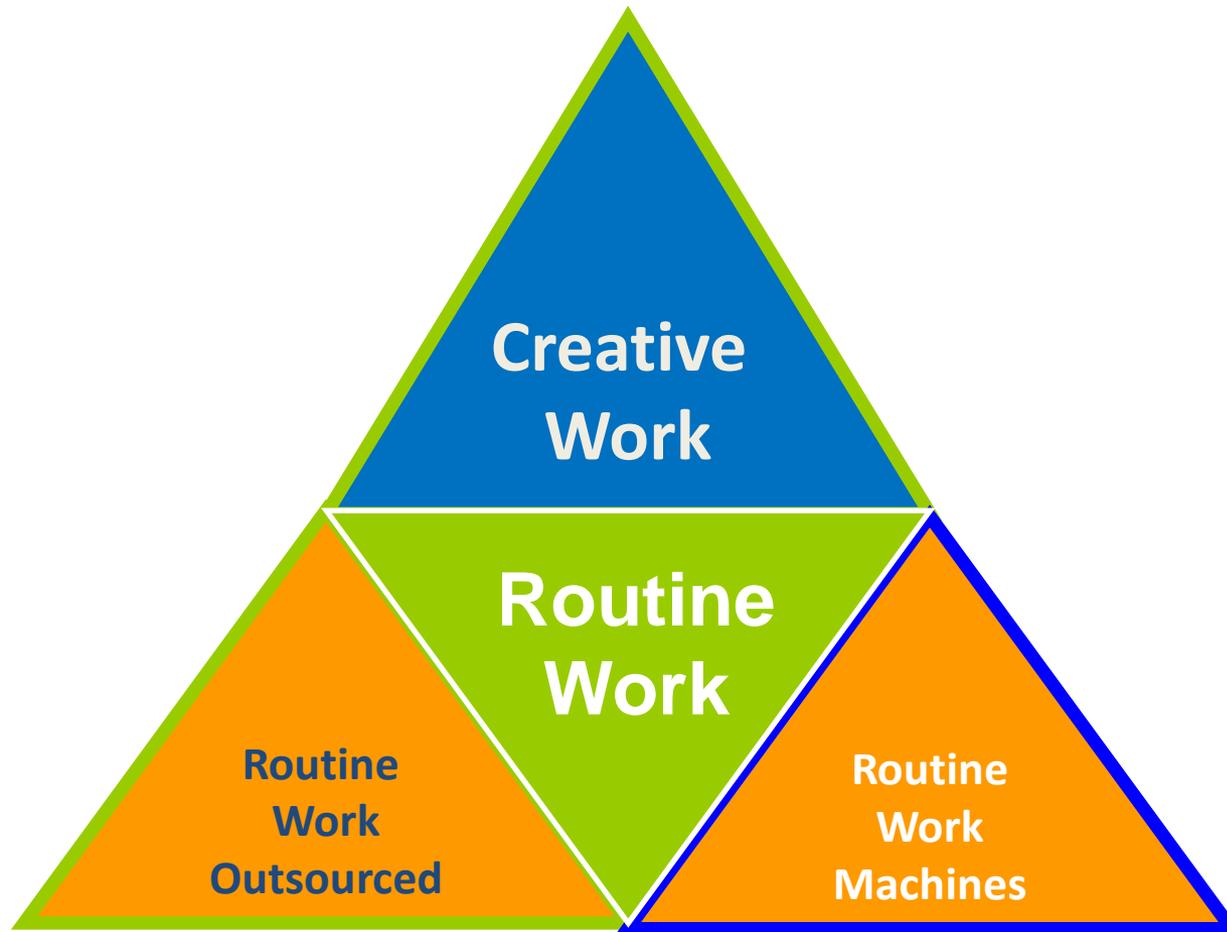
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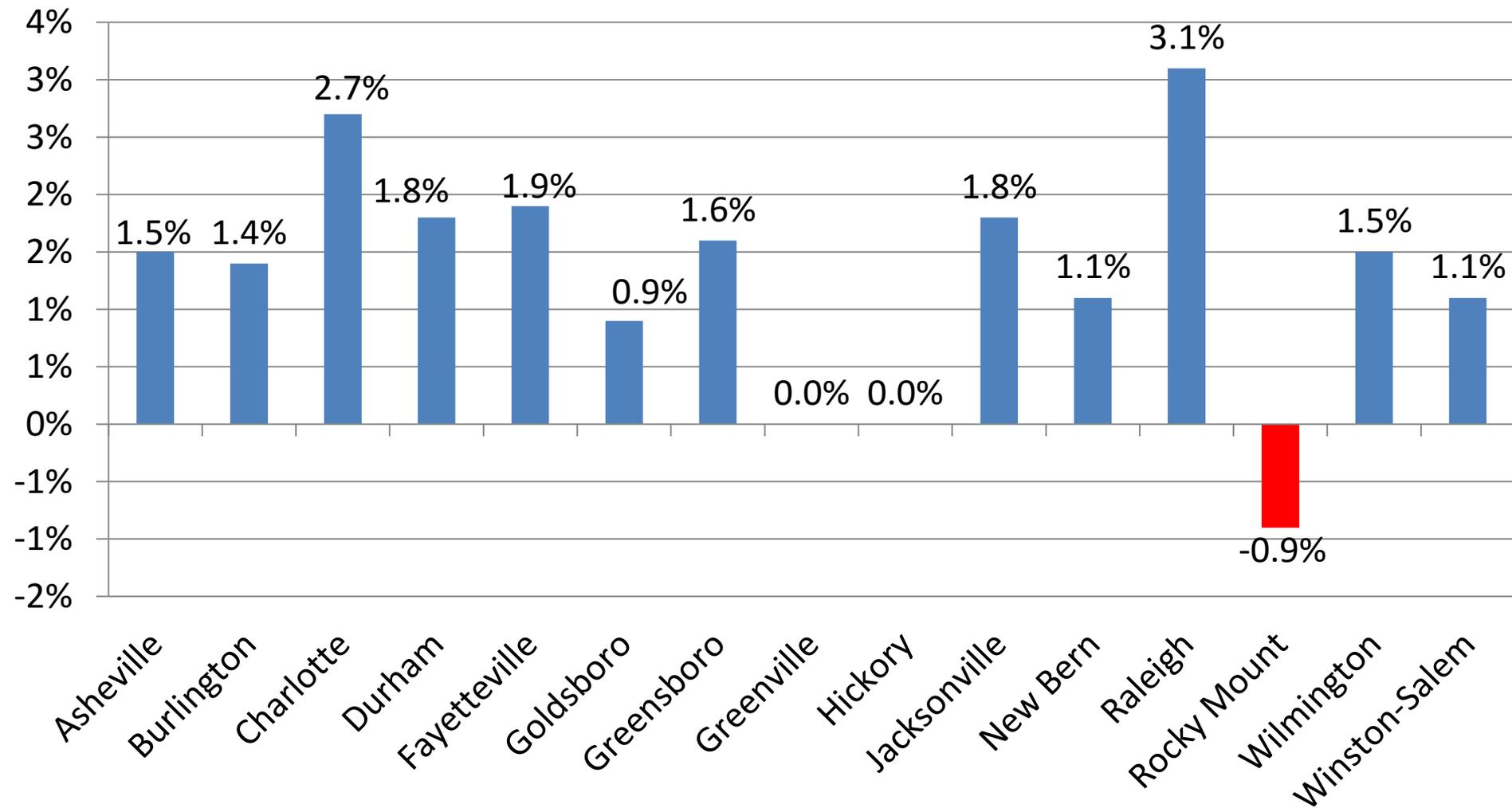
GIG ECONOMY



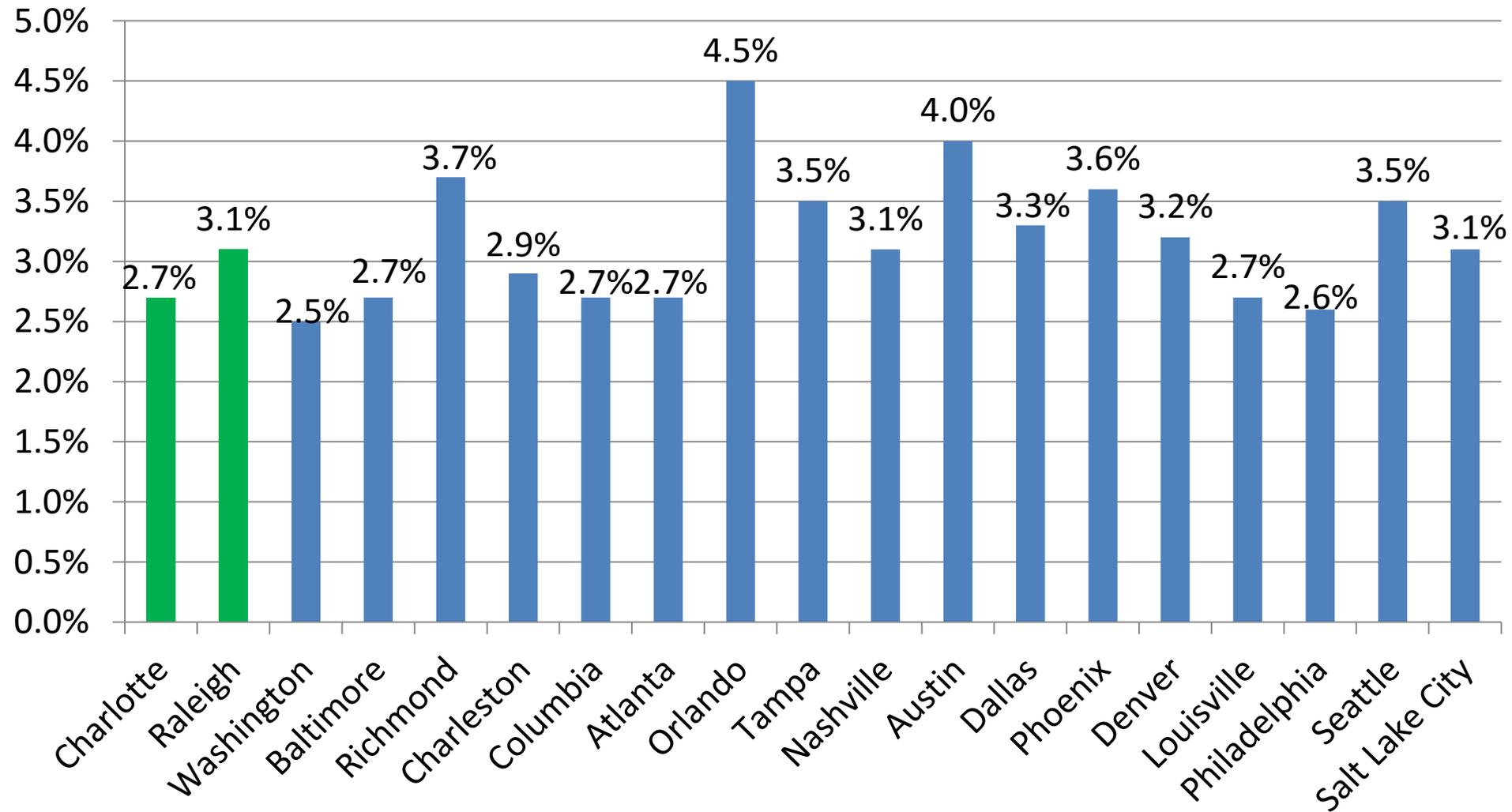
Work Shifts



North Carolina Metro Employment Growth June 2015 – June 2016

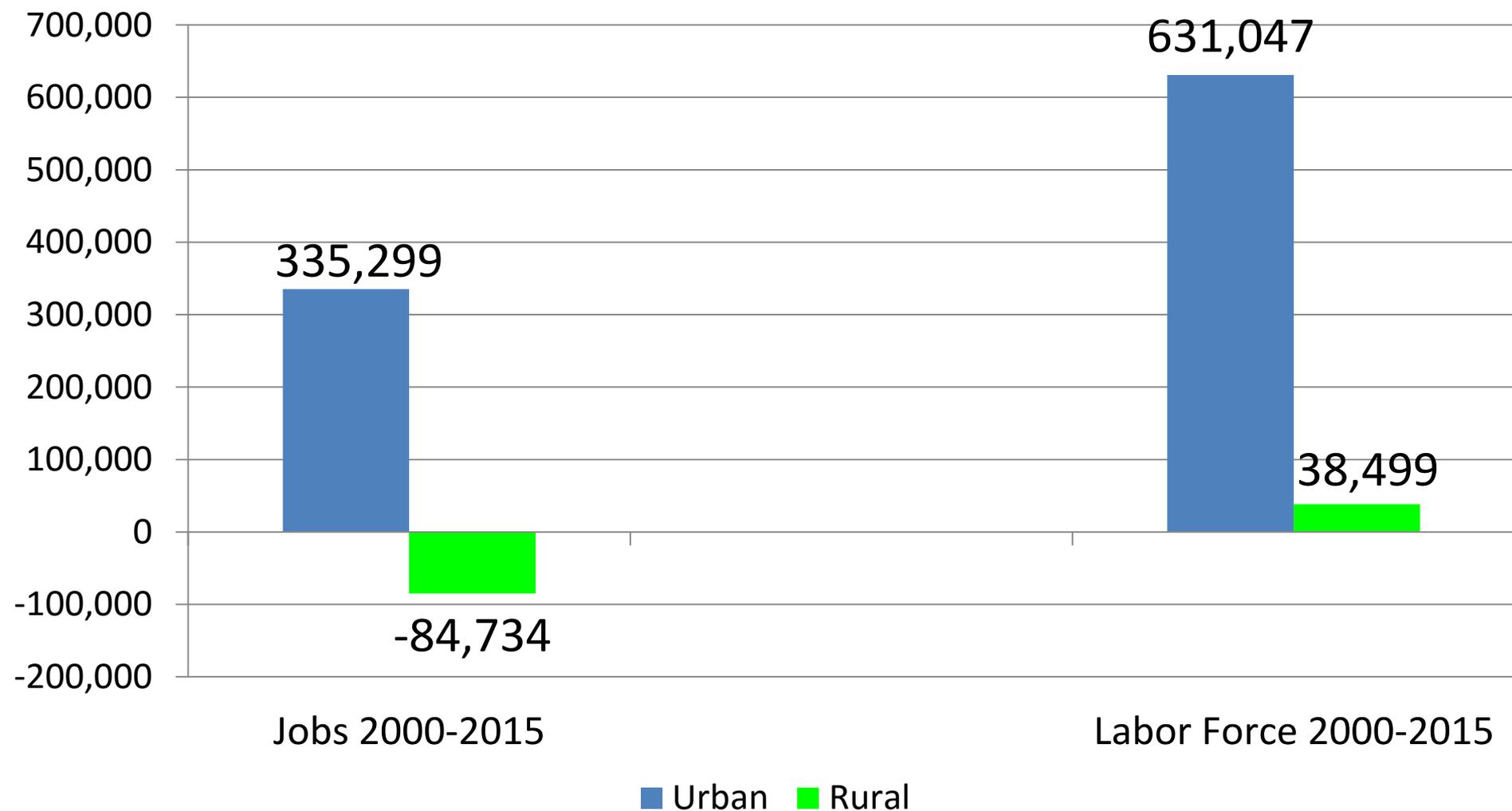


Metro Employment Growth June 2015 – June 2016



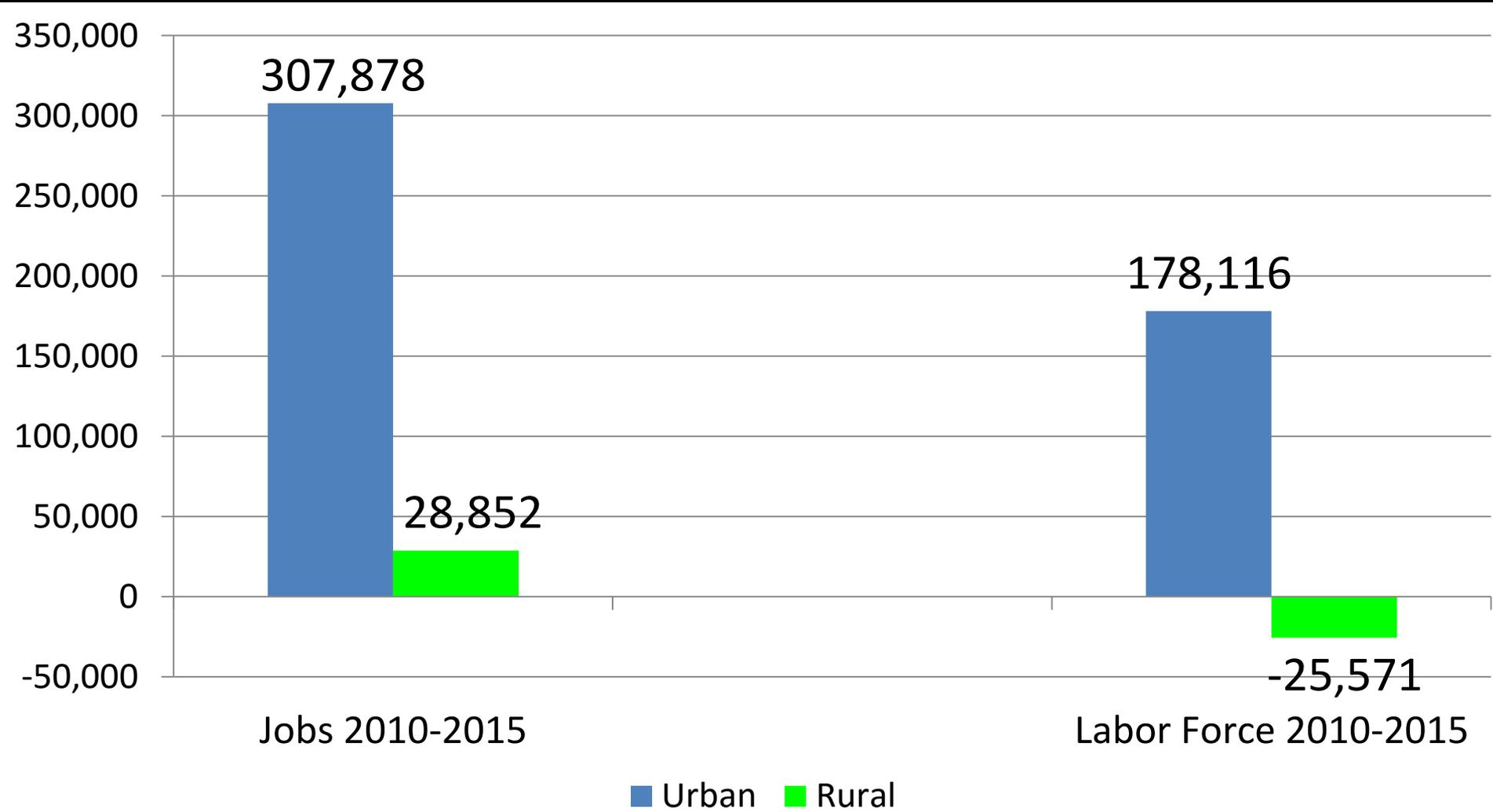
NC Job & Labor Force Shifts 2000-2015

Urban and Rural



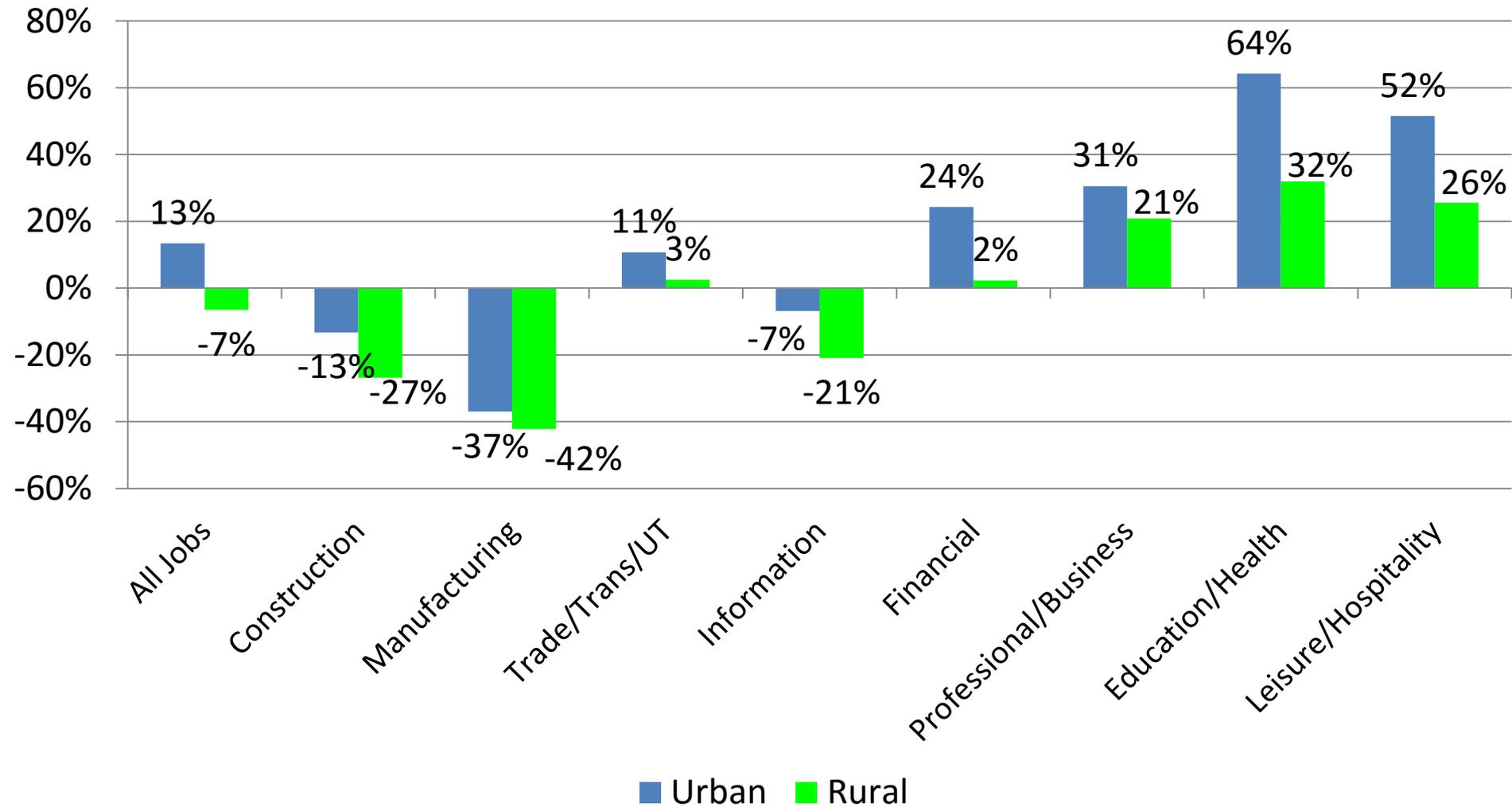
NC Job & Labor Force Shifts 2010-2015

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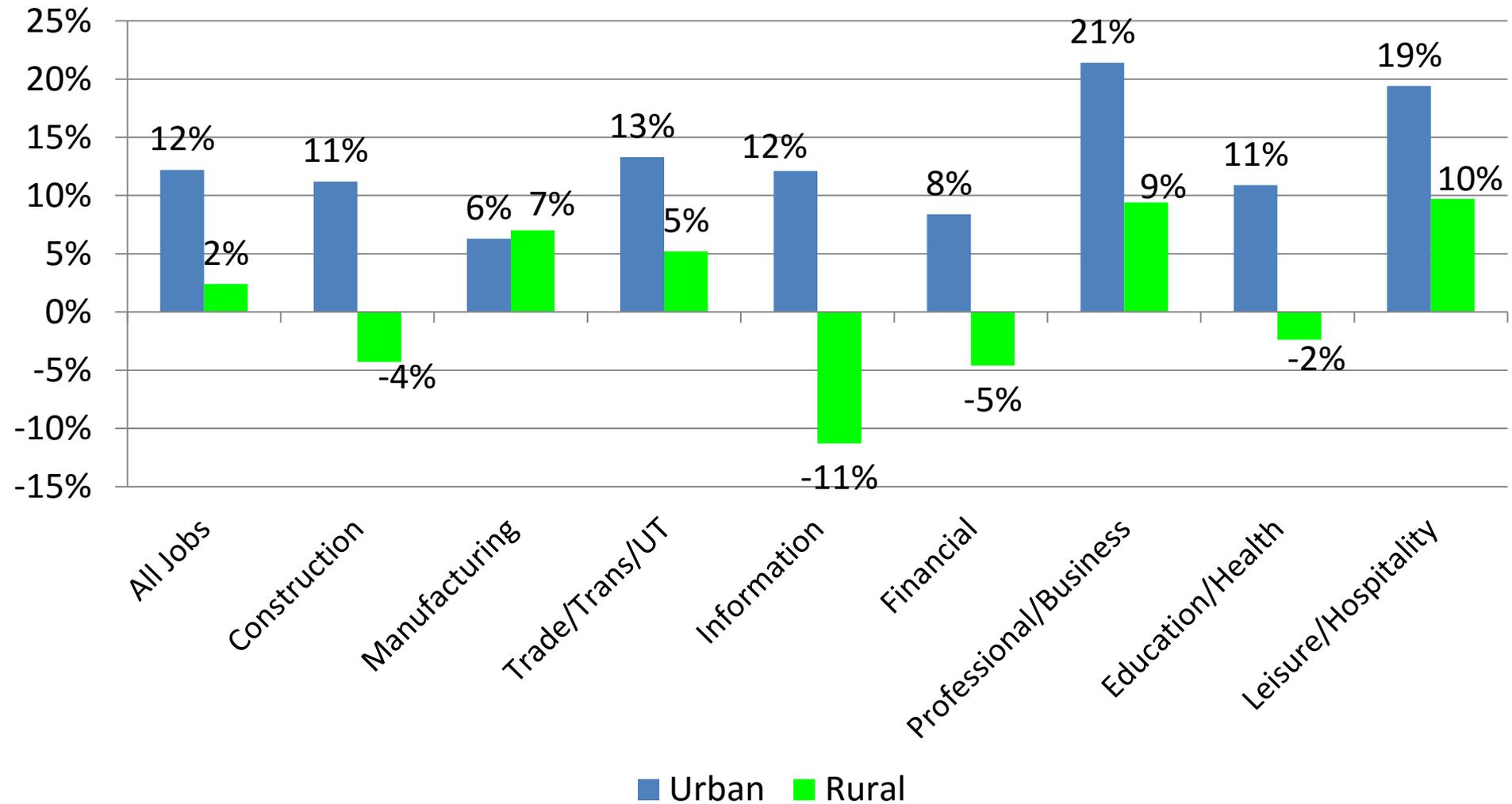
NC Job Changes 2000-2015

Urban and Rural



NC Job Changes 2010-2015

Urban and Rural



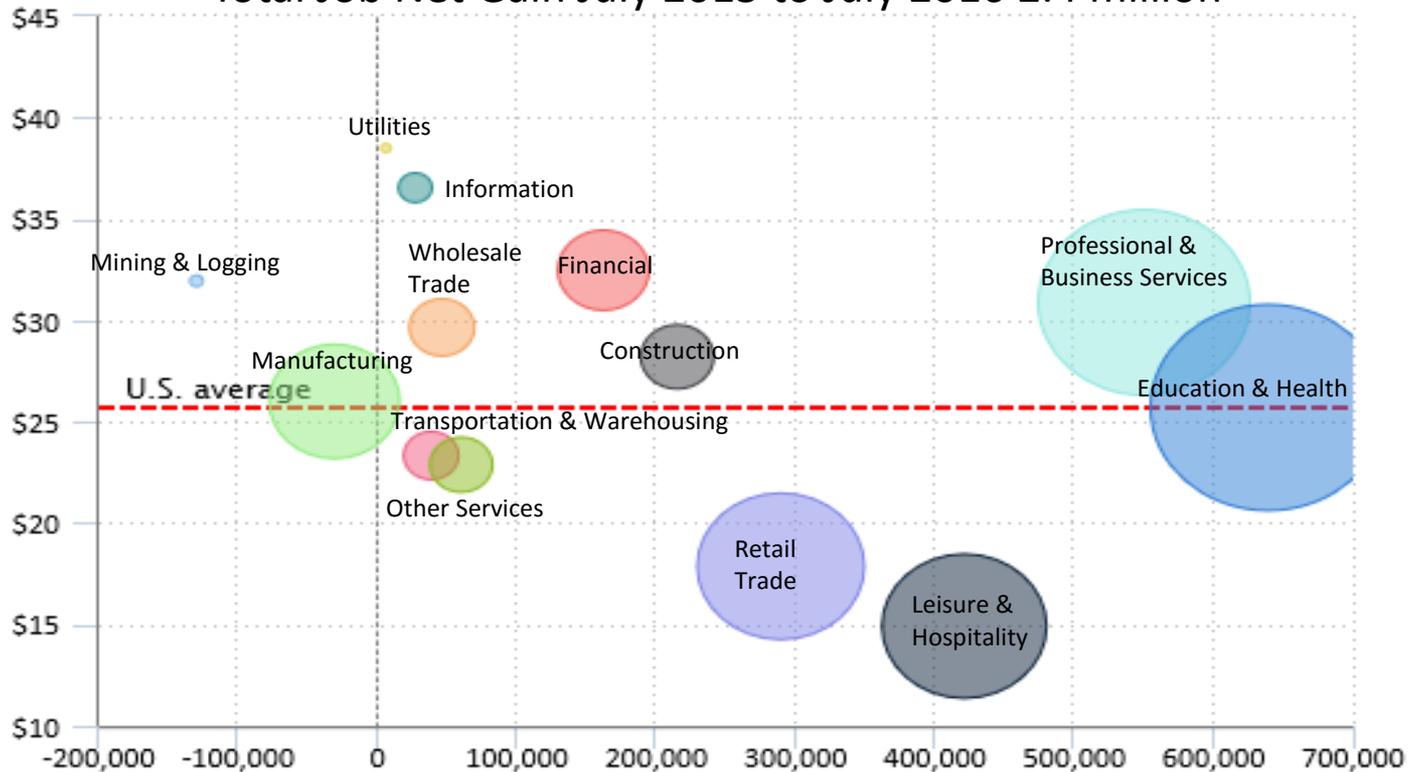
Employment and average hourly earnings by industry for all private sector employees, seasonally adjusted, July 2016



Bubble size represents employment level

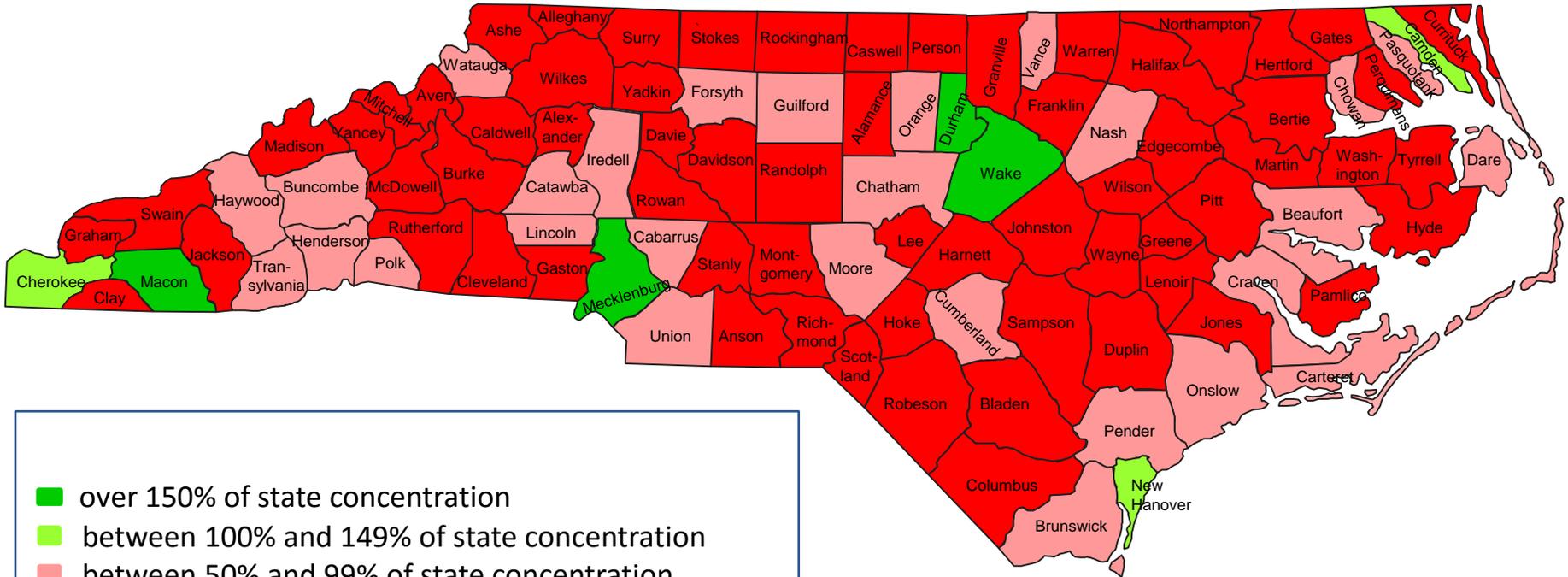
- Mining and logging
- Retail trade
- Financial activities
- Education and health services
- Construction
- Transportation and warehousing
- Professional and business services
- Leisure and hospitality
- Manufacturing
- Utilities
- Information
- Wholesale trade
- Other services

Total Job Net Gain July 2015 to July 2016 2.4 million



Click legend items to change data display. Hover over chart to view data.
 Source: U.S. Bureau of Labor Statistics.

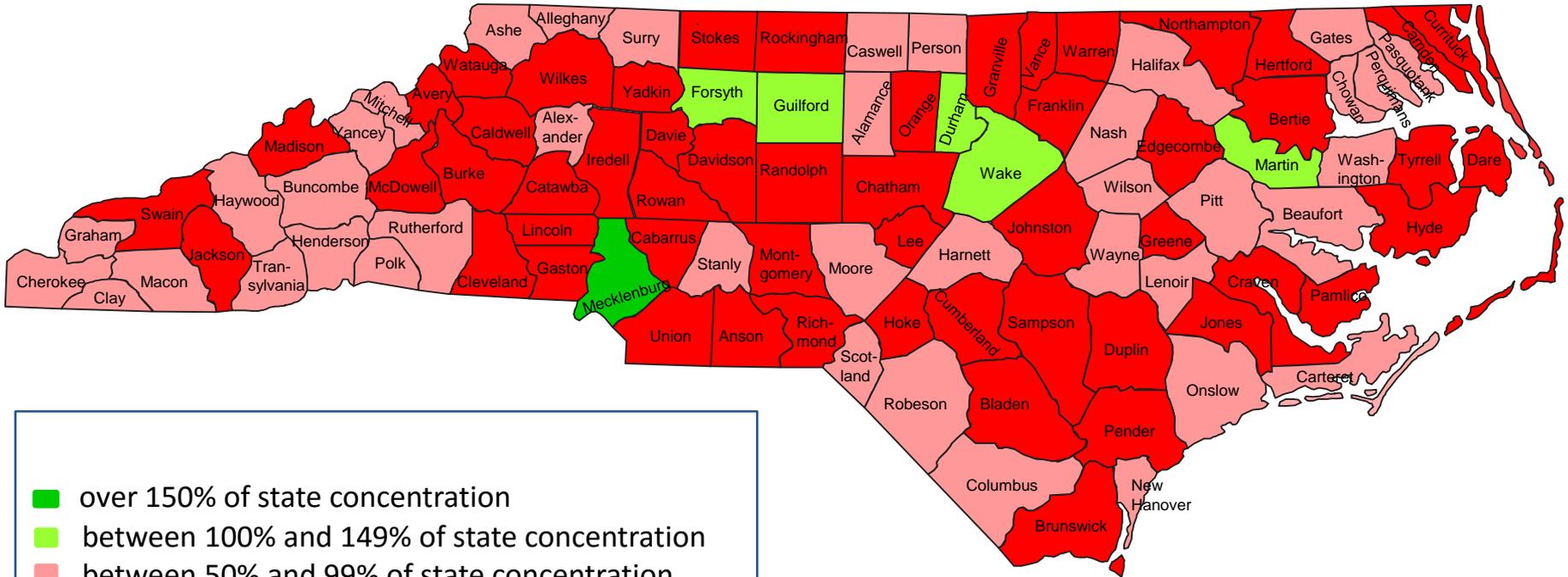
Concentration of County Jobs in Professional, Scientific and Technical Services



- over 150% of state concentration
- between 100% and 149% of state concentration
- between 50% and 99% of state concentration
- under 50% of state concentration

Professional, Scientific and Technical Services represents 4.93% of North Carolina jobs

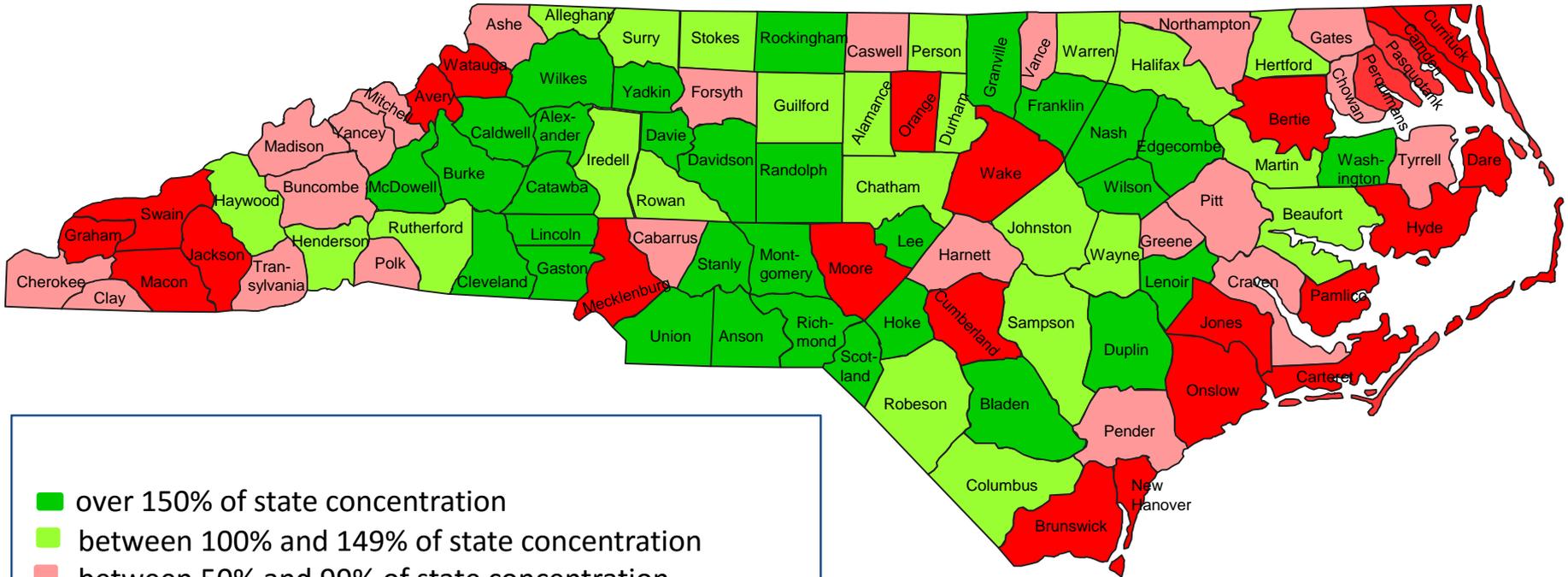
Concentration of County Jobs in Finance and Insurance



■ over 150% of state concentration
■ between 100% and 149% of state concentration
■ between 50% and 99% of state concentration
■ under 50% of state concentration

Finance and Insurance represents 3.60% of North Carolina jobs

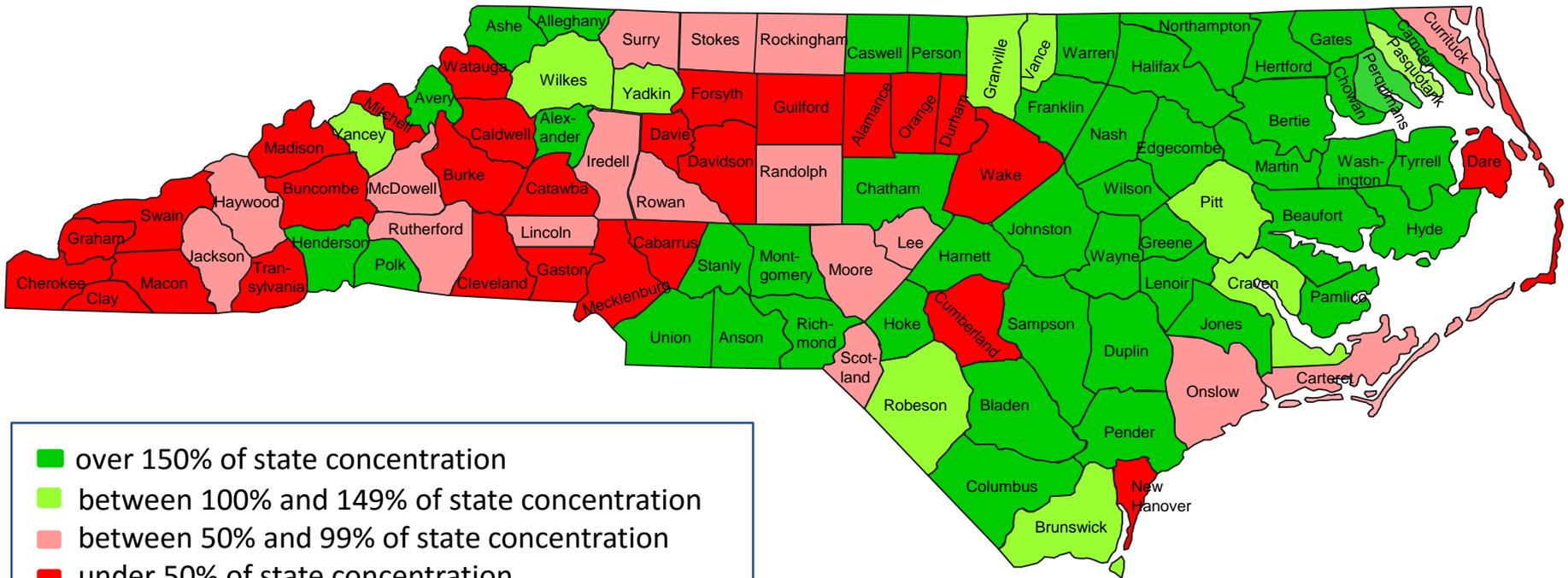
Concentration of County Jobs in Manufacturing



■ over 150% of state concentration
■ between 100% and 149% of state concentration
■ between 50% and 99% of state concentration
■ under 50% of state concentration

Manufacturing represents 11.21% of North Carolina jobs

Concentration of County Jobs in Agriculture, Forestry, Fishing

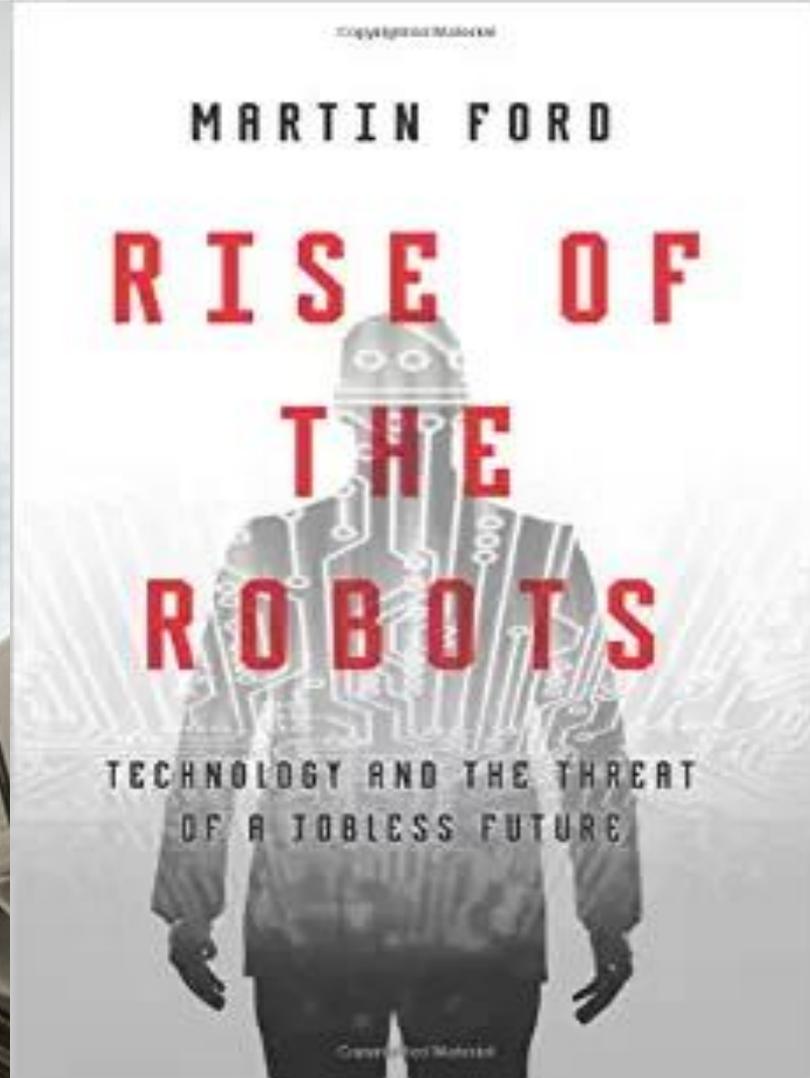


Agriculture, Forestry and Fishing represents .73% of North Carolina jobs

#4- Technological Unemployment



© © Blutgruppe/Corbis



THE SECOND MACHINE AGE

WORK, PROGRESS, AND PROSPERITY
IN A TIME OF
BRILLIANT TECHNOLOGIES

ERIK BRYNJOLFSSON
ANDREW McAFEE

Erik Brynjolfsson Andrew McAfee Race Against The Machine



How the Digital Revolution is Accelerating Innovation,
Driving Productivity, and Irreversibly Transforming
Employment and the Economy

Erik Brynjolfsson is a professor at the MIT Sloan School of Management, Director of the MIT Center for Digital Business, He graduated from Harvard University and MIT.

Andrew McAfee is a principal research scientist and associate director at the MIT Center for Digital Business at the Sloan School of Management. He graduated from MIT and Harvard University.

Technological Unemployment

- Coined in 1930 by John Maynard Keynes
- He predicted by 2030 we could all be working 15 hours a week
- McKinsey says 45% of all current job tasks could be automated today with existing technology
- 80% of low-wage jobs could be automated within 20 years

MI
special
features



GE's analog computer instantaneously answers power problems of 46,000-sq. mile Ohio area.

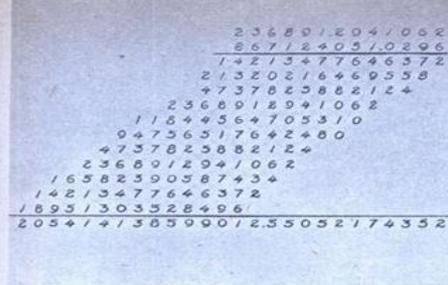
How Automation Will Affect Your Job

New skills, a shorter work week and more leisure time will be yours in 1975—thanks to machines with "brains"!

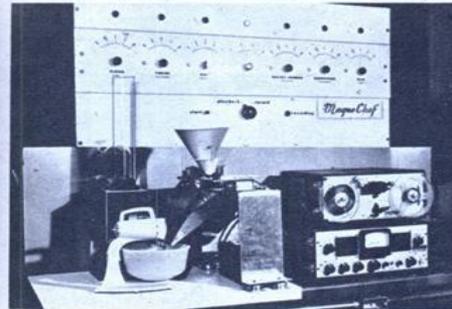
By Robert Bendiner

THE YEAR is 1975. For a man of 50 leaving a factory gate at five in the afternoon, you look remarkably fresh. Your light, comfortable-looking summer suit is pressed and spotless, your face and hands are free of grime, and your features show no sign of the strain that men once associated with the heat and

59



These two 13 digit numbers could be multiplied in 31-millionths of a second with IBM calculator built for the U. S. Navy.



Automatic cake-maker by Magne-Chef of Chicago may be omen of things to come, making life easier for housewife of 1975.

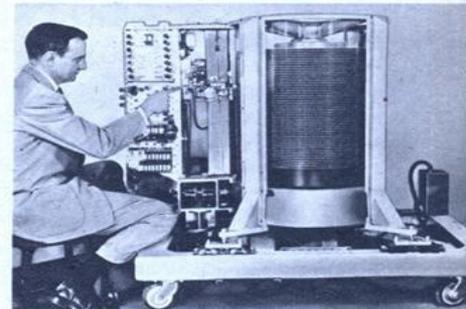
"brain," linked to all the machines on the line, just as a human brain is linked to the machinery of the body. Once instructed, it would direct each machine in the performance of its duty, synchronizing their movements and coordinating their operations into a smooth, orderly process. And at the heart of the system was a principle known as "feedback."

It was this mysterious "feedback" that was to make all the difference. A man's hand, reaching across a table to pick up a book, is guided by his brain. The eye keeps telling the brain whether the hand is approaching the book. The brain corrects the hand if it is overreaching, falling short, or moving too far to the right or left. The whole process is instantaneous, of course, and car-

October, 1955



Not a man can be seen near this machine which produces automotive cylinder blocks by the fast-growing process of automation.



IBM's new magnetic disc "memory" device for storage of business information has five million characters at its disposal.

Components in these Admiral TV printed circuit panels are soldered in single dip formerly requiring 428 manual operations.



61

STUDIO CLASSICS

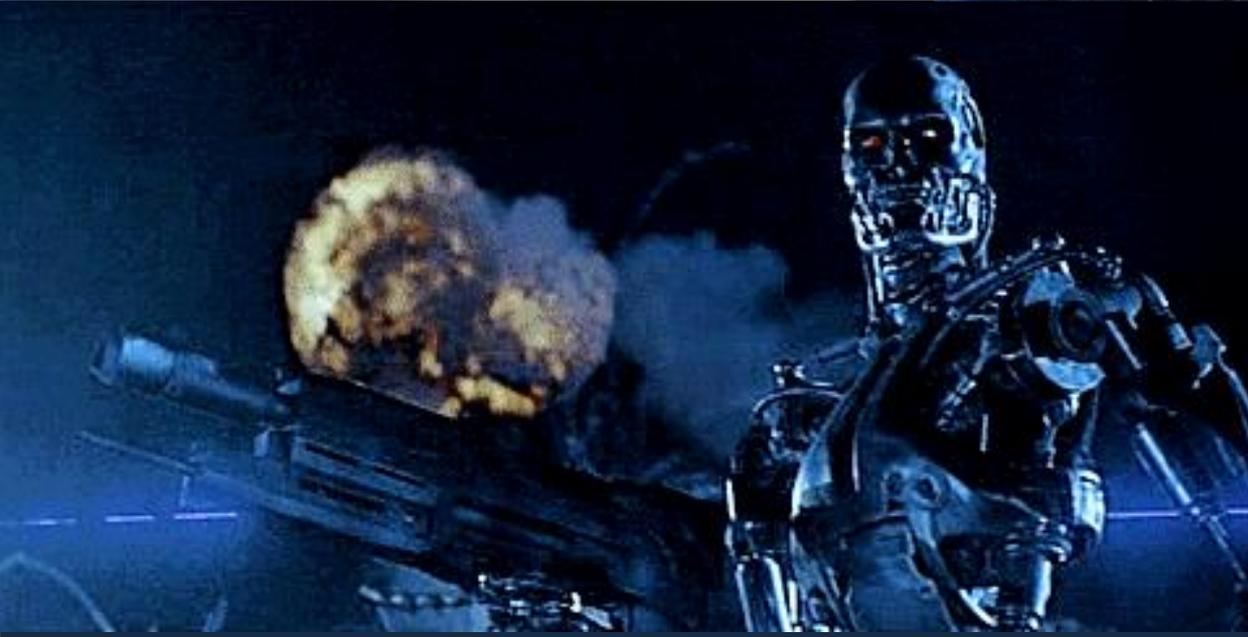
WITH
TRACY

WITH
HIPBURN

Desk Set



"TOP ENTERTAINMENT... GREAT FUN!"











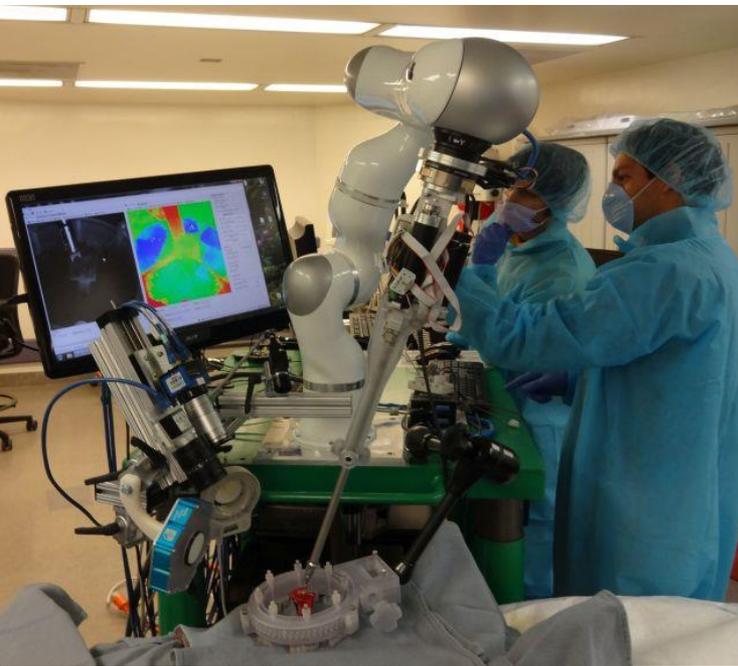


COURTESY MOLEY ROBOTICS





Medical is the fastest growing job category...but...



Using a sling, it can lift a person from the sofa.







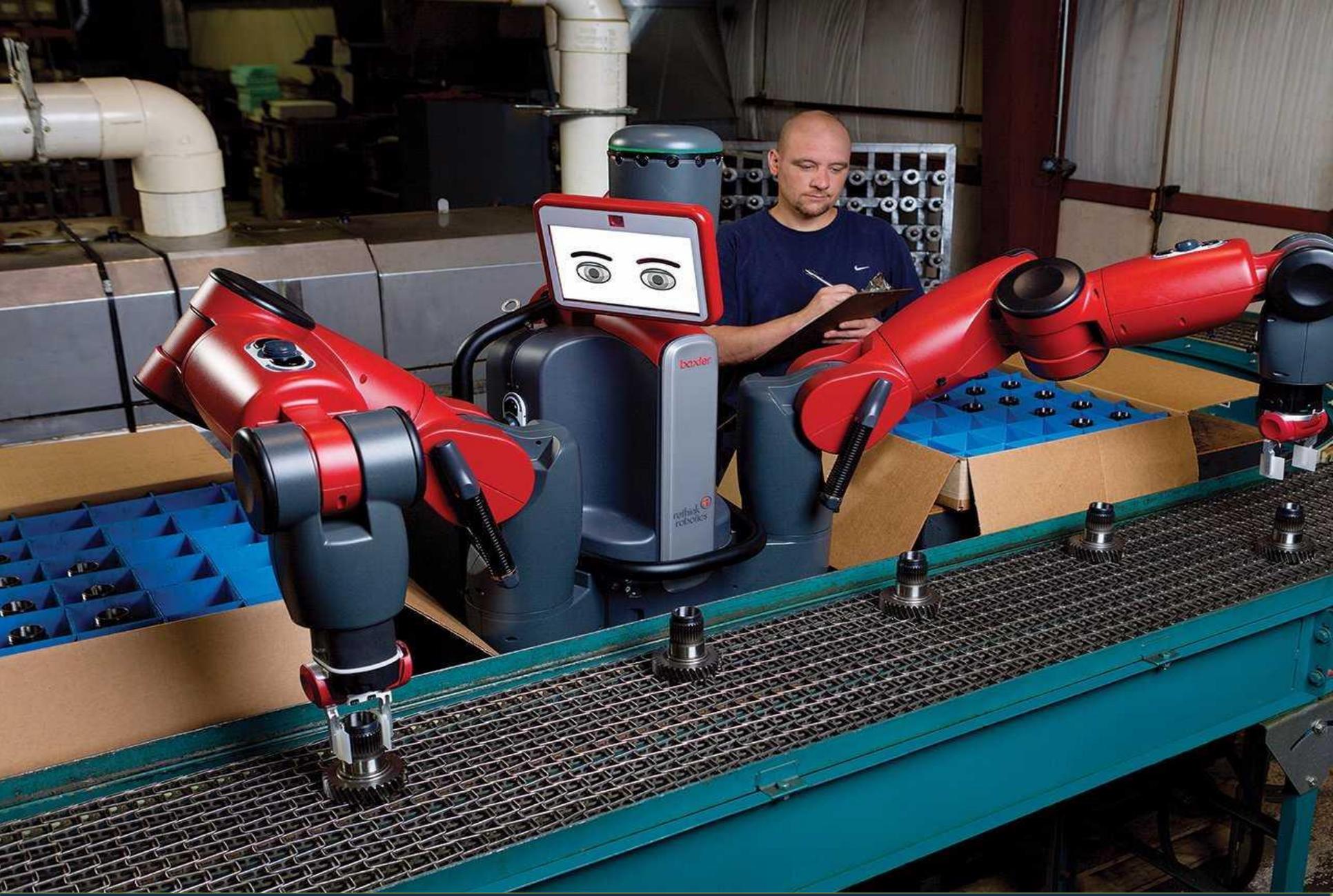










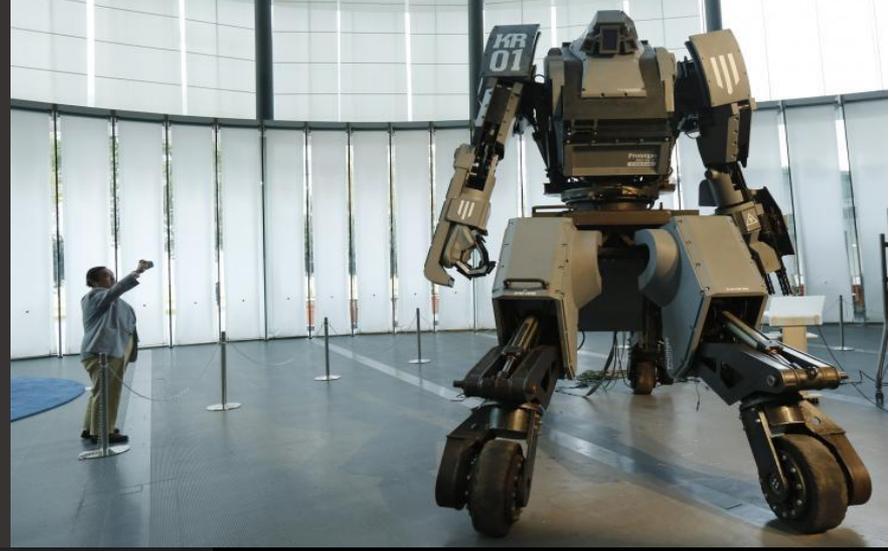












Speakers at Summer Saturday County Commissioner Events



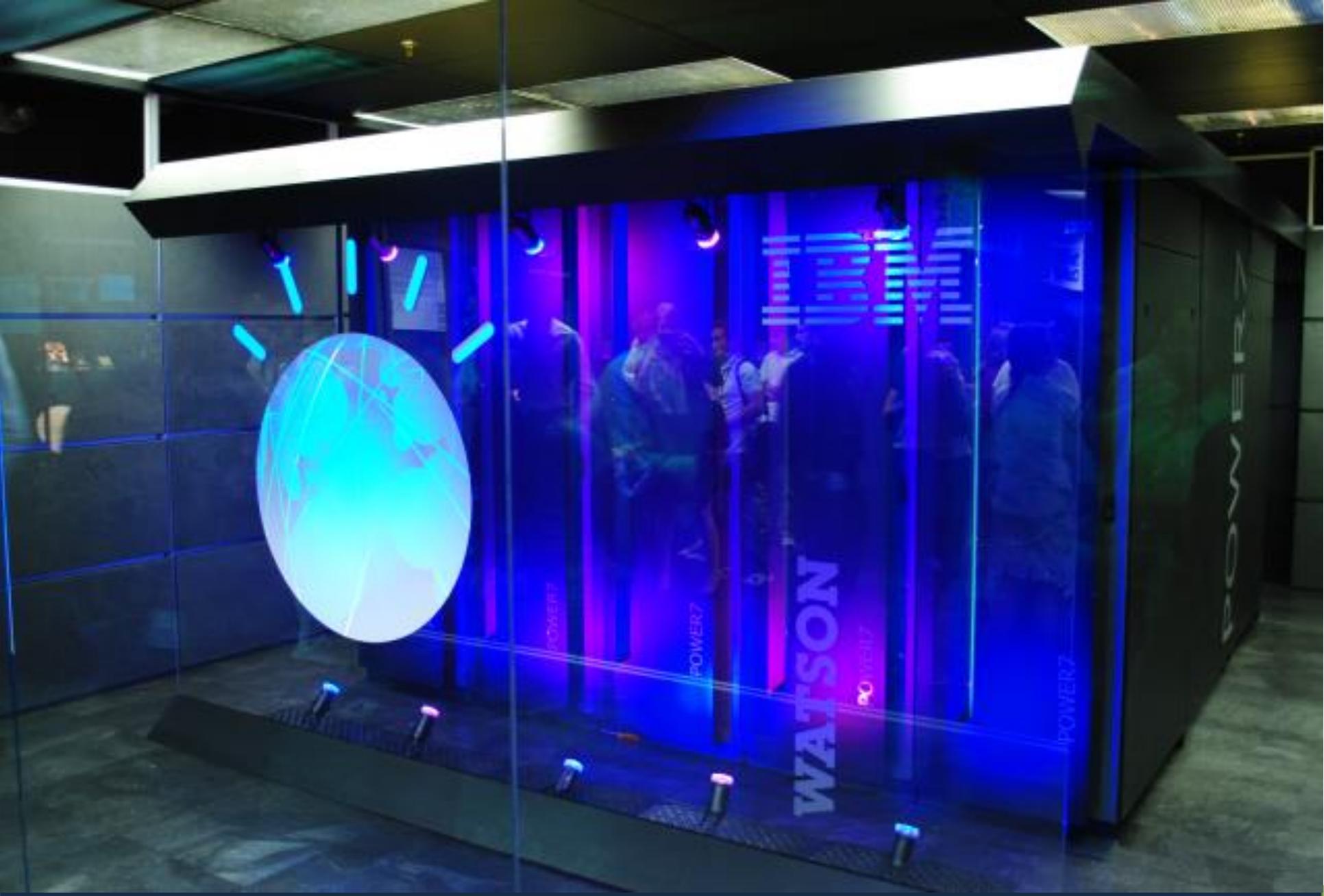
But we are just at the beginning of a new wave of automation and robotics, machine dexterity, vision, VR, smart materials and consumer marketing



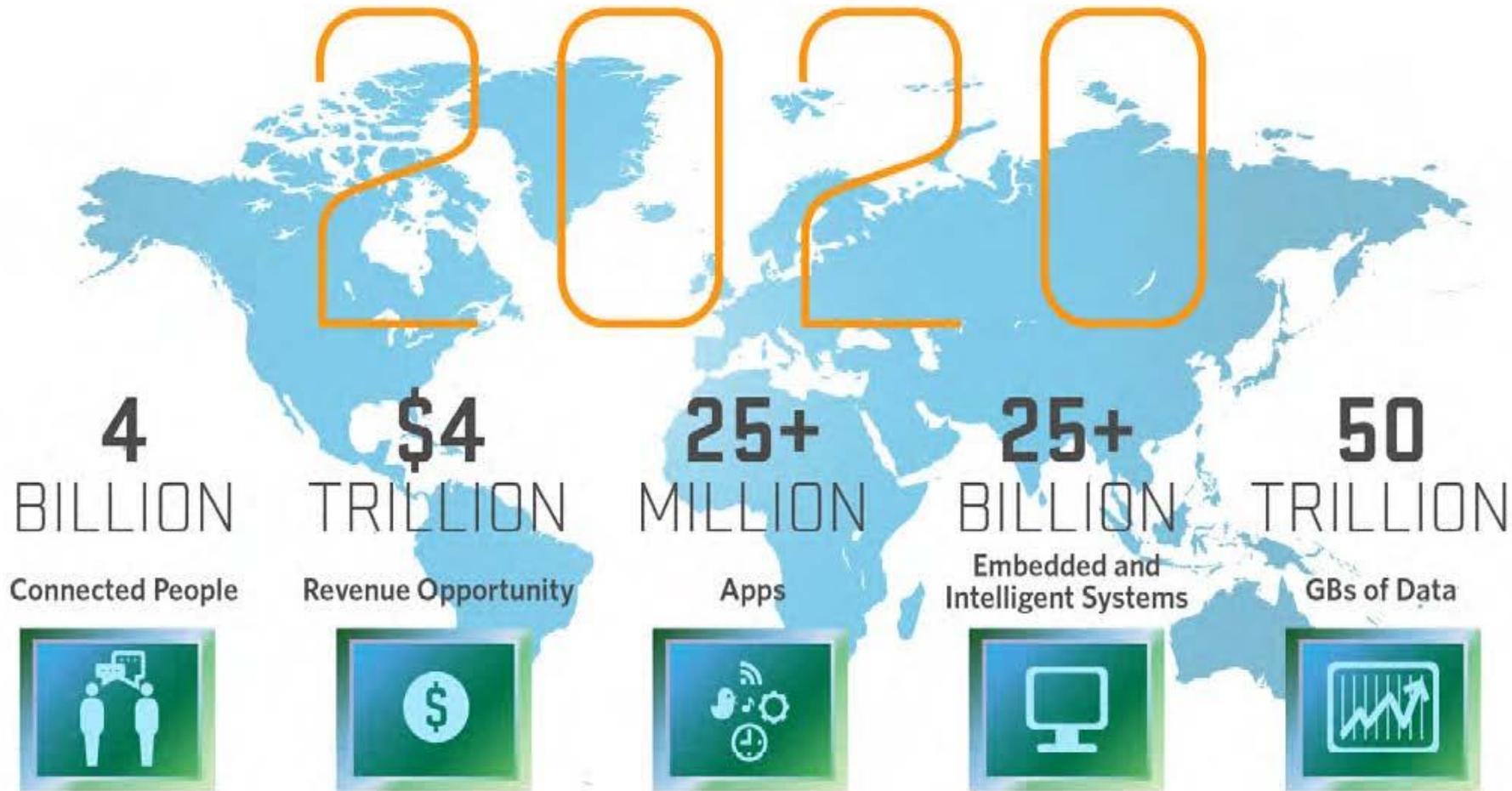






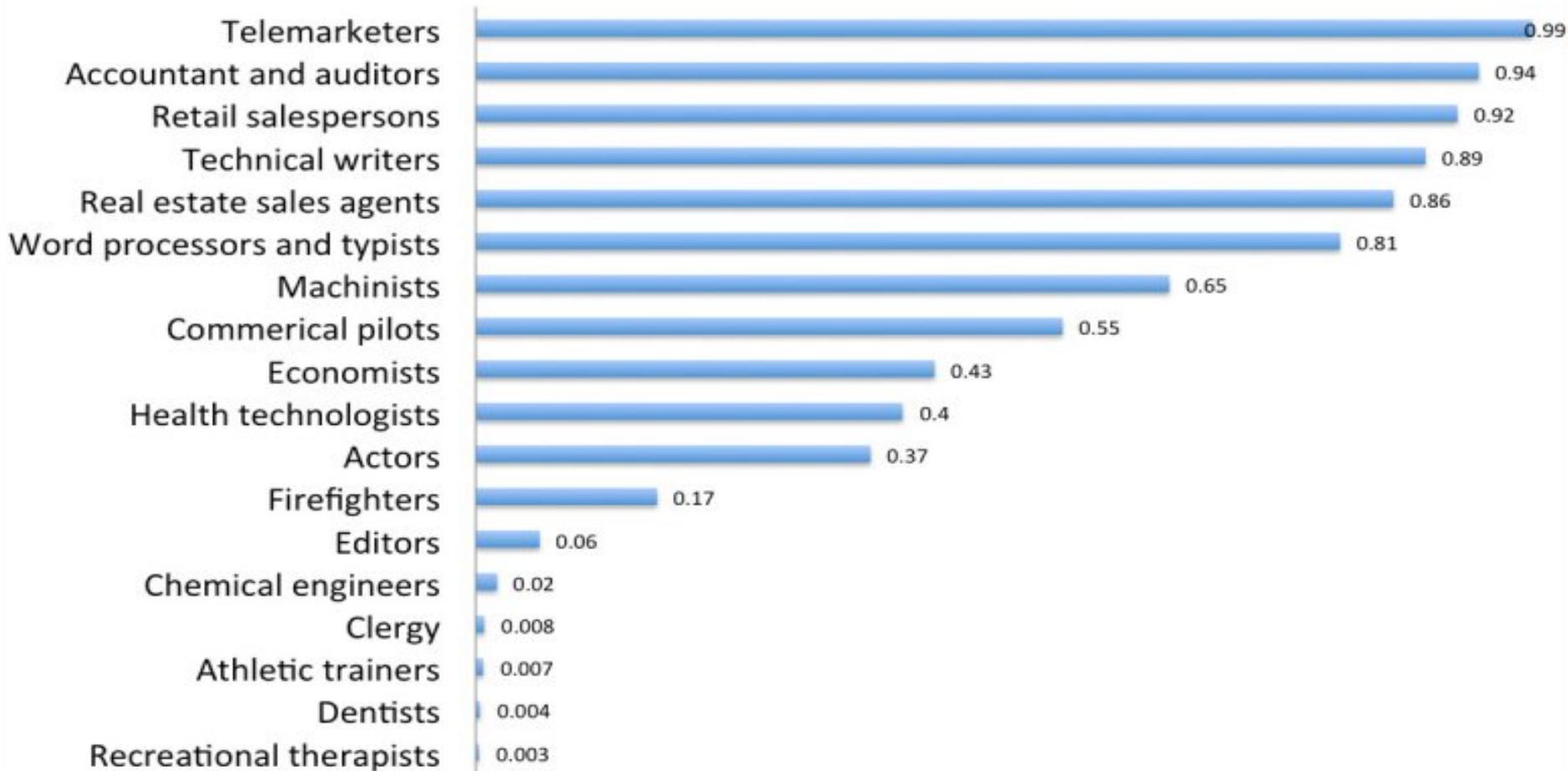


Internet of Everything



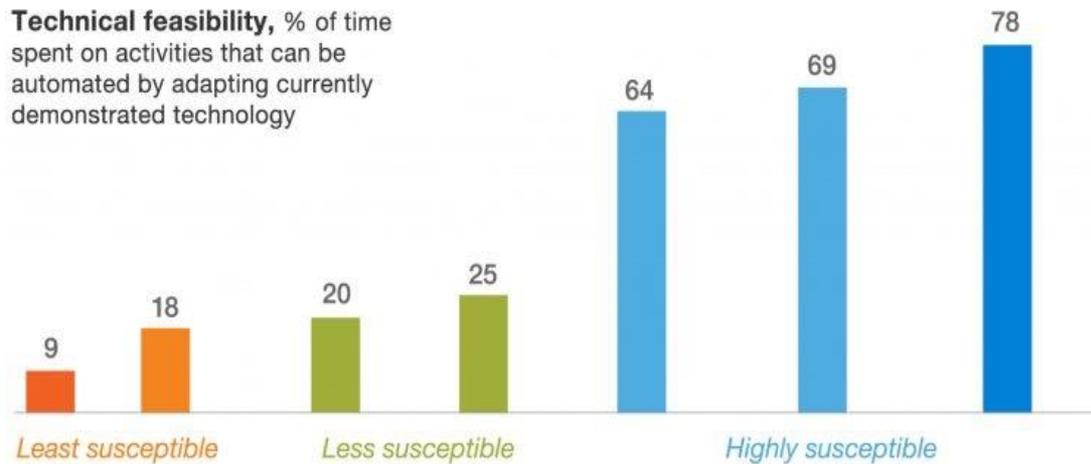
Source: Mario Morales, IDC

Probability Robots Will Take Your Job In Next 20 Years, 1=Certain

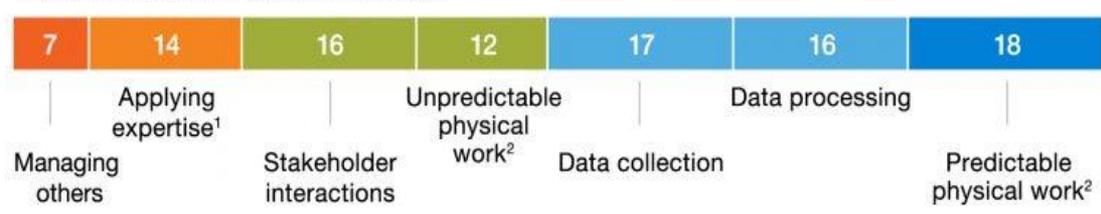


Analyzing work activities rather than occupations is the most accurate way to examine the technical feasibility of automation.

Technical feasibility, % of time spent on activities that can be automated by adapting currently demonstrated technology



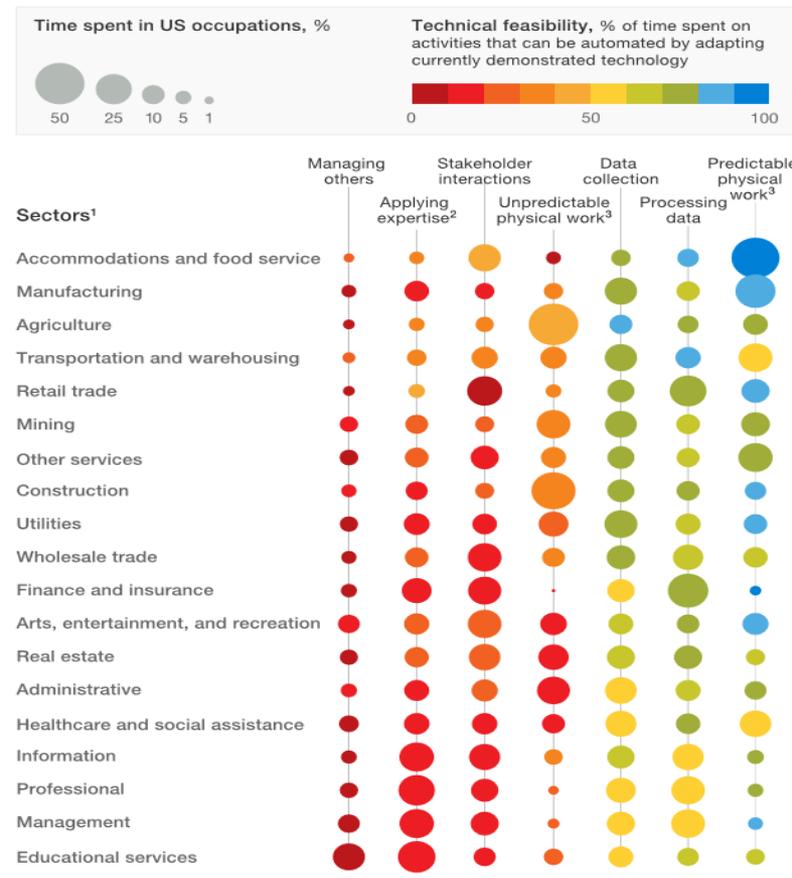
Time spent in all US occupations, %



In practice, automation will depend on more than just technical feasibility. Five factors are involved: technical feasibility; costs to automate; the relative scarcity, skills, and cost of workers who might otherwise do the activity; benefits (eg, superior performance) of automation beyond labor-cost substitution; and regulatory and social-acceptance considerations.

¹Applying expertise to decision making, planning, and creative tasks.
²Unpredictable physical work (physical activities and the operation of machinery) is performed in unpredictable environments, while in predictable physical work, the environments are predictable.

Automation is technically feasible for many types of activities in industry sectors, but some activities can be more affected than others.



In practice, automation will depend on more than just technical feasibility. Five factors are involved: technical feasibility; costs to automate; the relative scarcity, skills, and cost of workers who might otherwise do the activity; benefits (eg, superior performance) of automation beyond labor-cost substitution; and regulatory and social-acceptance considerations.

¹Agriculture includes forestry, fishing, and hunting; other services excludes federal-, state-, and local-government services; real estate includes rental and leasing; administrative includes administrative support and government administration; healthcare and social assistance includes private, state-government, and local-government hospitals; professional includes scientific and technical services; educational services includes private, state-government, and local-government schools.
²Applying expertise to decision making, planning, and creative tasks.
³Unpredictable physical work (physical activities and the operation of machinery) is performed in unpredictable environments, while in predictable physical work, the environments are predictable.

#5- Workforce Skills Development as a Real Policy & Economic Development Priority

- “A top priority of the nation’s governors is developing the skilled and knowledgeable workforce required for states to be economically competitive in a global economy.”

National Governors Association

- “In business today, no competition is tougher than the global race for talent. In every industry, every job sector, and every part of the world, employers are asking the same question: How are we going to find, train, and retain the best workers?”

U.S. Chamber of Commerce



Top Factors for Companies Considering New Investment

- 1) Availability of skilled labor
- 2) Labor costs
- 3) Proximity to major markets
- 4) State & Local Incentives
- 5) Availability buildings
- 6) Highway accessibility
- 7) Available land
- 8) Tax exemptions
- 9) Expedited or “fast track” permitting
- 10) Shipping costs
- 11) Accessibility of a major airport
- 12) Energy availability and costs



Site Selection Consultants

Top Factors for Companies Considering New Investment

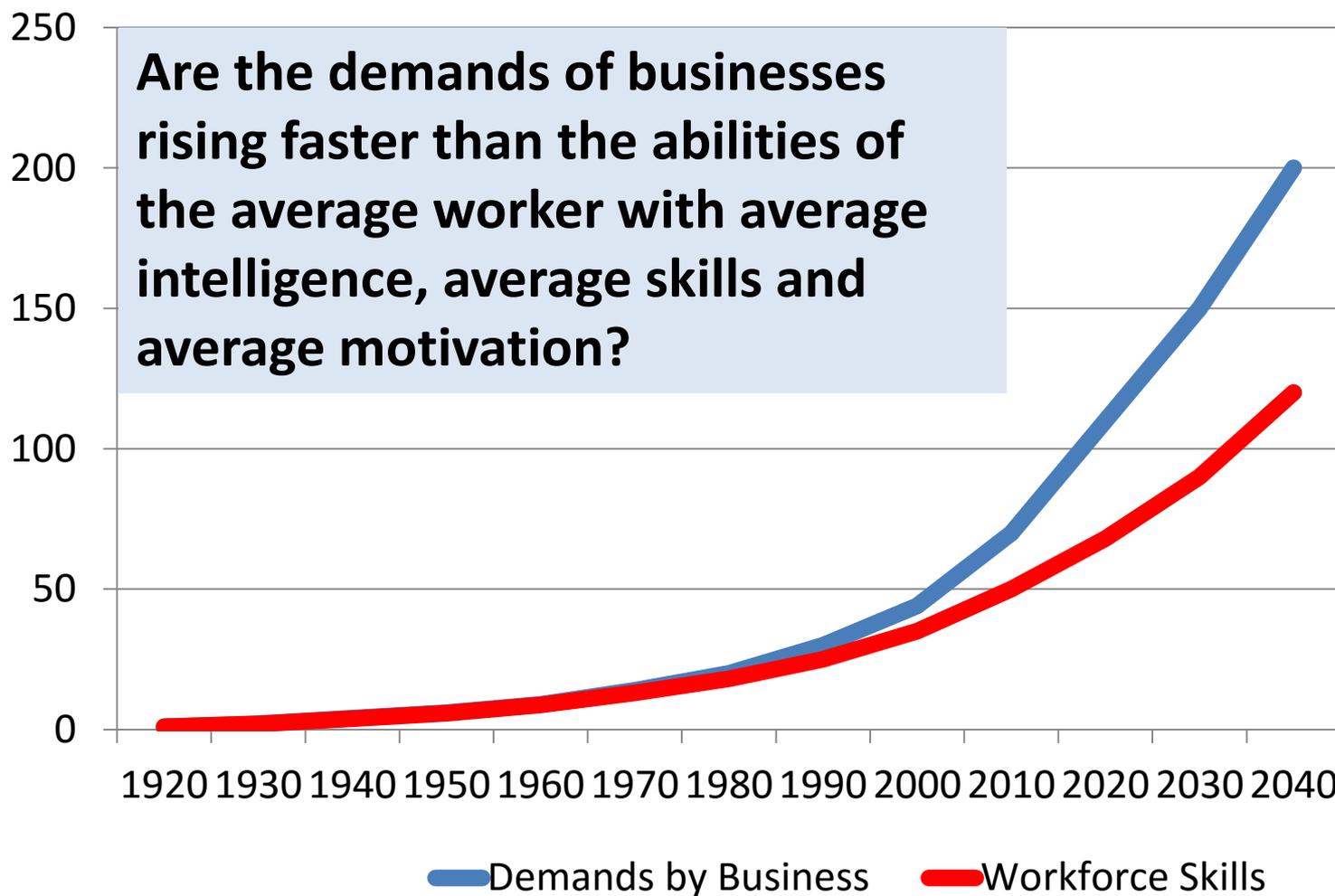
- 1) Availability of **skilled** labor
- 2) Highway accessibility
- 3) Quality of Life
- 4) Occupancy or construction costs
- 5) Availability buildings
- 6) Labor costs
- 7) Corporate tax rate
- 8) Proximity to major markets
- 9) State & Local Incentives
- 10) Energy availability and costs
- 11) Tax exemptions
- 12) Expedited or “fast track” permitting



Corporate CEOs

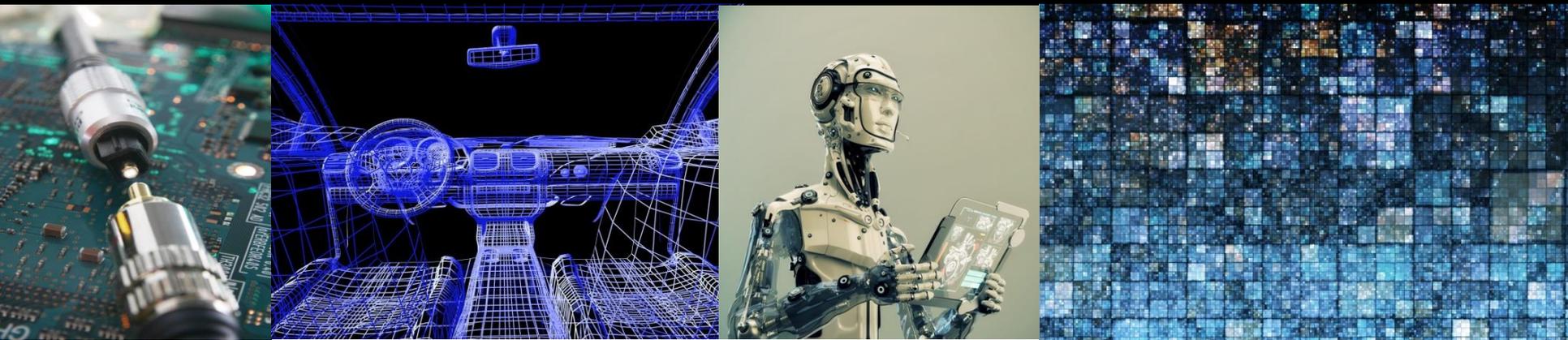


Can the Skills of the Talent Pool Keep Up With the Demand for Skills

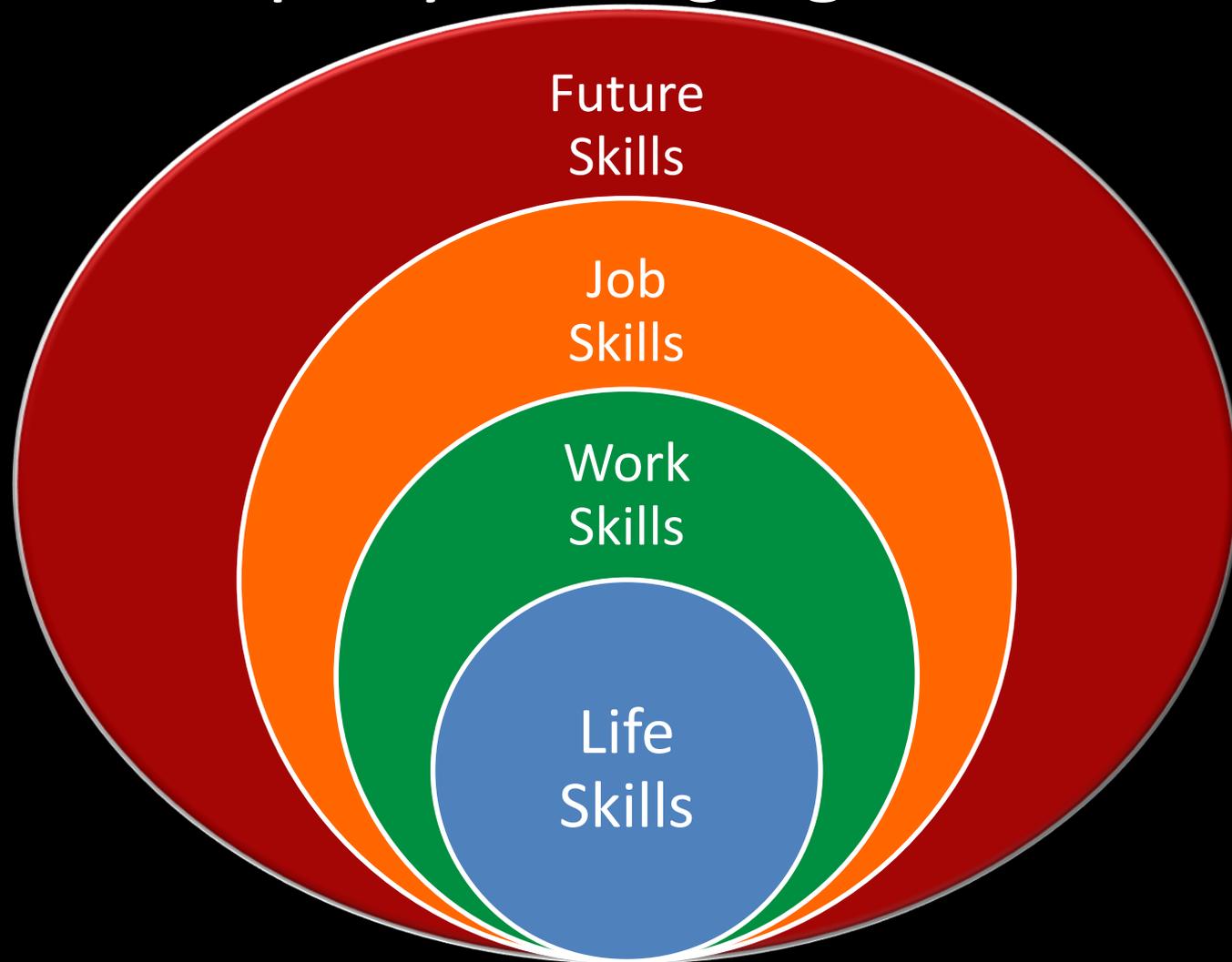


Only the best-educated humans will compete with machines. And education systems in the U.S. and much of the rest of the world are still sitting students in rows and columns, teaching them to keep quiet and memorize what is told to them, preparing them for life in a 20th century factory.”

— Howard Rheingold, tech writer and analyst



Skills Do You Need To Be Successful in a Rapidly Changing World?



What Skills Do You Need To Be Successful in a Rapidly Changing World?

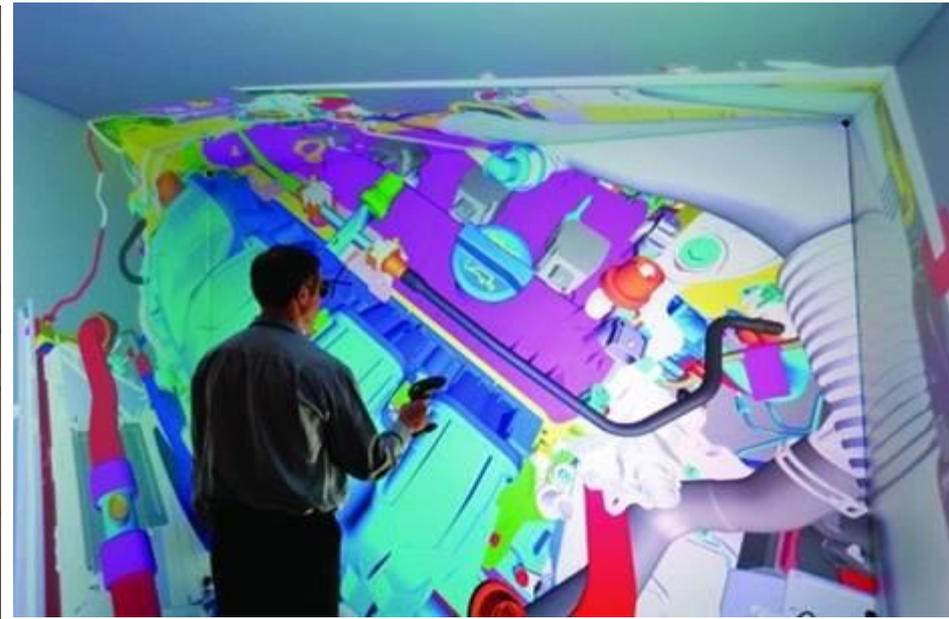
- **Social Intelligence**- Understanding and working with people, emotions, and priorities
- **Cross-Cultural Competencies**-Globalization + empathy (Worldliness)
- **Cognitive Load Management**- Comfortably converting complexity into information and then into action

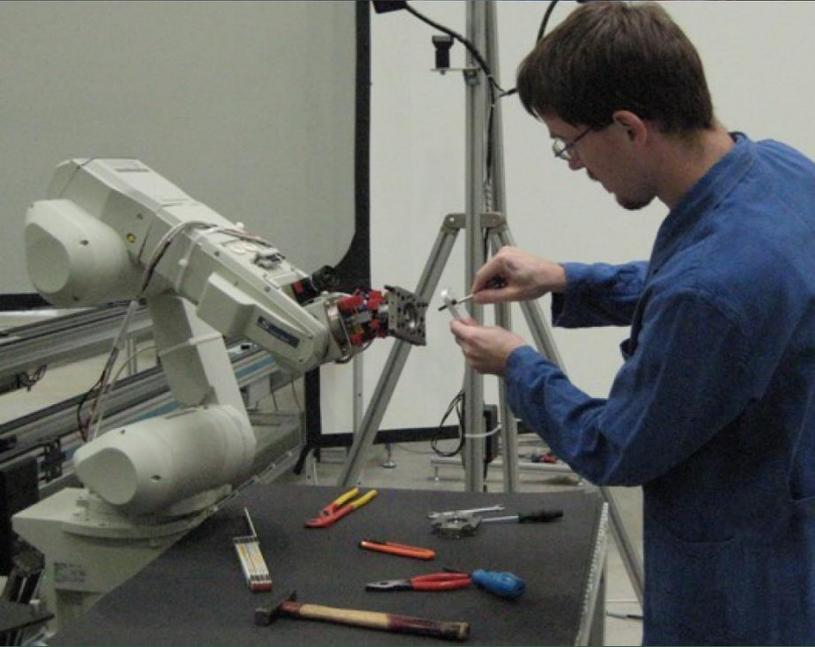
Future Skills



What Skills Do You Need To Be Successful in a Rapidly Changing World?

- **Technology Integration-** Work with machines to create value-added outcomes





IMAGINING THE

FUTURE



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