



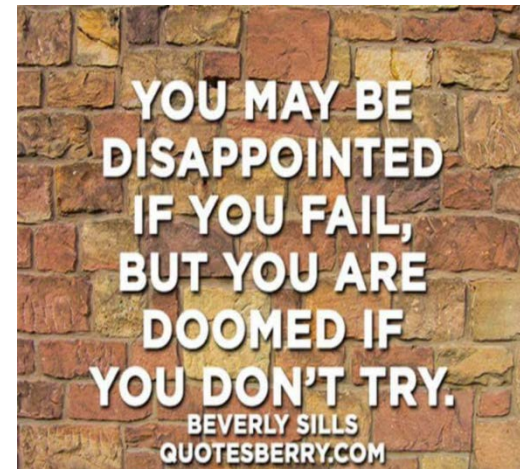
Future of Manufacturing

Presented by:

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UW-Stout Manufacturing Outreach Center



Helping manufacturers
SUCCEED

UW-STOUT MANUFACTURING OUTREACH CENTER

A resource of the Discovery Center
Phone. 866.880.2262

Web. www.uwstout.edu/moc

a NIST | Network
MEP | Affiliate

The National Institute of Standards and Technology's (NIST) Hollings Manufacturing Extension Partnership (MEP)

- Work with small and mid-sized U.S. manufacturers to create & retain jobs, increase profits, and save time & money
- Over 1,400 technical experts organized into 51 MEP Centers with 370 Service Locations across the fifty states & Puerto Rico



UW-Stout: Wisconsin's Polytechnic University



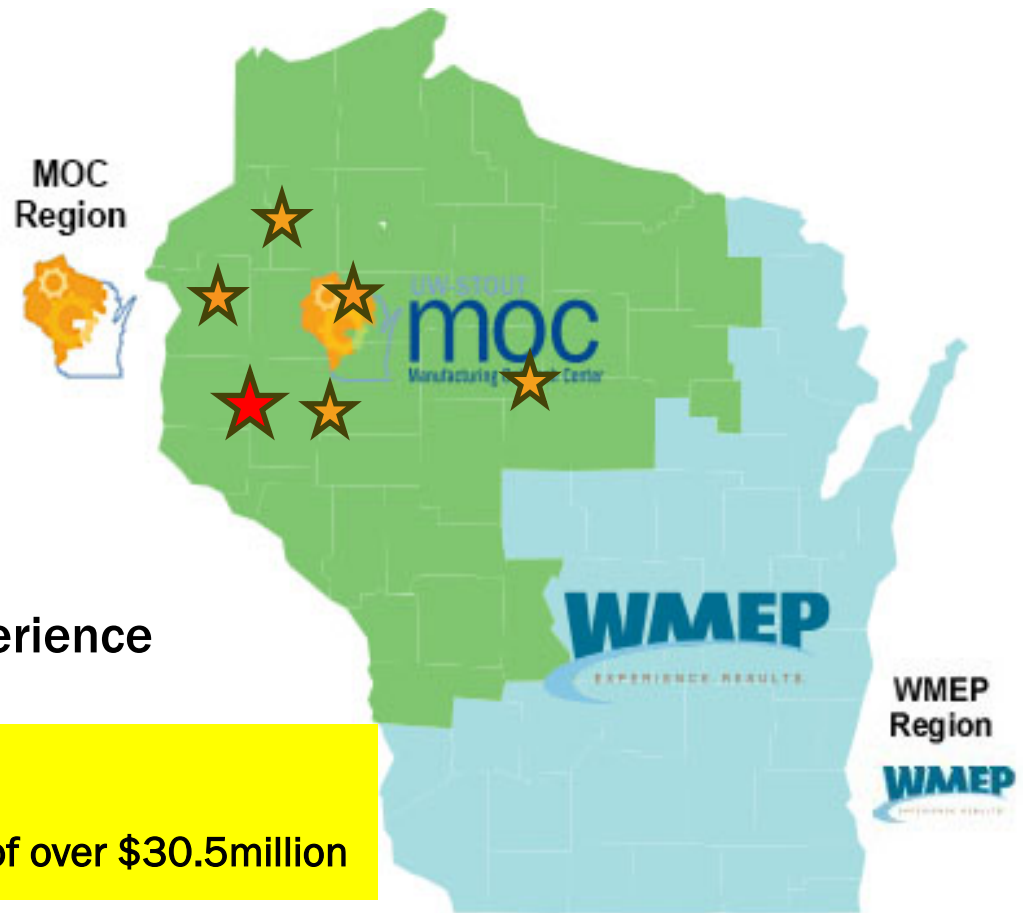
SCHOOL MOTTO: HANDS-ON, MINDS-ON
ROUGHLY 9,300 STUDENTS
PLACEMENT RATE OF OVER 97%

Area Served by UW-Stout MOC

3,584 manufacturers in
33 Wisconsin Counties
(green shaded region)

 Home Office
 Satellite Offices

- 9 Project Managers
- Over 200 years of industry experience
- Rolling 4 quarters results
 - Served 117 Manufacturers
 - Create / retained 229 jobs
 - Achieved *client reported* impacts of over \$30.5million



**“IN 10 YEARS, OVER 40% OF THE
FORTUNE**



WILL NO LONGER BE HERE.”

Source: Babson Olin School of Business

By 2025, more than 75% of the S&P 500 will be companies that we have not heard of yet!



Source: Professor Richard Foster, Yale University

Radical Changing World

4 Trends all happening at once.....

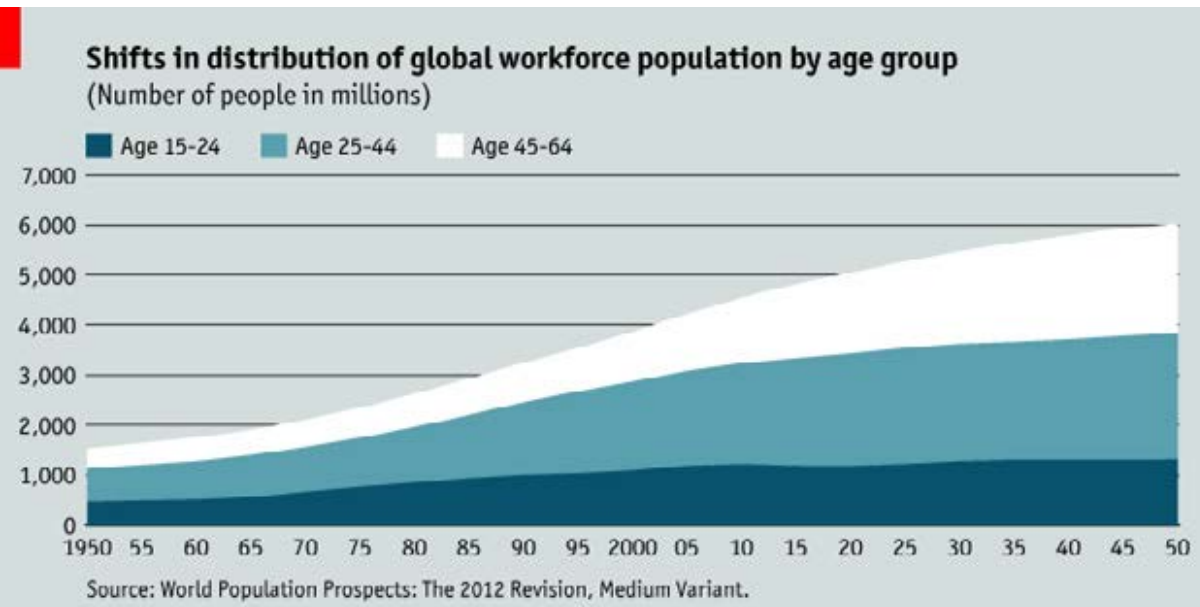
- Urbanization
- Accelerating Technology Changes
- Aging World / Resources Challenges
- Greater Global Connections

Although we all know that these disruptions are happening, most of us fail to comprehend their full magnitude and the second and third-order effects that will result

Adopted from No Ordinary Disruption – McKinsey & Company employees

Trend 3: Aging World / Resource Challenges

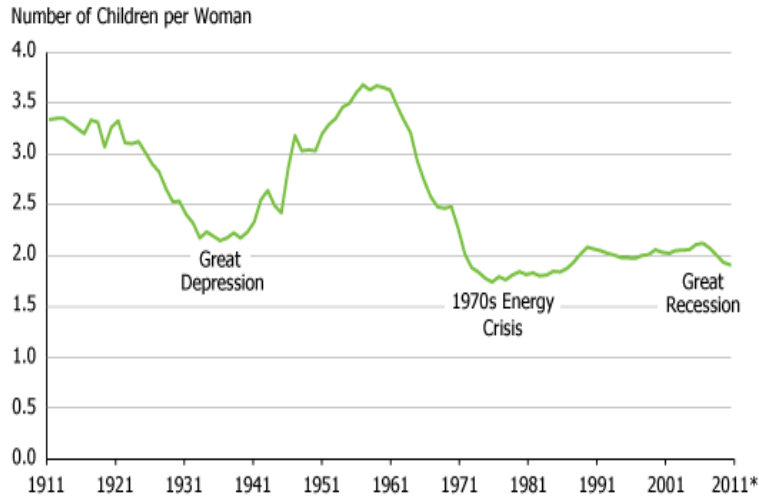
- 2.1 children per woman to replace a generation
- 60% World replacement rate below generation replacement rate
- Elderly will place higher demand on governments



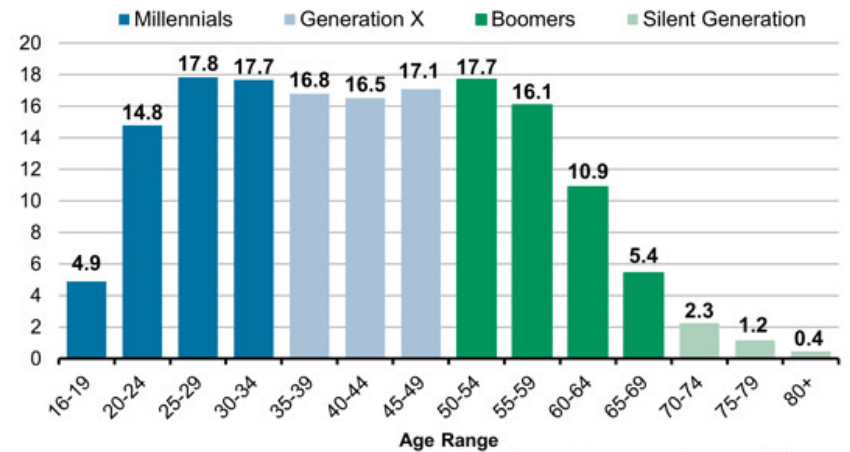
Adopted from *No Ordinary Disruption* – McKinsey & Company employees

USA Fertility rates and Workforce

The U.S. Fertility Rate Has Fallen During Periods of Economic Decline



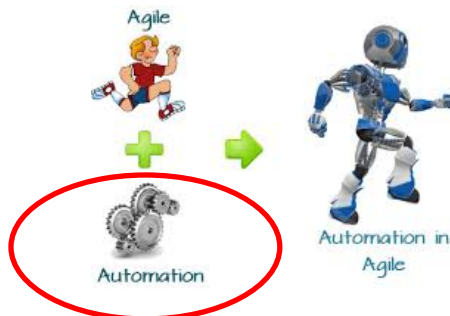
Projected size of U.S. labor force (in millions) by age, for the year 2015



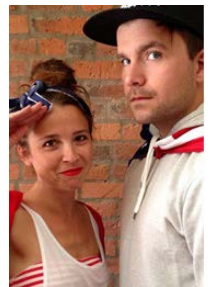
Source: Department of Labor | WSJ.com

* Estimated by PRB.

Source: National Center for Health Statistics



By 2020 50% Of the workforce will be millennials



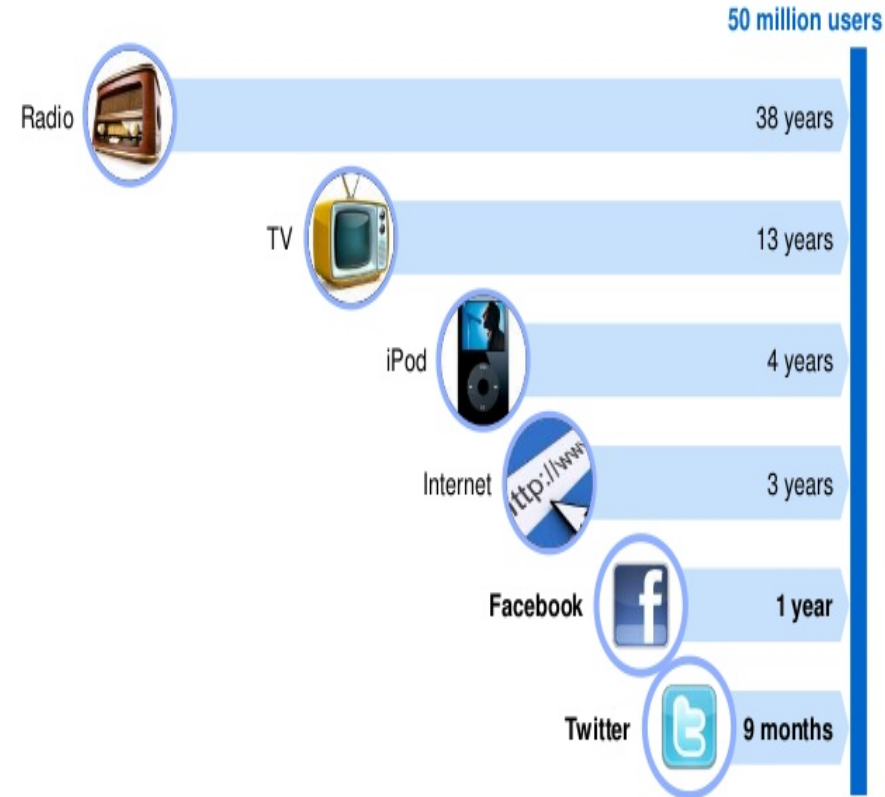


Trend 2: Accelerating Technology Changes

- 50 years for 50% of Americans to have a phone
- 38 years for 50 million radio listeners
- 6 years Facebook had 600 million
- WhatsApp sold for \$19 billion after just 5 years
- 1 trillion objects expected to be connected to the Internet by 2025

Social technologies have been adopted at record speed
Time to reach 50 million users

ILLUSTRATIVE



SOURCE: Various press reports

McKinsey & Company | 3

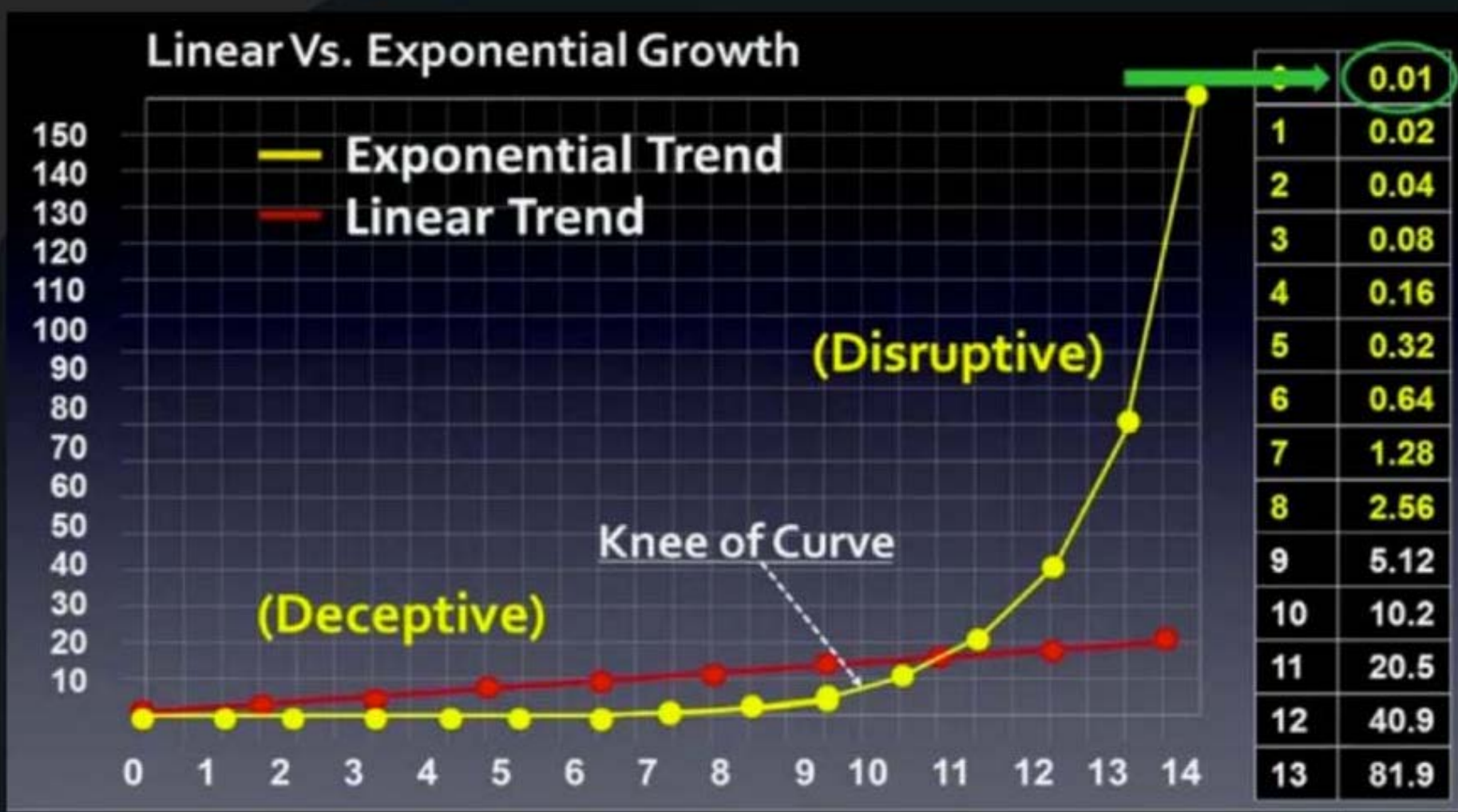
Adopted from No Ordinary Disruption – McKinsey & Company employees

12 Technology Trends!

1. Next-generation genomics
2. Advanced materials
3. Energy Storage
4. Advanced oil and gas exploration and recovery
5. Renewable energy
6. Advanced robotics
7. Autonomous and near autonomous automobiles
8. 3-D printing
9. Mobile Internet
10. Internet of things
11. Cloud Technology
12. Automation of knowledge

Adopted from No Ordinary Disruption – McKinsey & Company employees

Trend 2: Accelerating Technology Changes



Adopted from York Exponential – John McElligott



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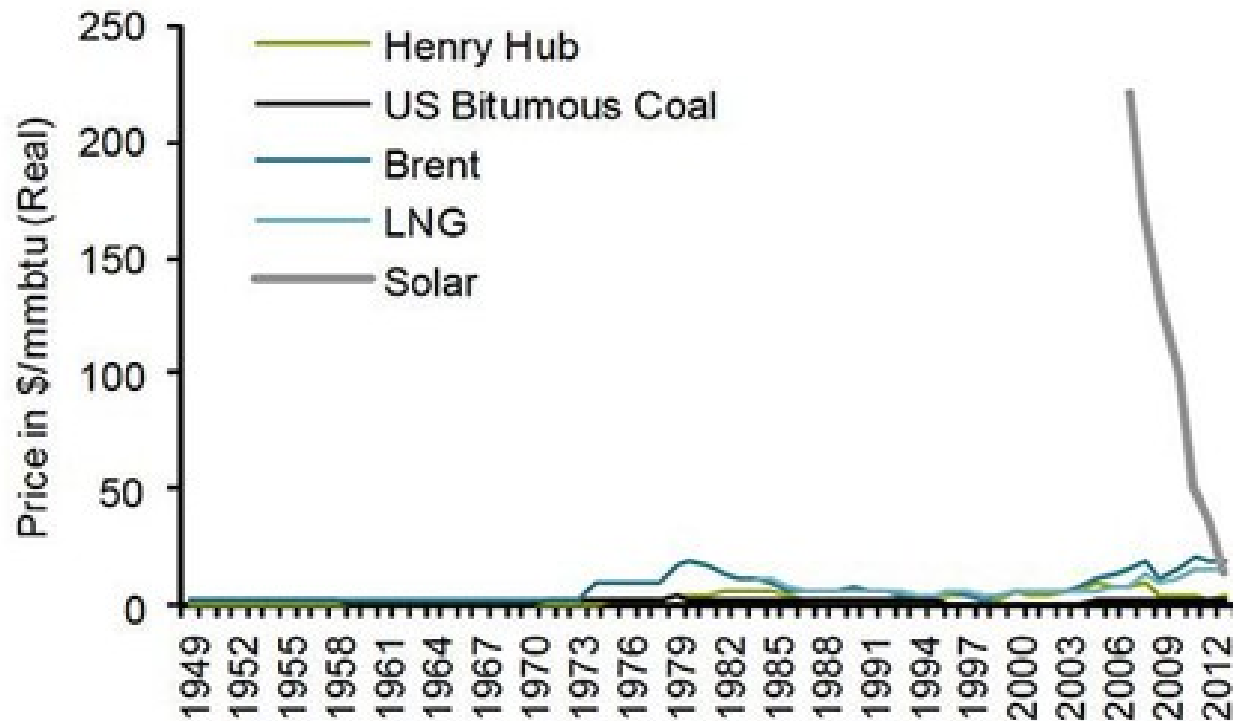
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Trend 2: Accelerating Technology Changes

Energy - Solar

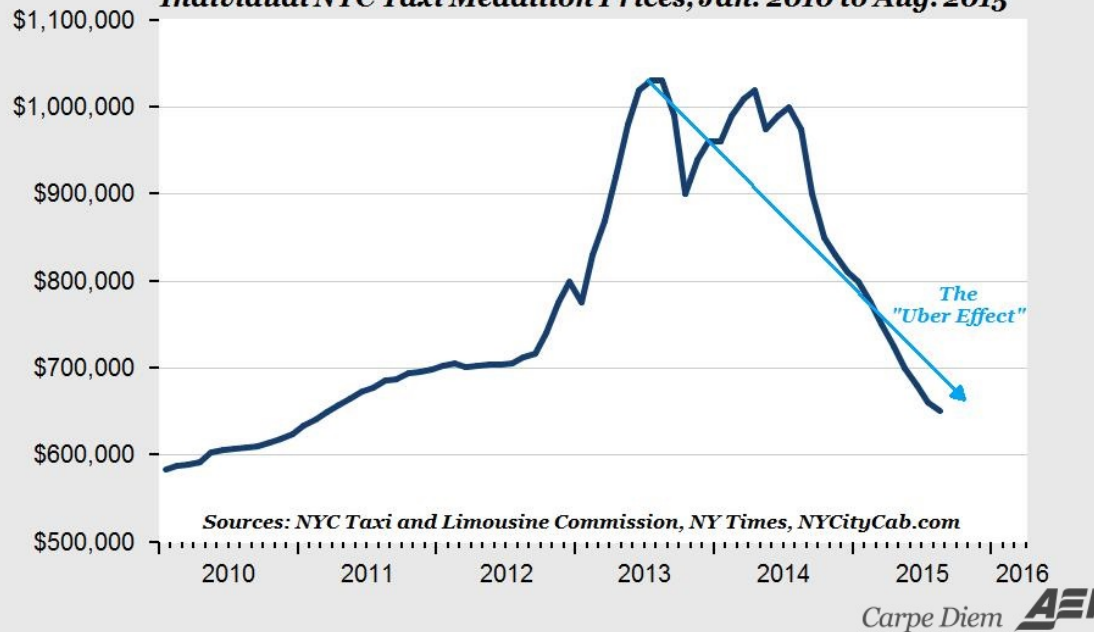
Welcome to the Terrordome...



Trend 2: Accelerating Technology Changes

Services

Individual NYC Taxi Medallion Prices, Jan. 2010 to Aug. 2015



Trend 2: Accelerating Technology Changes

3D Printing



“THE RPD MACHINE CAN PRINT 20 TONS OF TITANIUM PER YEAR. THIS IS A GAME CHANGER.”
WARREN M. BOLEY JR., NORSK TITANIUM



Lead times
The production of a 200-pound block of titanium, and the machining to get to a 20-pound airplane part, typically “requires a lead time of 55 to 75 weeks. And Norsk can print that in an hour or two,” says Boley. That kind of process provides a very different template for a customer’s cash flow and working capital management.
“If Boeing wanted to make 12 to 14 Dreamliners a month, we can feed its supply chain with a responsive process that

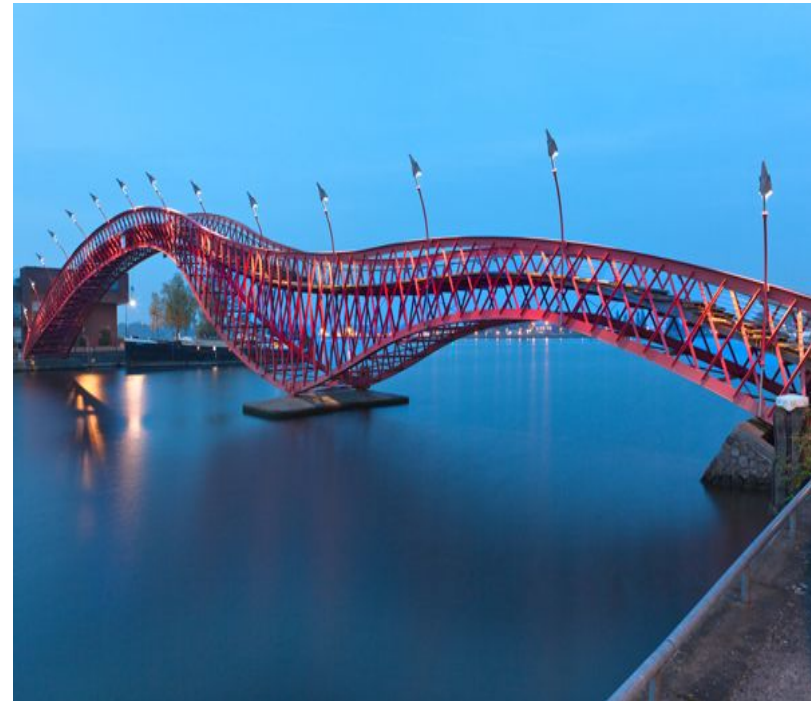
In a three-stage process, near-net-shape RPD forms are machined for aerospace quality inspection and then finished for assembly.

doesn’t take years to set up; we can make a part in a day and deliver it the next day or next week. This saves inventory, and cash flow is orders-of-magnitude different. The inventory savings, the working capital, are revolutionary.”
Running a big batch of titanium at a

rolling mill “is like an Apollo moonshot,” in terms of the planning needed, Boley says. With RPD, “a manufacturer like Boeing can now order a single part. The RPD machine doesn’t care what it produced yesterday or last week. It can build part A this hour, part B next hour and part C in the third hour. You get to one-piece flow, the ultimate lean expression.”

Value proposition
According to Boley, the potential savings

January 2016 Modern Metals® 21



Trend 2: Accelerating Technology Changes

- **Collaborative**



- Social (Jibo)



Trend 2: Accelerating Technology Changes

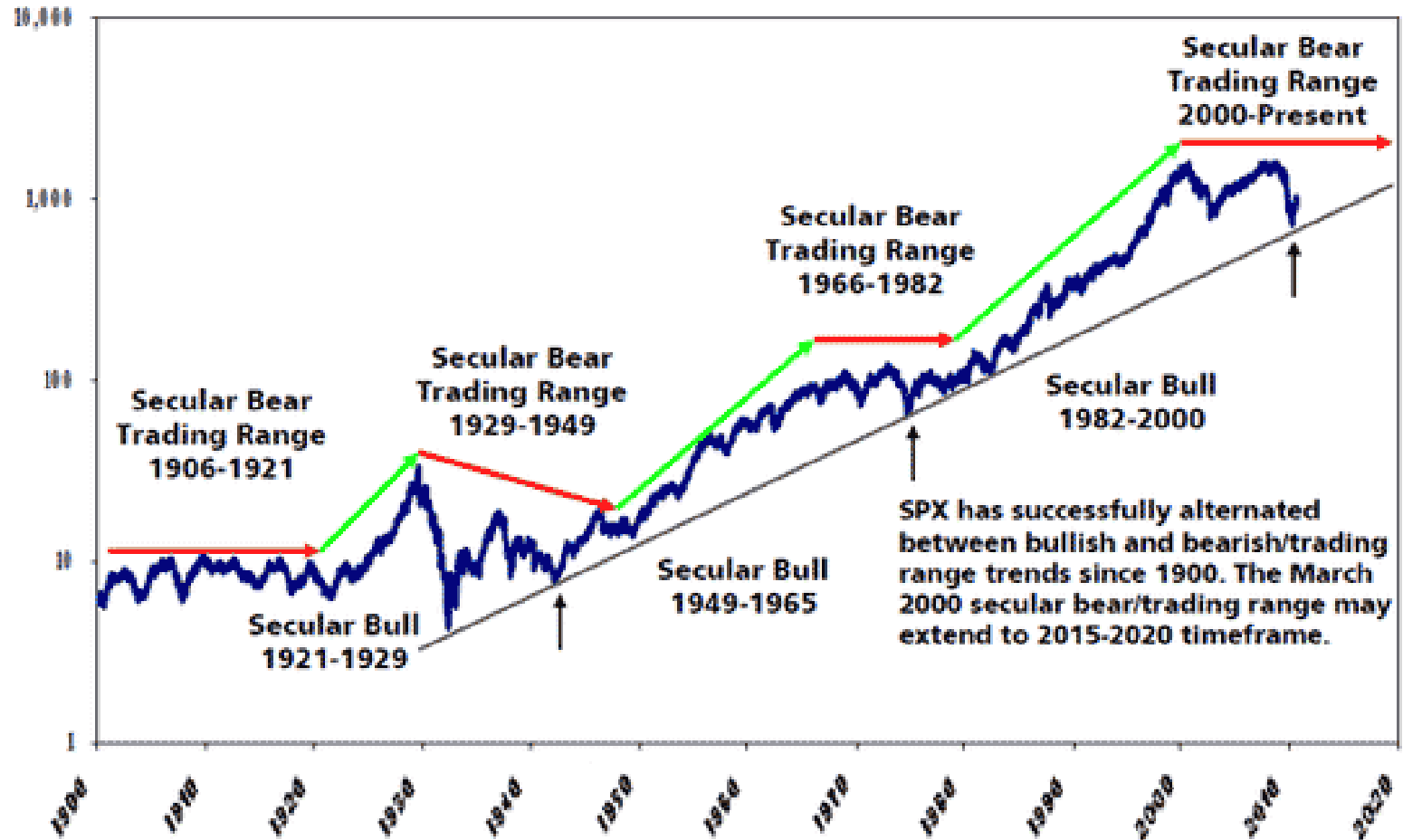


Trend 2: Accelerating Technology Changes

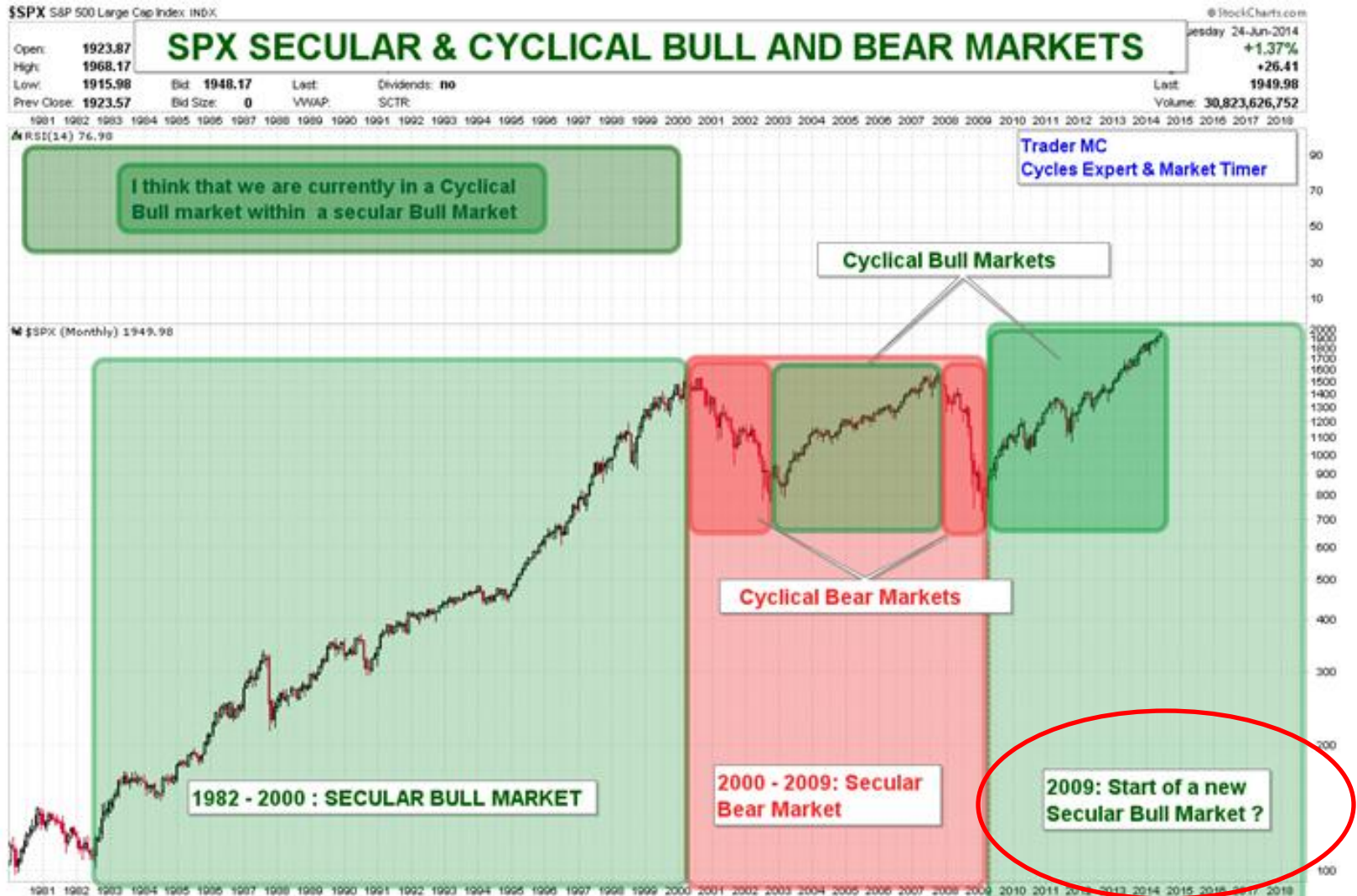


What's the Stock Market tell us?

SPX Index 1900 - Present



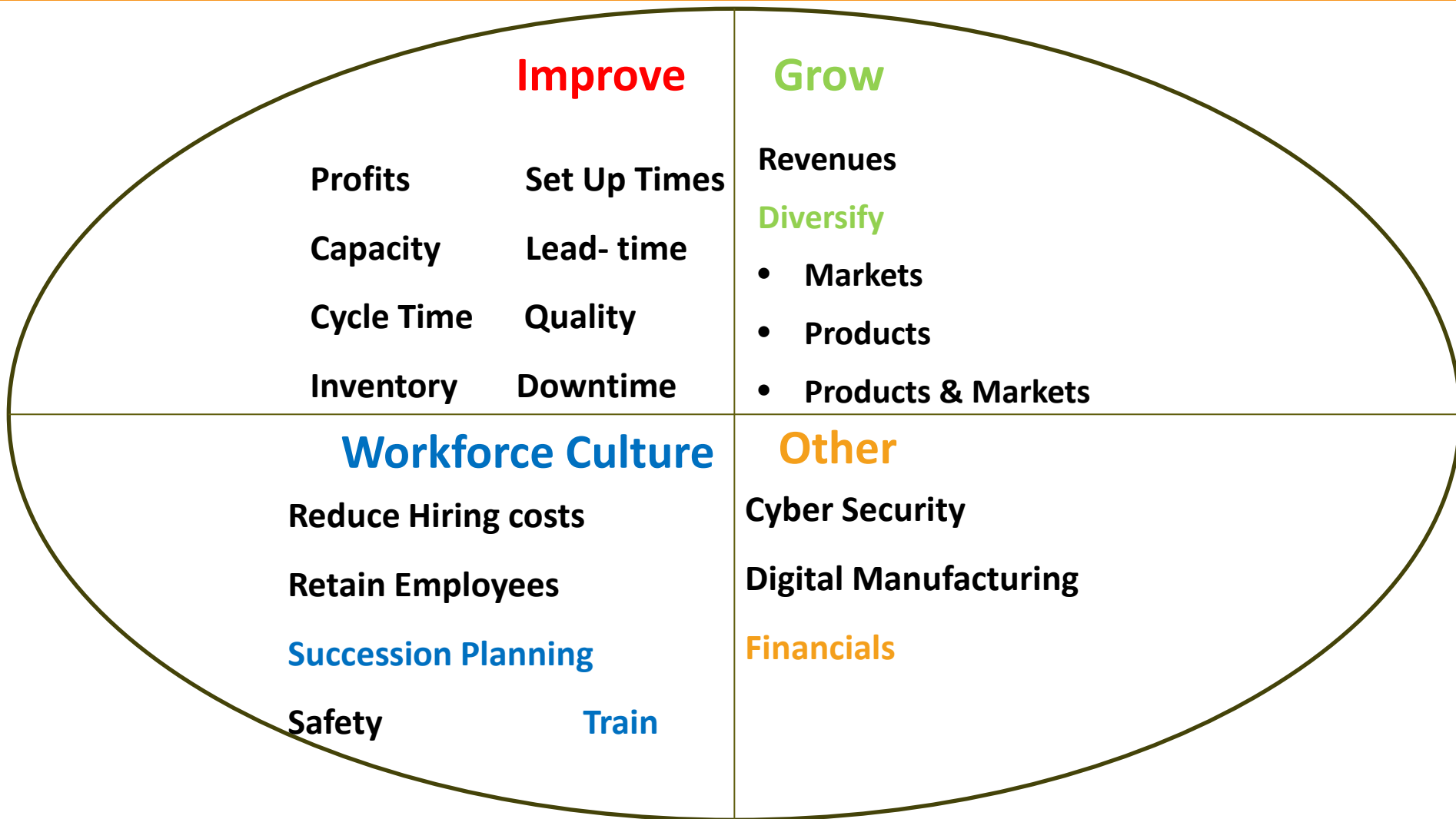
What's the Stock Market tell us?



Where's this leave us?

1. Manufacturing is as live as ever due to what some people are calling the 4th Industrial Revolution!
2. One of the best times to be in business!
3. One of the most challenging times!
4. Technology, Automation, and Design for Technology will play a huge role!

What can we do? – Balance your strategy!

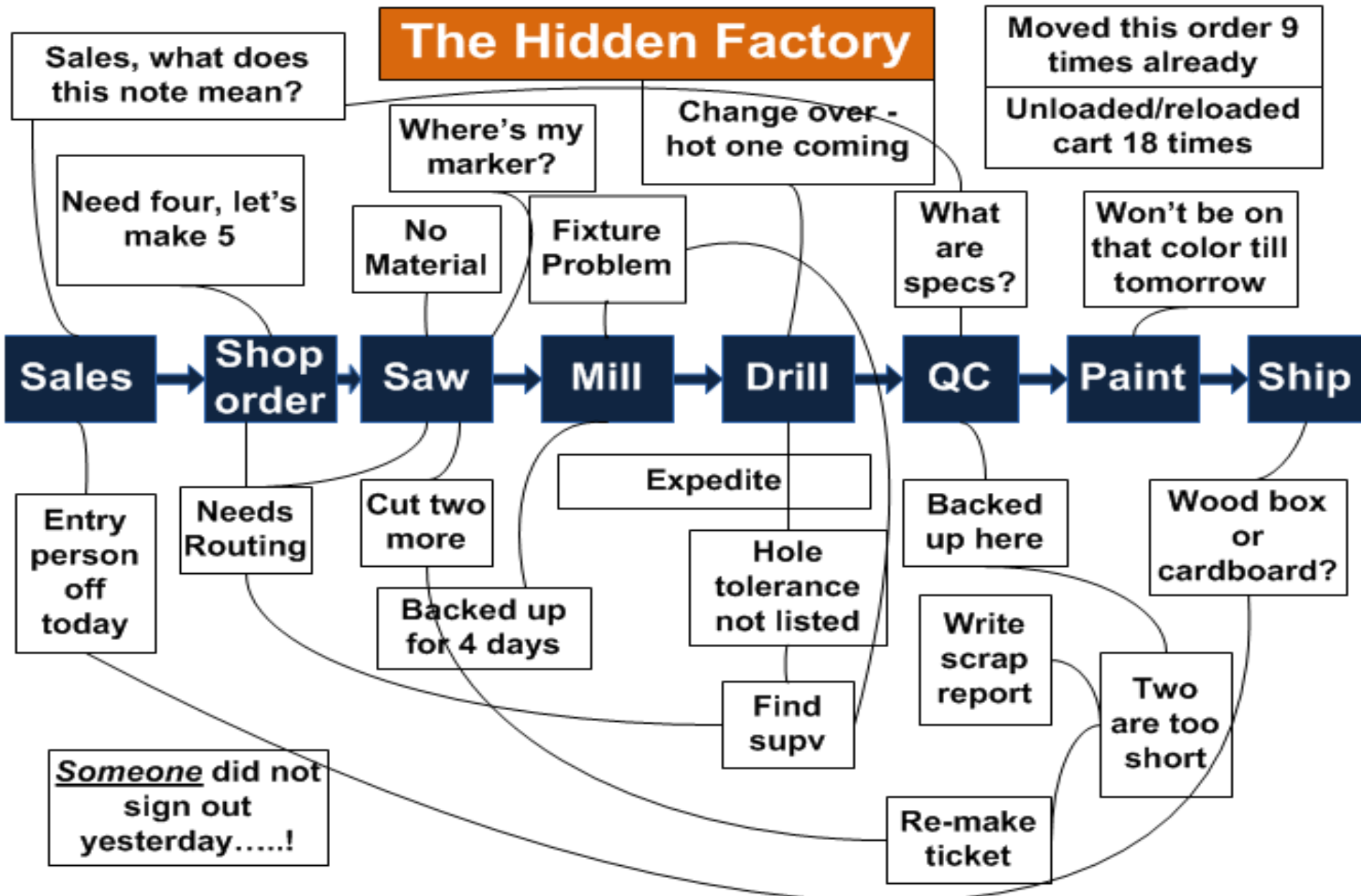


Improve

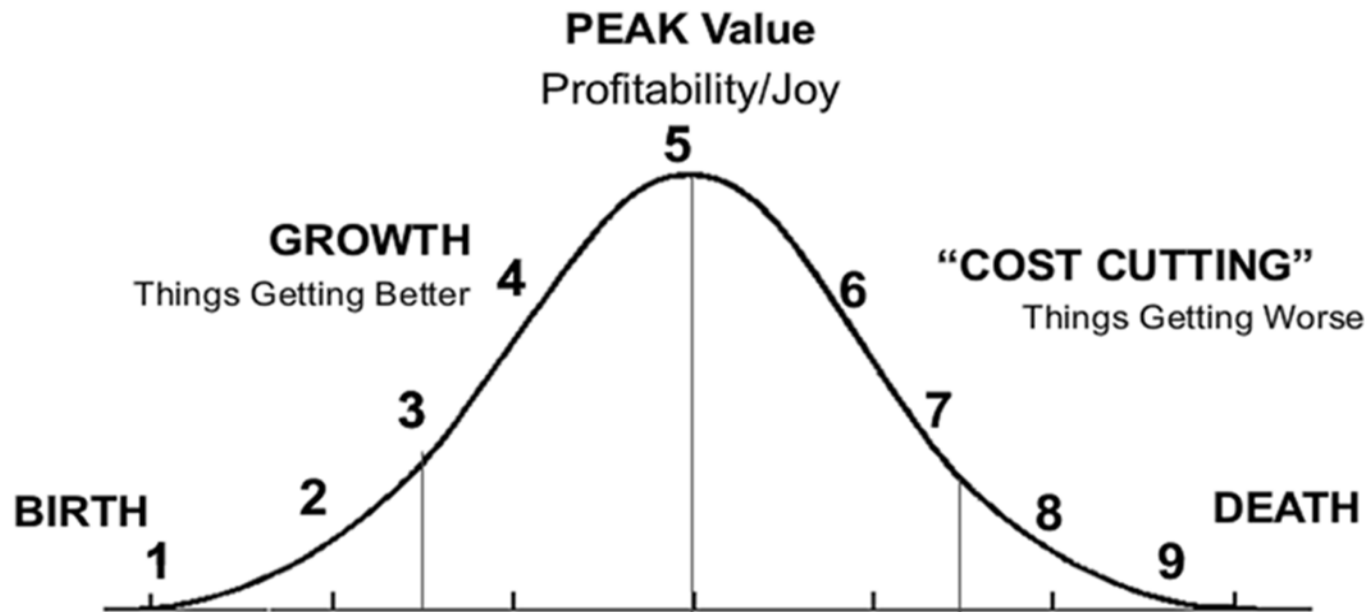
The Factory



Improve



Grow - Theoretical Business Cycle Curve

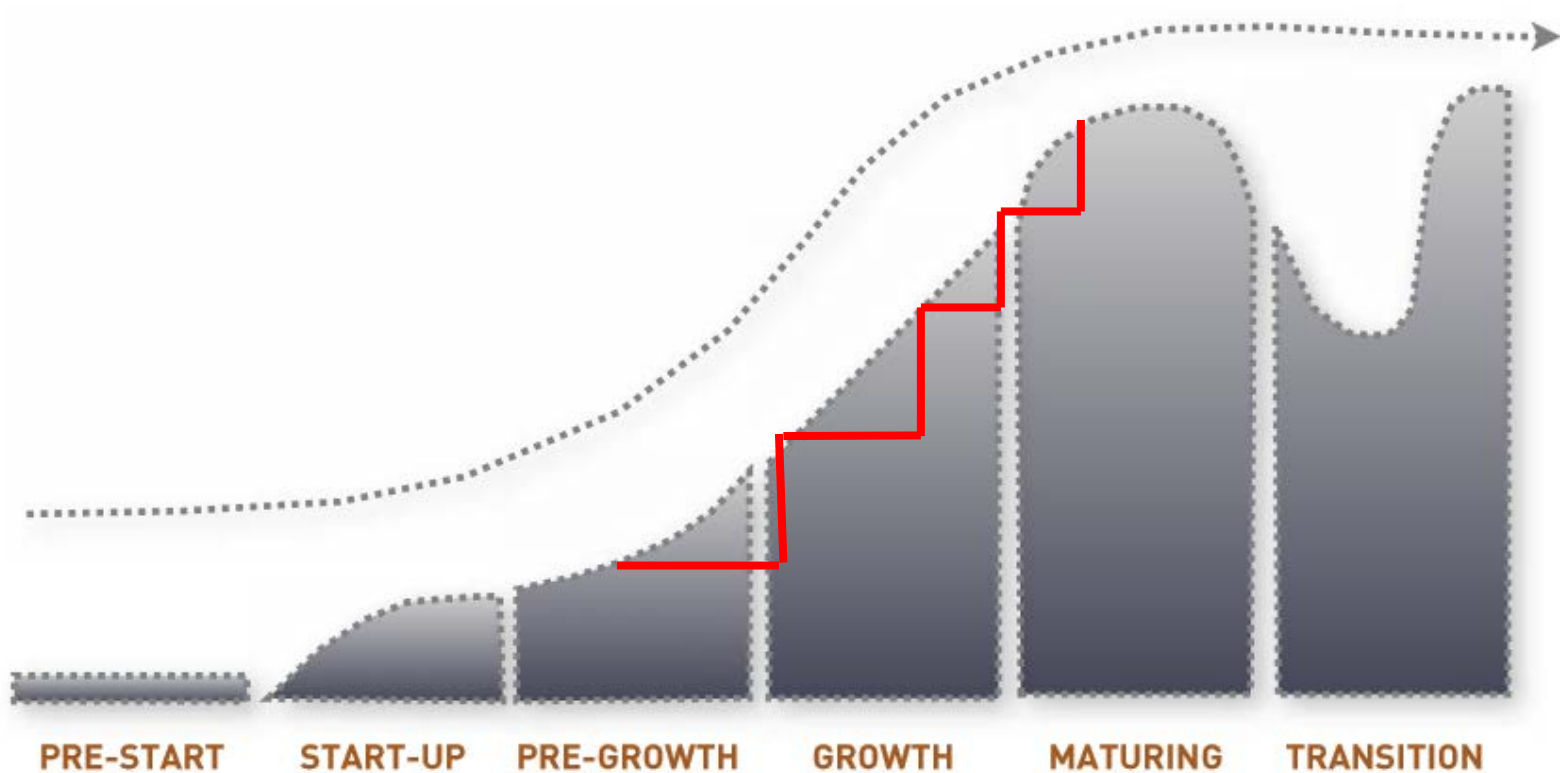


Where is your business on the Curve?

Where do you want to be?

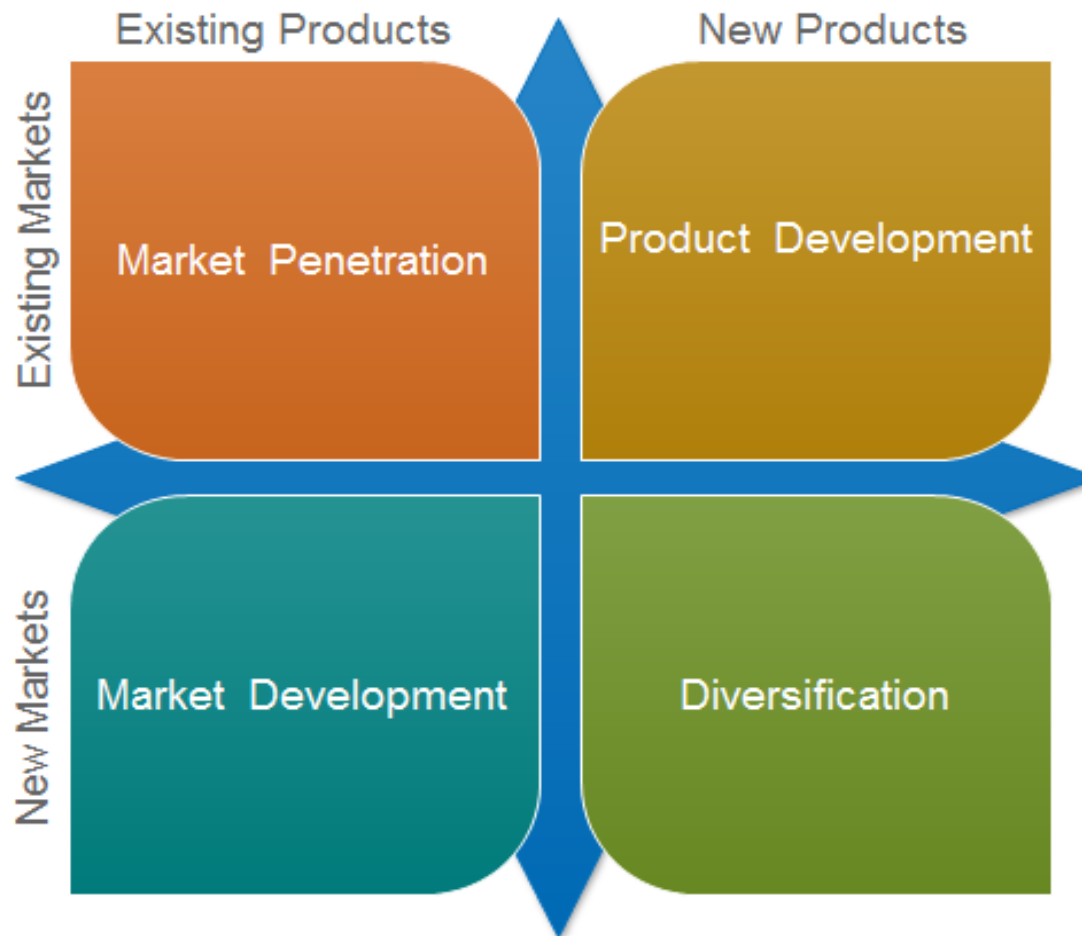
How are you going to get there?

Grow - Reality Business Cycle Curve



Grow

Ansoff Matrix



Grow

- **Market Penetration** = New Sales
- **New Products** = Innovation & Product Development
- **New Markets** = Market Intelligence
- **New Products & Markets** = all the above

Grow with continuous Research / Learning



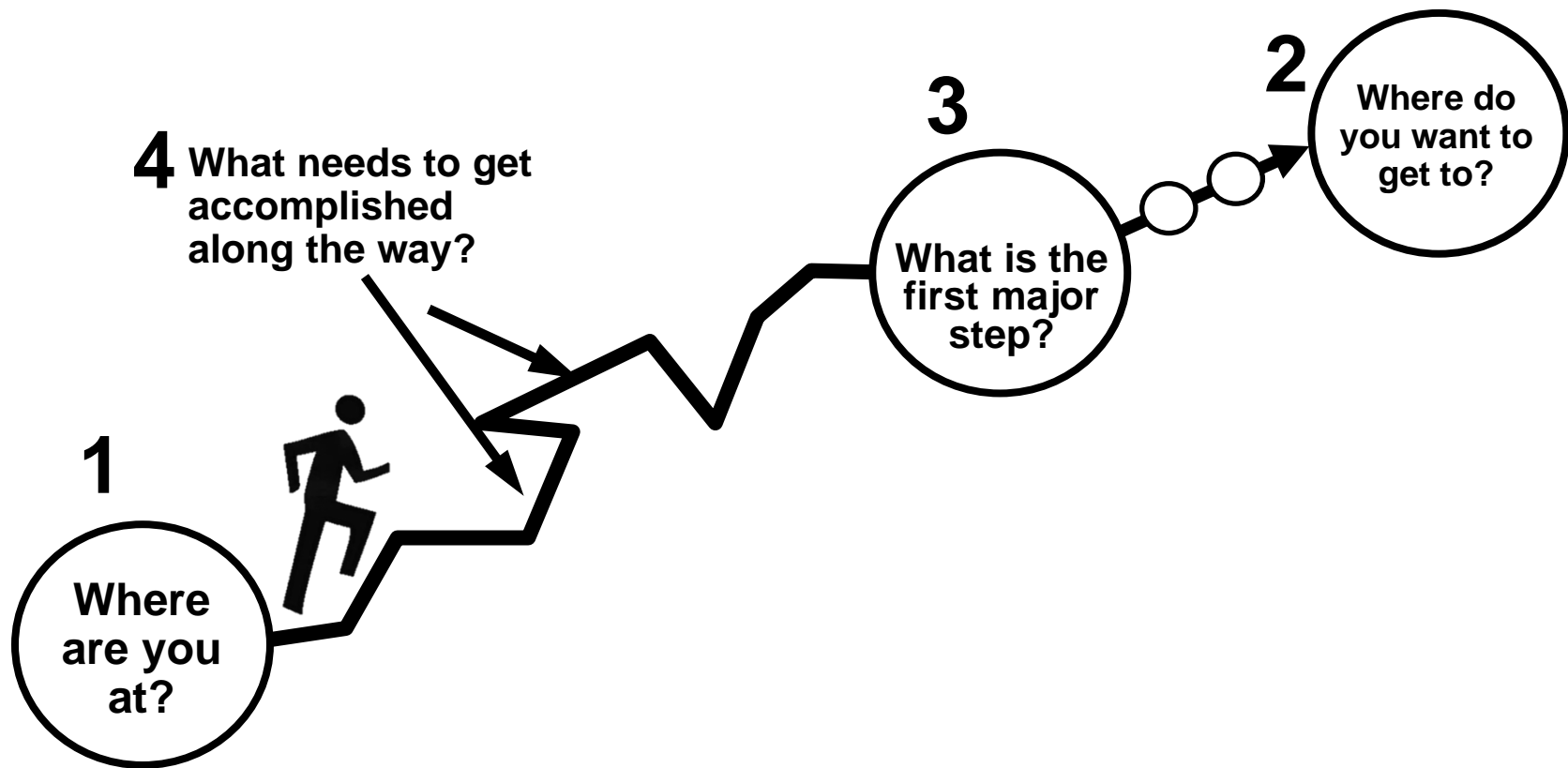
Workforce Culture



Where's this leave us?

1. Manufacturing is as live as ever due to the 4th Industrial Revolution!
2. One of the best times to be in business!
3. One of the most challenging times!
4. Technology, Automation, and Design for Technology will play a huge role!
5. **Continuously improve your business!**
6. **Grow your business to stay and avoid downturns!**
7. **Improve your Workforce Culture to attract/retain employees!**

What does your journey look like?





Thank You! Any Questions?

Contact Us:

UW-Stout Manufacturing Outreach Center

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SUCCEED

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