



JOBS

Tariffs and Trade Wars
Won't Solve Job Issues



Labor Productivity/JOBS



Old Peanut Threshing Machines (1950's)

- Bring peanut hay to a Stationary Machine on wagons from the field
- Included baling of the peanut straw after threshing separation of the nuts
- Typical crew of 20-25 persons
- All available hands on deck (no discrimination)
- Even young children involved as appropriate.
- What took 25 people to do in the 1950s is done by 1 person today!

Jobs in the US/World

Some History

- The Industrial Revolution
 - Rural to City Shift
 - **Computers/Semiconductors**
 - The World Economy

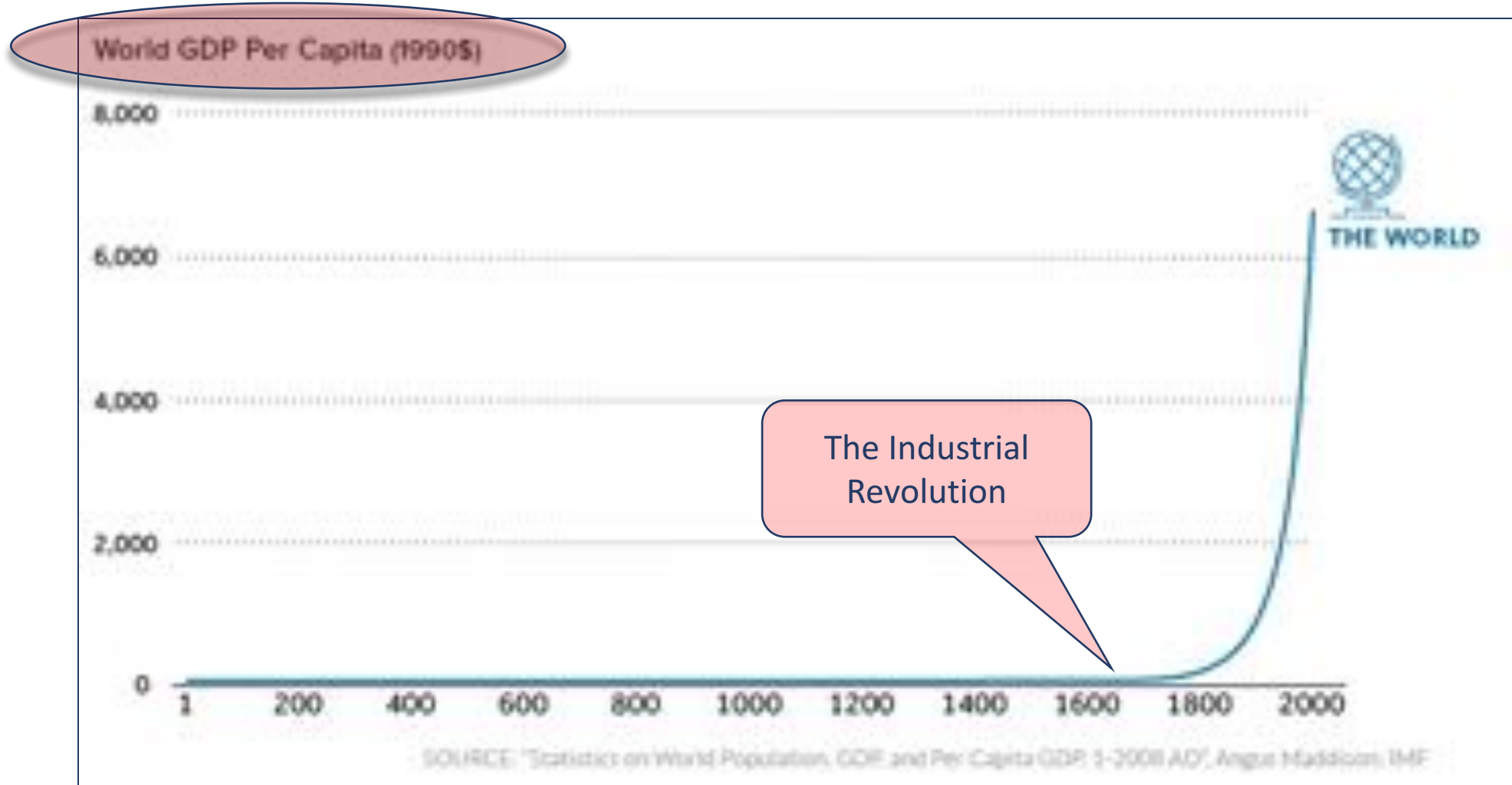
A Look into the Future!

- Pervasiveness of Computers/Software
- **Autonomous Vehicles**
- Artificial Intelligence

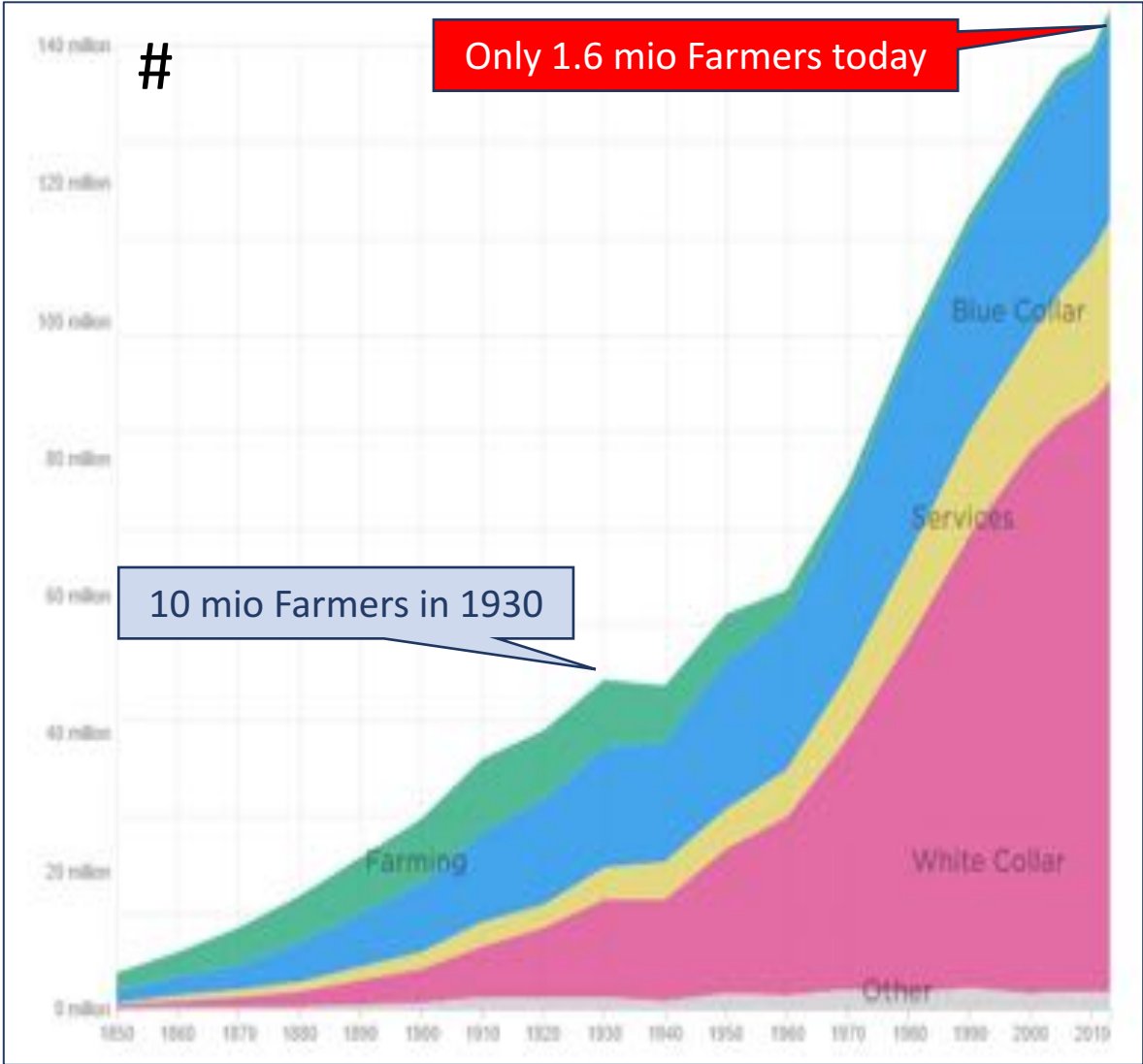
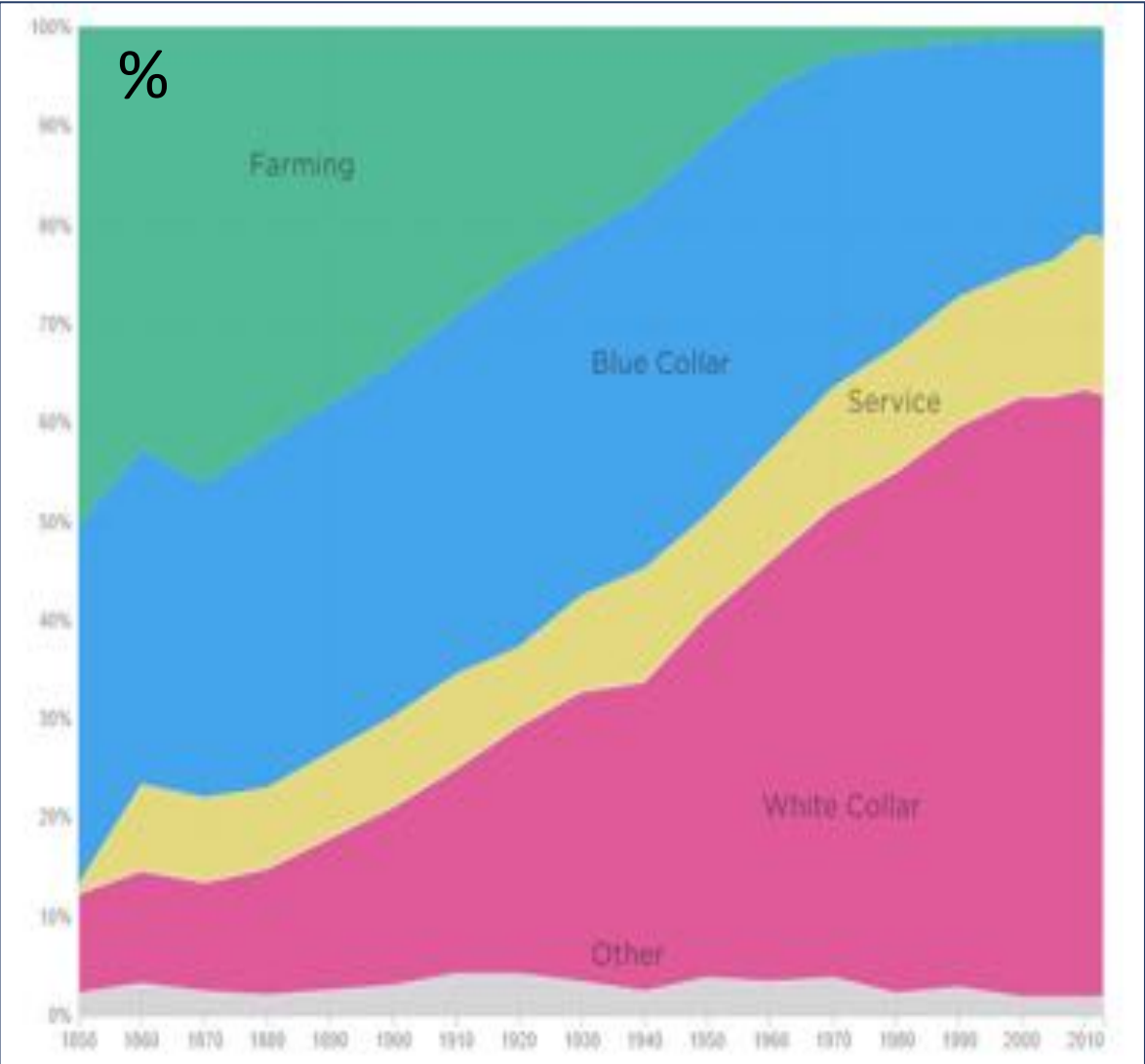
How do we respond?

- Educational Reform
- Lifetime Learning

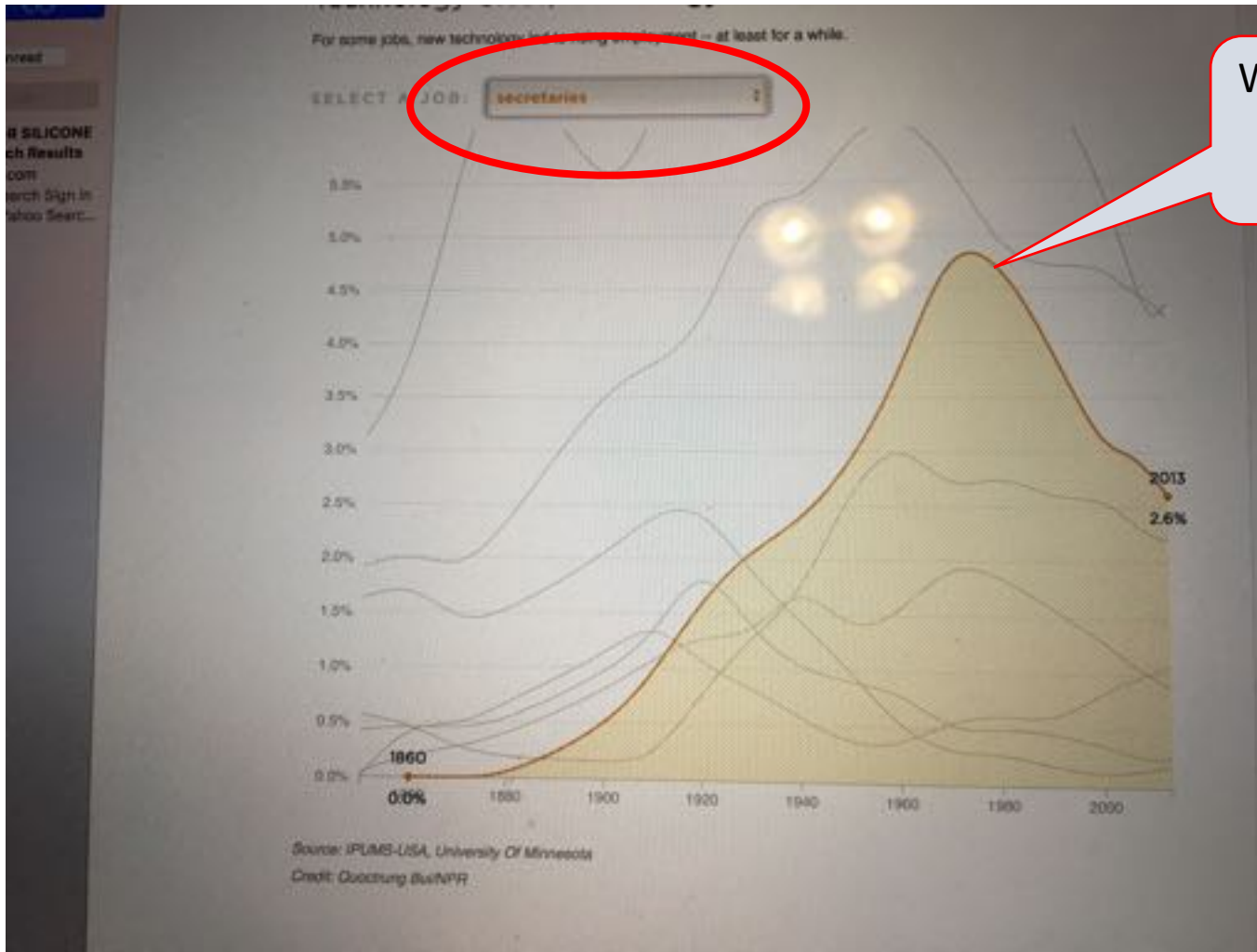
The industrial Revolution



Jobs in the US by % and Total Number



Source: The Visual Capitalist and NPR



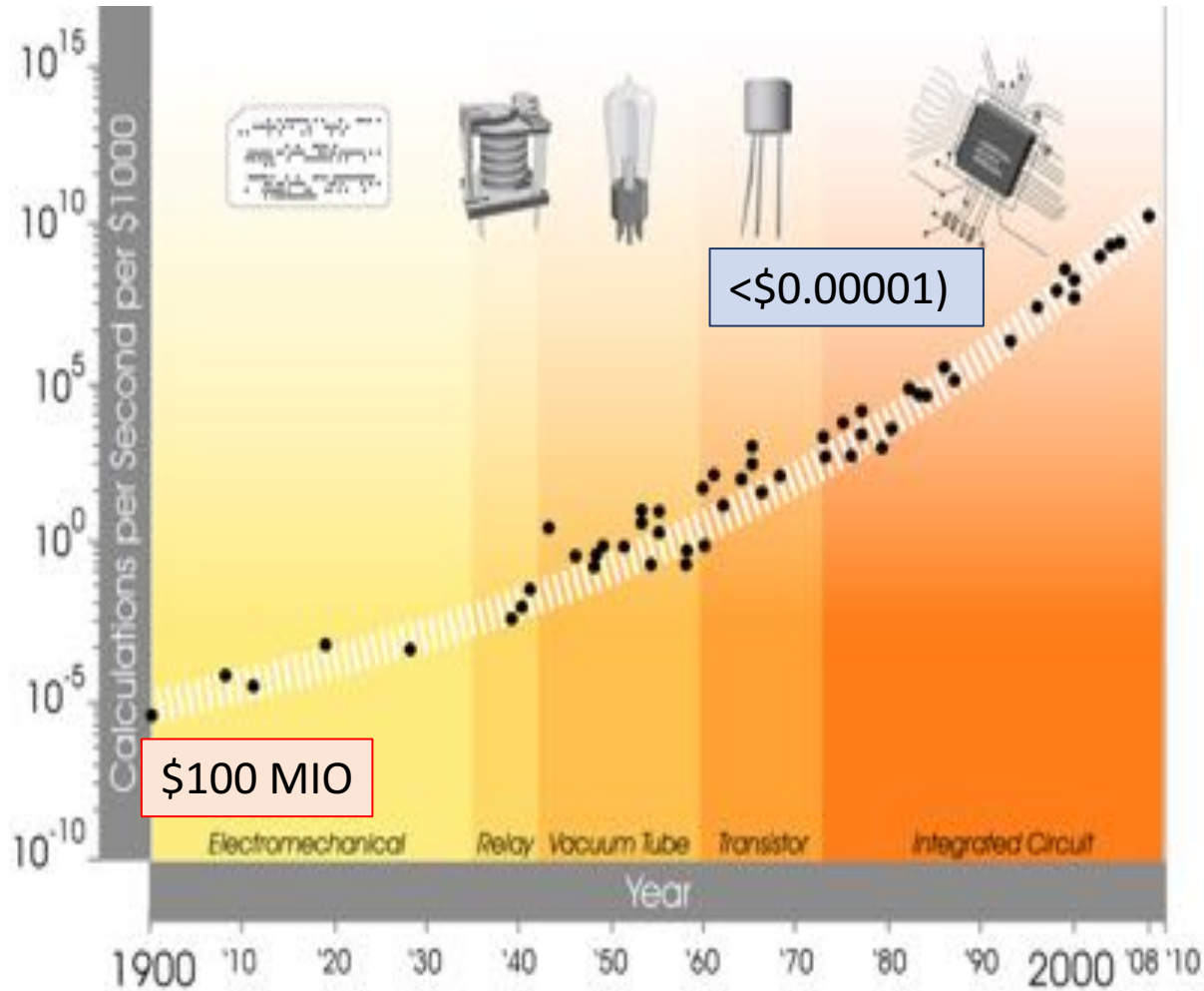
What triggered the rapid change??

How Machines destroy and create Jobs?

Source: NPR

<https://www.npr.org/sections/money/2015/05/18/404991483/how-machines-destroy-and-create-jobs-in-4-graphs>

Computer/Electronics Evolution



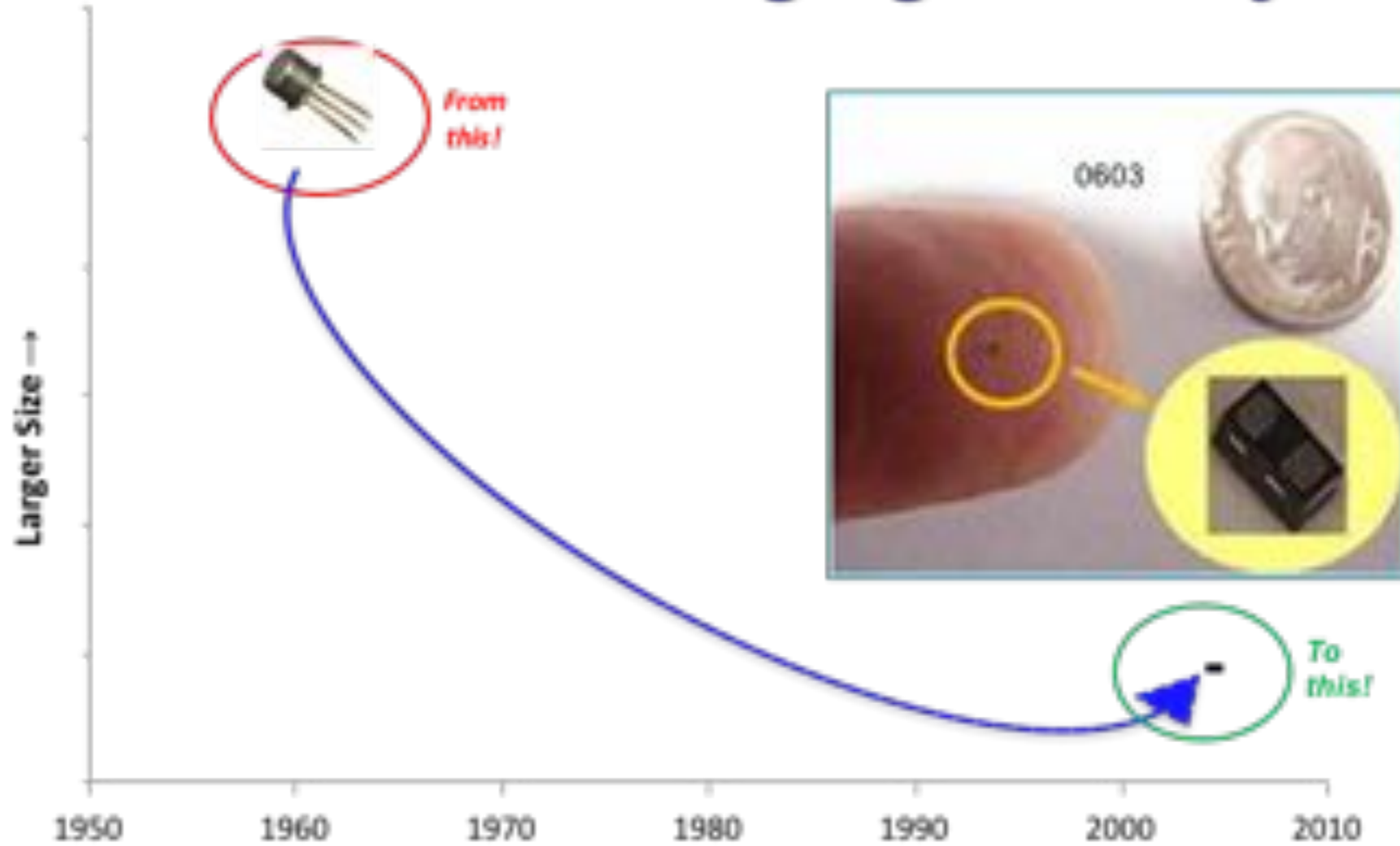
Moore's law:

THE number of transistors in a dense integrated circuit doubles about every two years.

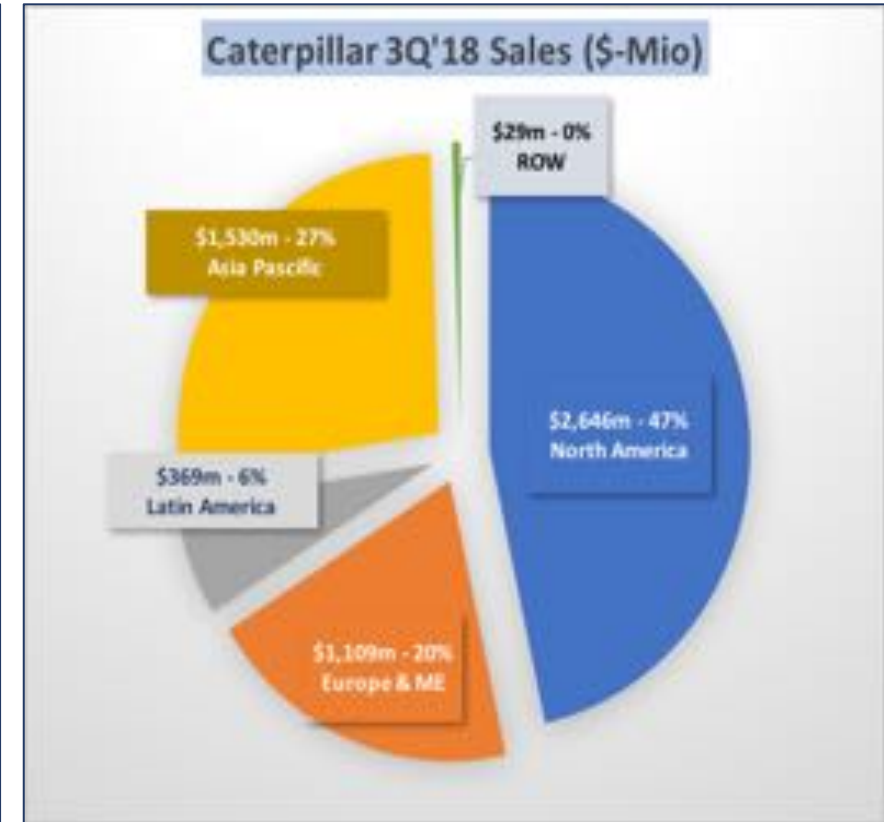
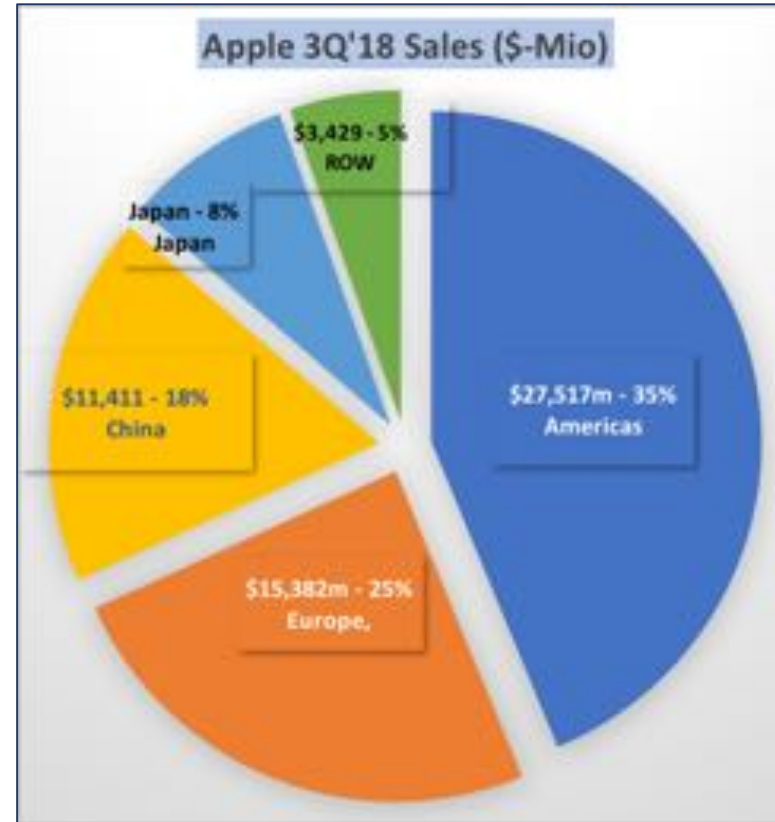
Improvement in Design, Wafer Fabrication and Packaging simultaneously.

Source: Wikipedia

Transistor Packaging Journey



Most American Corporations are International



International Sales help to amortize Development Costs as well as volume to drive cost reduction of the product. They also advance American Interests around the world.

TOP 5 PUBLICLY TRADED COMPANIES (BY MARKET CAP)

Tech Other



TOP 5 PUBLICLY TRADED COMPANIES (BY MARKET CAP)

 Tech  Other



LIDAR is a Key Component in Autonomous Vehicles



VIDEO: <https://youtu.be/NZKvf1cXe8s>

LiDAR is believed to be a key component for Autonomous Vehicles

- Up to 300 m vision
- Works in Dark and even fog and rain but to a lesser distance.
- Measures distance to an accuracy of 1-2 centimeters
- With spinning LiDAR, it has a 360 view
- Expect to improve Performance, Reliability, and Form factor going forward.

Autonomous Mining Haulers



These Caterpillar Mining Haulers have been in operation for almost 5-years in large mining operations.

Ideal development application as the mining site is a controlled environment

[Video: https://www.cat.com/en_US/by-industry/mining/articles/catcommandforhauling-expanding.html](https://www.cat.com/en_US/by-industry/mining/articles/catcommandforhauling-expanding.html)

Autonomous Farming Implements in Development



Most of the major Farm Equipment manufacturers are working on Autonomous equipment with different levels of Autonomy

Case Tractor of the Future in this image.

[VIDEO: https://www.caseih.com/northamerica/en-us/pages/campaigns/autonomous-concept-vehicle.aspx](https://www.caseih.com/northamerica/en-us/pages/campaigns/autonomous-concept-vehicle.aspx)

Autonomous Tractor Trailer Trucks

Lidar Unit



OTTO Automation did some initial development work on Autonomous Trucks, before they sold the unit to UBER.

Uber discontinued the truck effort to focus on autonomous cars for its ride share and delivery service

Significant productivity gain to have interstate trucks drive continuously

VIDEO: <https://www.wired.com/2016/10/ubers-self-driving-truck-makes-first-delivery-50000-beers/>

AUTONOMOUS DELIVERY VEHICLE



Autonomous delivery vehicle being tested in Phoenix at the moment.

All electric vehicle being tested on actual streets within a couple of miles of the Kroger store in the area

No room for a driver.

VIDEO: <https://apnews.com/256e18799e7a4959bed312ead8a60683>

Automation is Cannibalizing Traditional Jobs



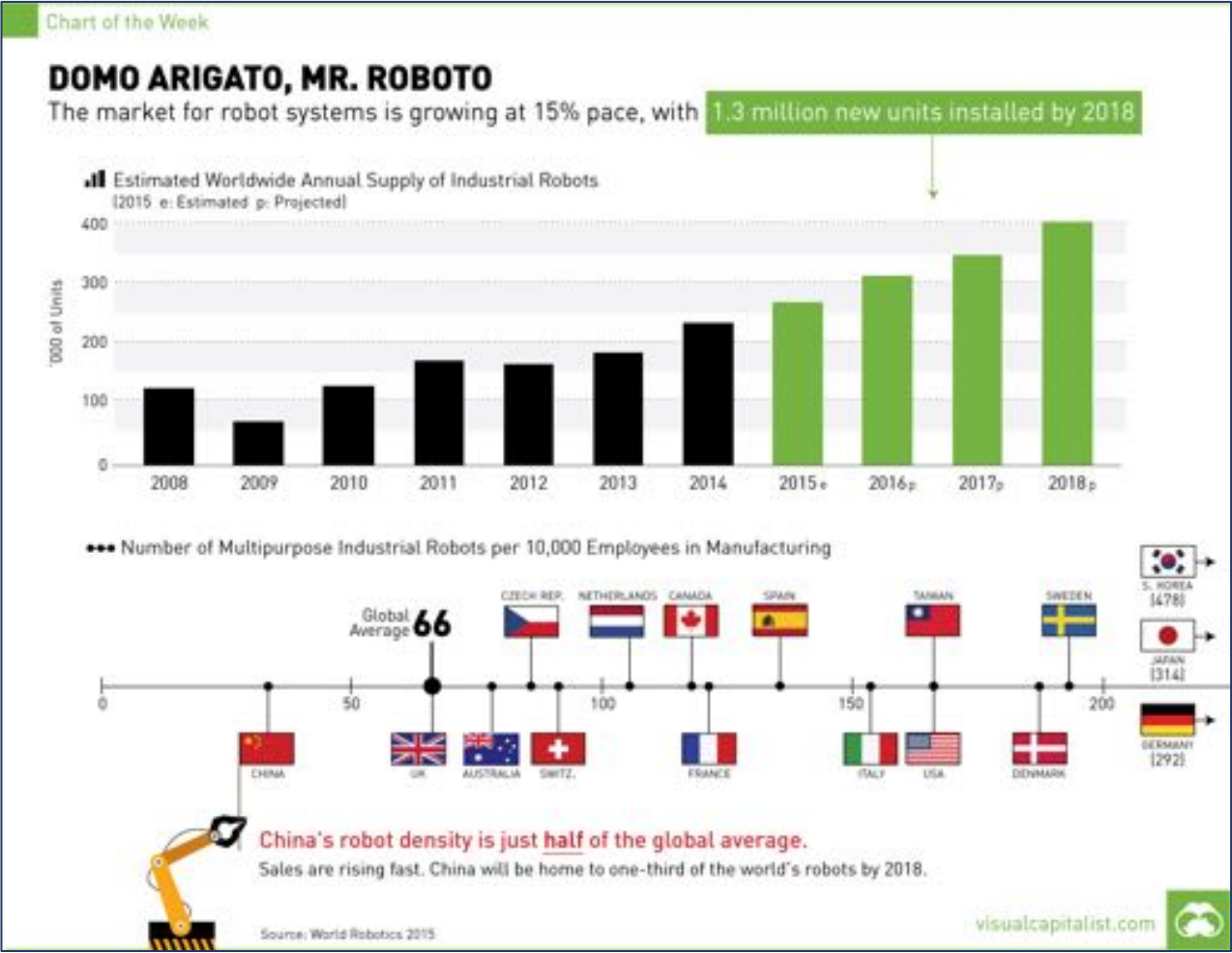
The Automation level at Tesla is tremendous. Although other Auto manufactures have automation it is not to this level – Yet!

Tesla has struggled to hire the personnel that can deal with all this automation.

Engineers develop, but Technicians sustain in operation and need a very high level of skill!

<https://video.search.yahoo.com/search/video?fr=aaplw&p=tesla+automation+video#id=1&vid=cb8e8a36c574077cbfa35fe6d6149dfd&action=click>

Automation Leadership in the World



Major Industrialized Countries leading the charge.

Japan would be expected to lead the, but closely followed by other industrial nations

China will have to follow, because some of the work required can only be done by highly precise robots.

<https://www.visualcapitalist.com/domo-arigato-mr-roboto-chart/>

Challenges in The Future

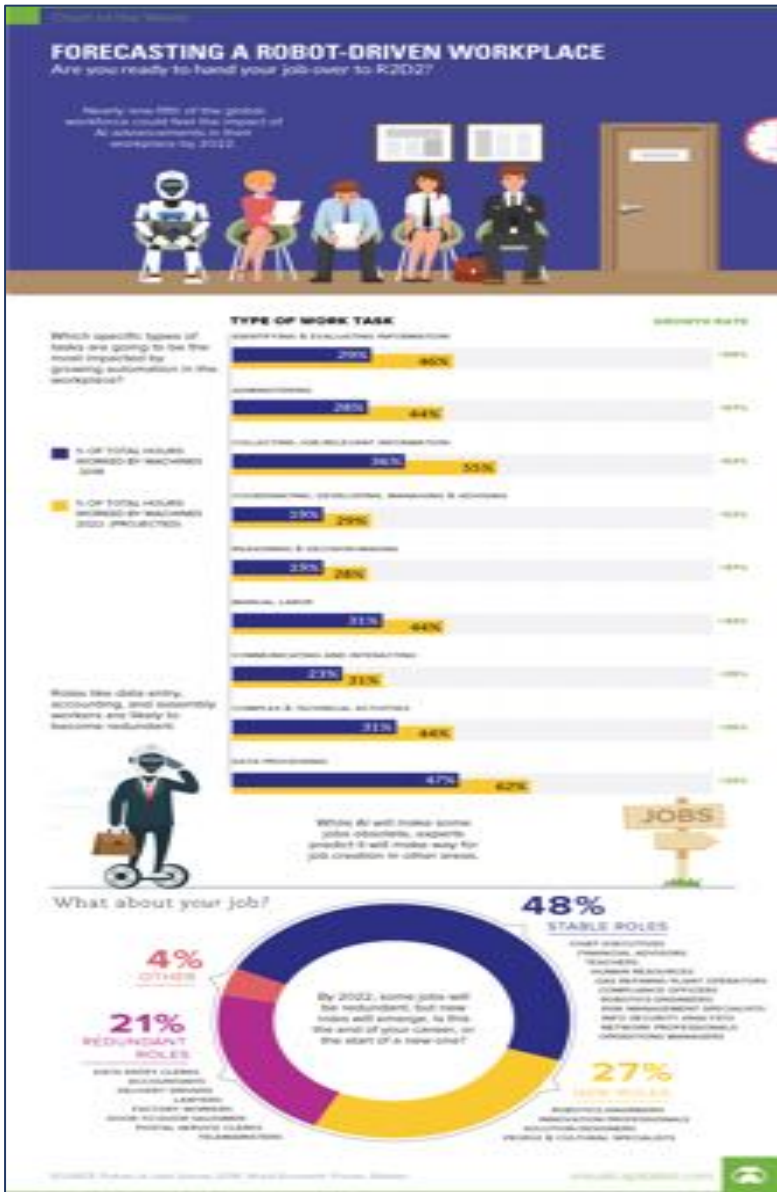
Education needs to Change

- You can't just get by in School (and land a good paying factory job)
- Build a foundation in Science and Math (STEM)
- Electronics and Computer lab training
- Technical Schools to develop Electronics and computer skills
- Financial Support with Schools, Teachers and Facilities

Re-education when Skills become obsolete

- Jobs will change over a lifetime, needing re-development
- Financial support for the process
- Anticipating needs and having programs in place

Appendix



The Shifting Nature of Jobs in the Future

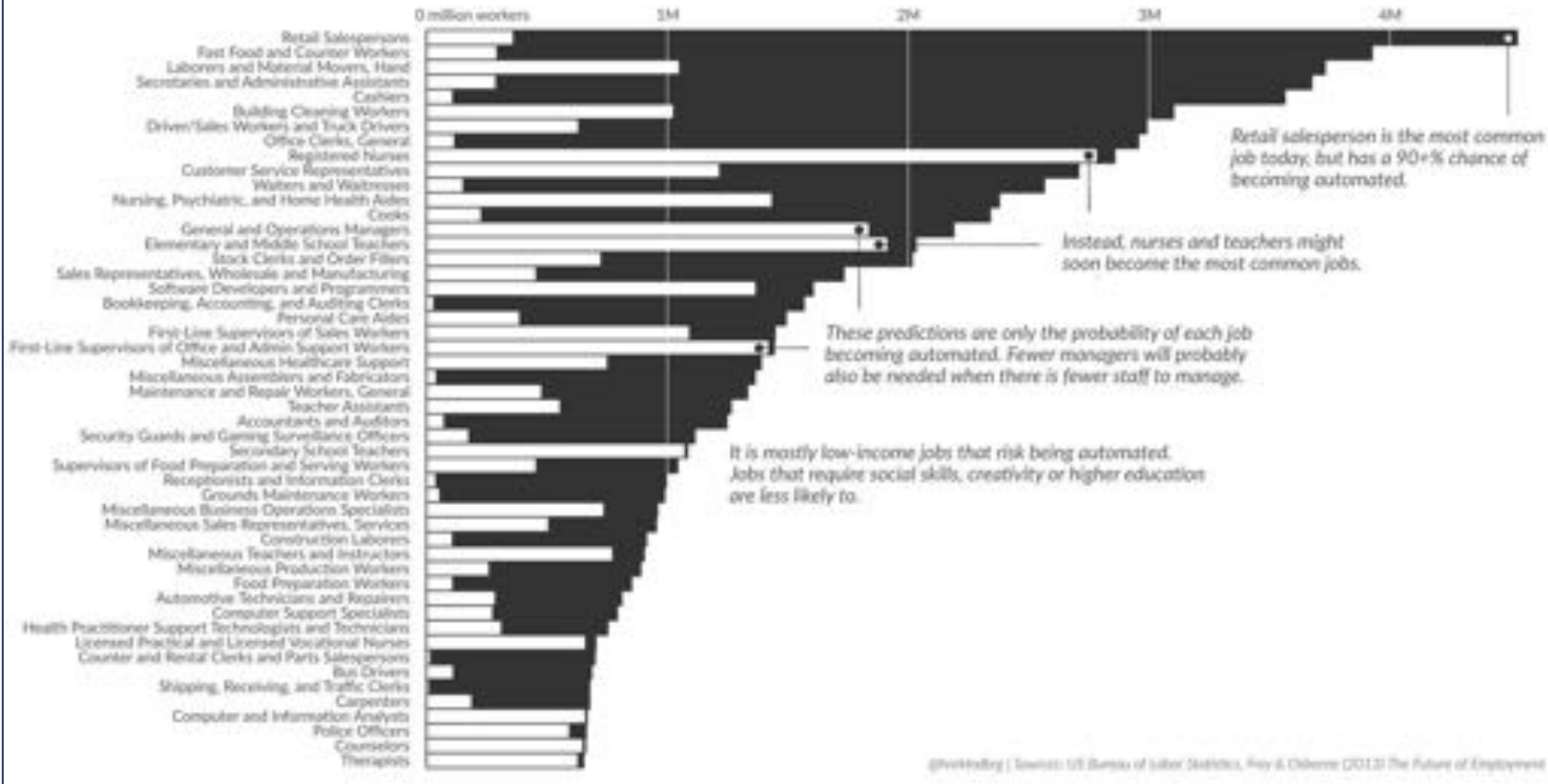
- Which areas will likely be eliminated with **automation**
- Which areas will grow?
- Which area seem to be immune (at least for the moment)?
- FINALLY, what does it all mean for society in general?

Source: <https://www.visualcapitalist.com/forecasting-a-robot-driven-workplace/>
<https://www.visualcapitalist.com/charting-automation-potential-of-u-s-jobs/>

The future of employment

About half of today's jobs will likely be done by computers in a decade or two. Automation has so far taken over mostly well-defined routine tasks, shifting jobs from middle-income manufacturing to lower-income service jobs. As computers get better at for example perception - think self-driving cars - those services jobs are likely next up to be replaced by machines. Frey and Osborne (2013) estimate the probability of each job becoming automated. Here are how their predictions apply to 2016 US employment statistics.

Black fields are jobs likely to be automated and white fields are jobs that are likely to remain.



The Future of Employment

Source:
<https://www.visualcapitalist.com/visualizing-jobs-lost-automation/>