



# ADAPTING TO TECHNOLOGICAL CHANGE WHILE MITIGATING CYBER THREATS IN THE GLOBAL SUPPLY CHAIN™

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Principal



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## “Sharpe like a knife”

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# Agenda

- Productivity and Invention
- Innovations like AI are impacting areas once considered safe
- Known Patterns
  - Crossing the Chasm
  - Creative Destruction
  - Adoption Requires an Accelerant (like COVID)
- Digitization and the Supply Chain
- Data is the new oil
- AI and Data
- Value

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# Caveat

“History does not repeat itself but, it often rhymes.”  
Mark Twain

## Historical Trends

Disruption to:

- Manufacturing
- Global Supply Chain
- Port Operations

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# Only US President to hold a patent

Abraham Lincoln

“...the fuel of interest to the fire of genius in the discovery and production of new and useful things.”





# Patent No. 6,469, "Buoying Vessels Over Shoals"



[Doug Coldwell,](#)

[https://en.wikipedia.org/wiki/Abraham\\_Lincoln%27s\\_patent#/media/File:Patent\\_Model\\_of\\_Abraham\\_Lincoln's\\_invention.jpg](https://en.wikipedia.org/wiki/Abraham_Lincoln%27s_patent#/media/File:Patent_Model_of_Abraham_Lincoln's_invention.jpg)

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# So?

1. Historically IP theft is our adversaries #1 goal

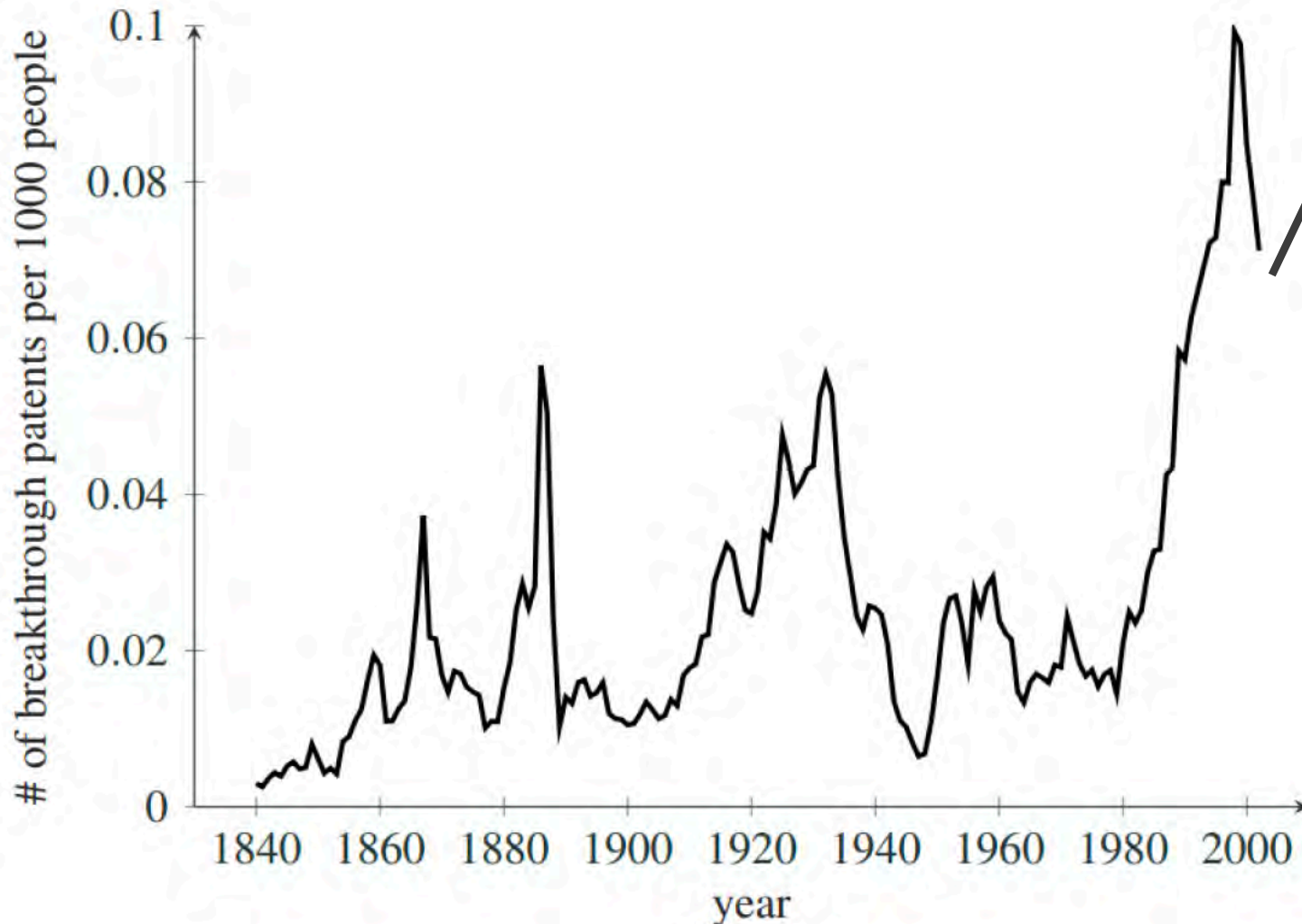
Data theft is now #1 goal

2. Current innovations are disrupting in ways not seen before.

Disruption occurs when we change the way we work and live.



**Figure 2: Breakthrough Patents Over Time**



Thank you, Pierre Yared, Vice Dean and Professor International Business, Columbia University

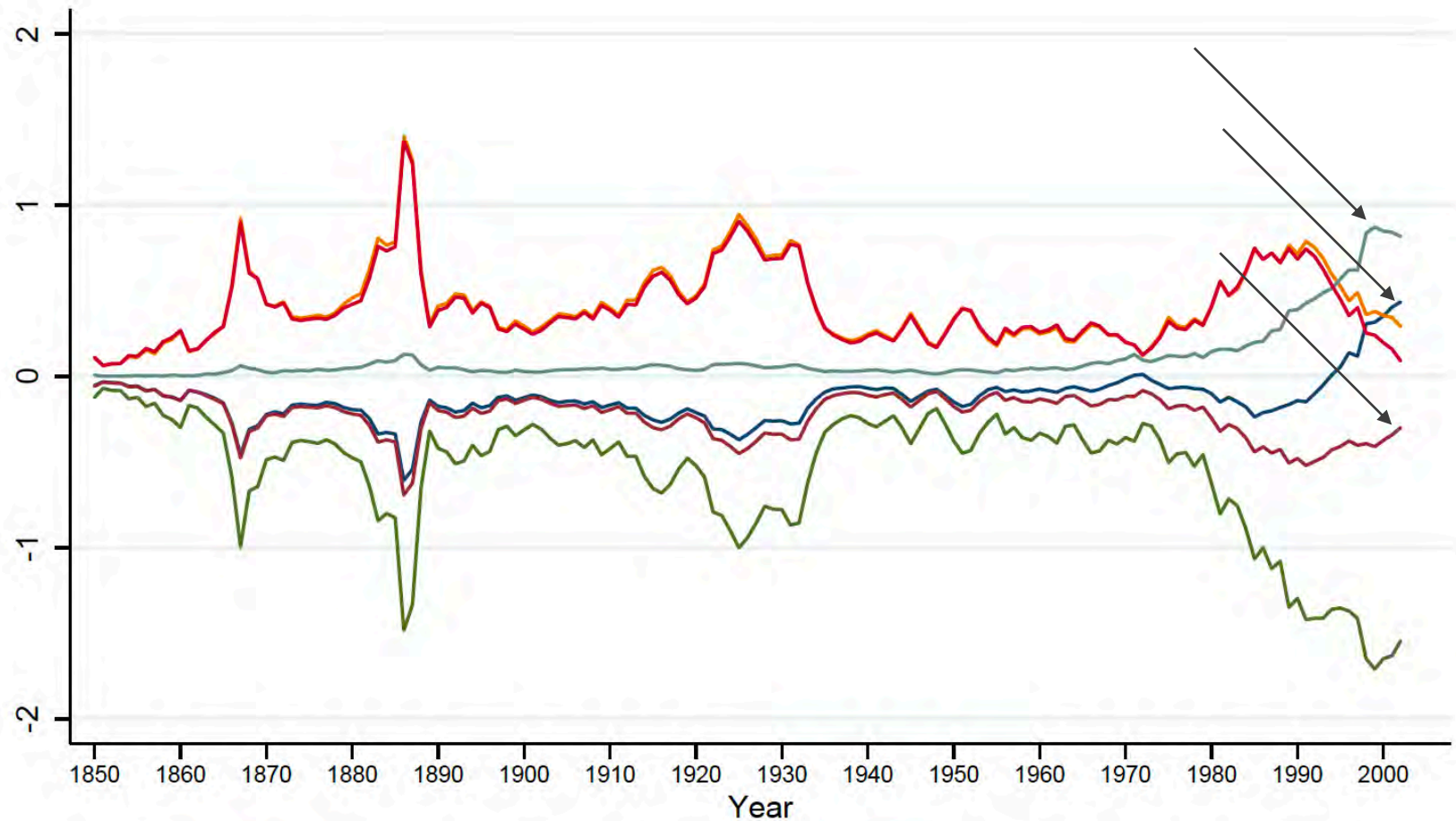
"Technological Change and Occupations over the Long Run", Leonid Kogan. Dimitris Papanikolaou. Lawrence D. W. Schmidt & Bryan Seegmiller

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**Figure 3: Exposures of Tasks To Technological Change—All Patents**



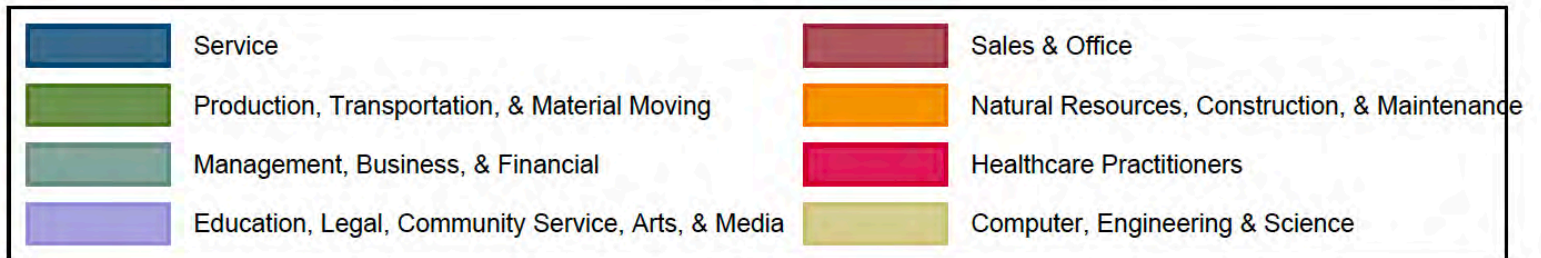
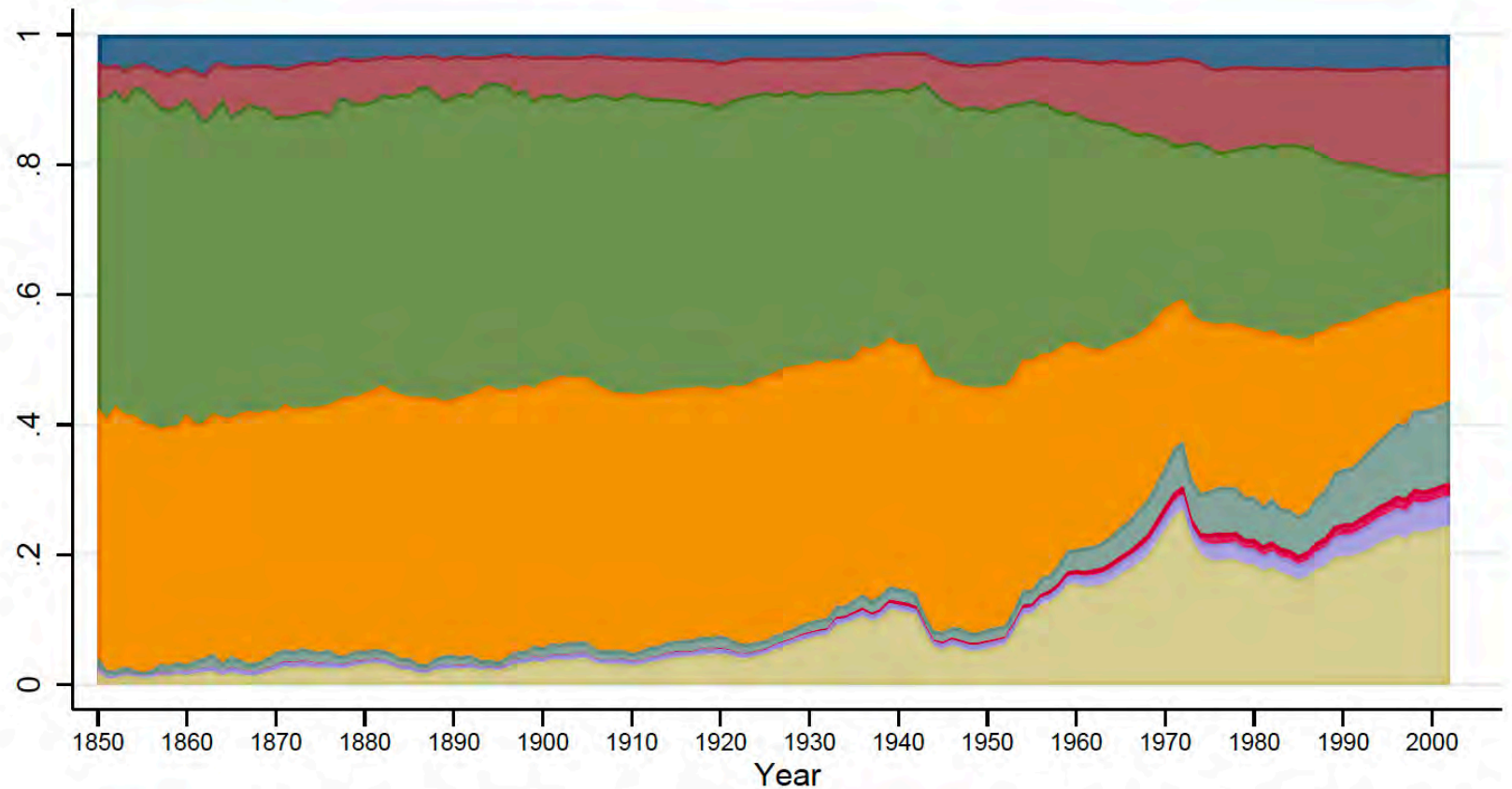
Thank you, Pierre Yared, Vice Dean and Professor International Business, Columbia University

“Technological Change and Occupations over the Long Run”, Leonid Kogan, Dimitris Papanikolaou,

Lawrence D. W. Schmidt & Bryan Seegmiller



**Figure 8: Technological Change And Occupations: Composition**



Thank you, Pierre Yared, Vice Dean and Professor International Business, Columbia University

“Technological Change and Occupations over the Long Run”, Leonid Kogan. Dimitris Papanikolaou.  
Lawrence D. W. Schmidt & Bryan Seegmiller



# Career Impact

Accountants  
Auditors  
Tax Preparation  
Telemarketers  
Medical Record Technicians  
Insurance Underwriters  
Legal Secretaries  
Real Estate Brokers  
Dental Lab Technicians  
Welders  
Roofers

Select disruption of 90% or higher



The Future of Employment  
Carl Benedikt Frey & Michael Osborne





"The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it."

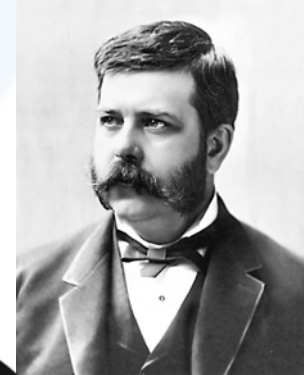
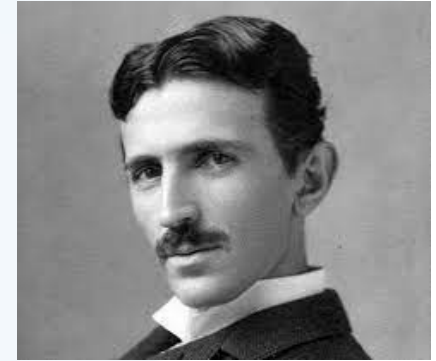
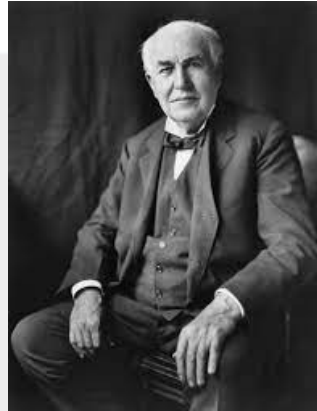
Mark Weiser





# Electricity

- Harnessing allowed us to build mills and factories away from running water
- Changed the way we work and live
- Initially feared
- Today not even given a 2<sup>nd</sup> thought EXCEPT when its not there



# Inventions that changed the world

- Light bulb
- Phone
- Refrigeration
- Clocks
- Eyeglass lenses
- Clean water



# Inventions that changed the world

- Clocks enabled navigation and the industrial revolution
- Clean water lead to the Integrated Circuits (IC)
- Air-conditioning enabled the largest migration of human beings in the human history



# And unintended consequences

- Air-conditioning gave us fluorocarbons
- Used everywhere, fire extinguishers, paint, deodorants, hair spray...
- Depleted the ozone layer
- Outlawed 1978
- Northern Hemisphere recover 2030
- Southern Hemisphere recover 2050

<https://www.sbs.com.au/news/the-ozone-layer-is-on-track-to-completely-repair-itself-in-our-lifetime>





# Known patterns do exist

- Crossing the Chasm
  - Cloud, Video and Collaboration are the new mission critical applications

[https://en.wikipedia.org/wiki/Crossing\\_the\\_Chasm](https://en.wikipedia.org/wiki/Crossing_the_Chasm)

- Creative Destruction

- Business models changed

[https://en.wikipedia.org/wiki/Creative\\_destruction](https://en.wikipedia.org/wiki/Creative_destruction)

- Digital Adoption Accelerated 5 to 10 years

- Telemedicine, Banking, Retail, Grocery

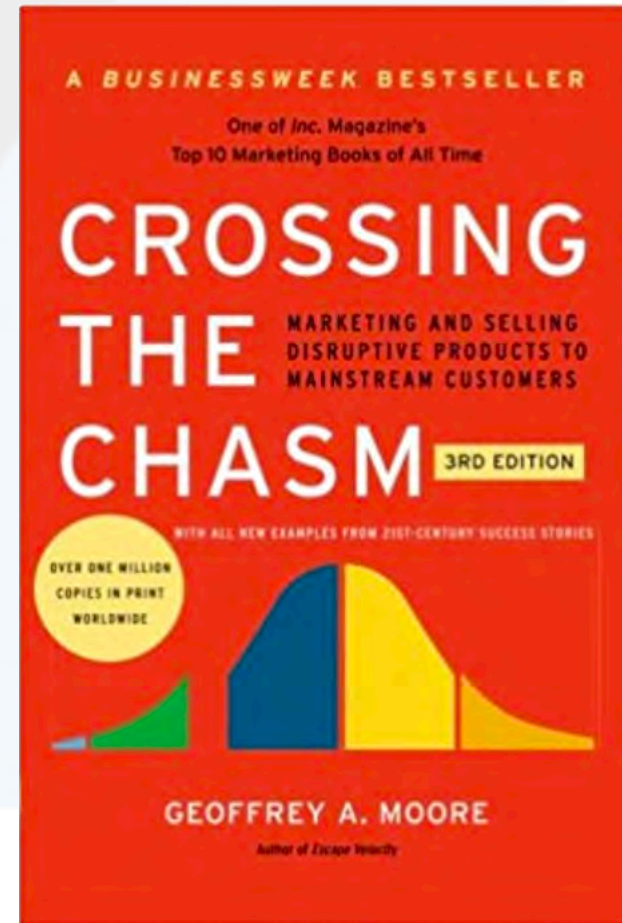
<https://bit.ly/2YmDgiW>



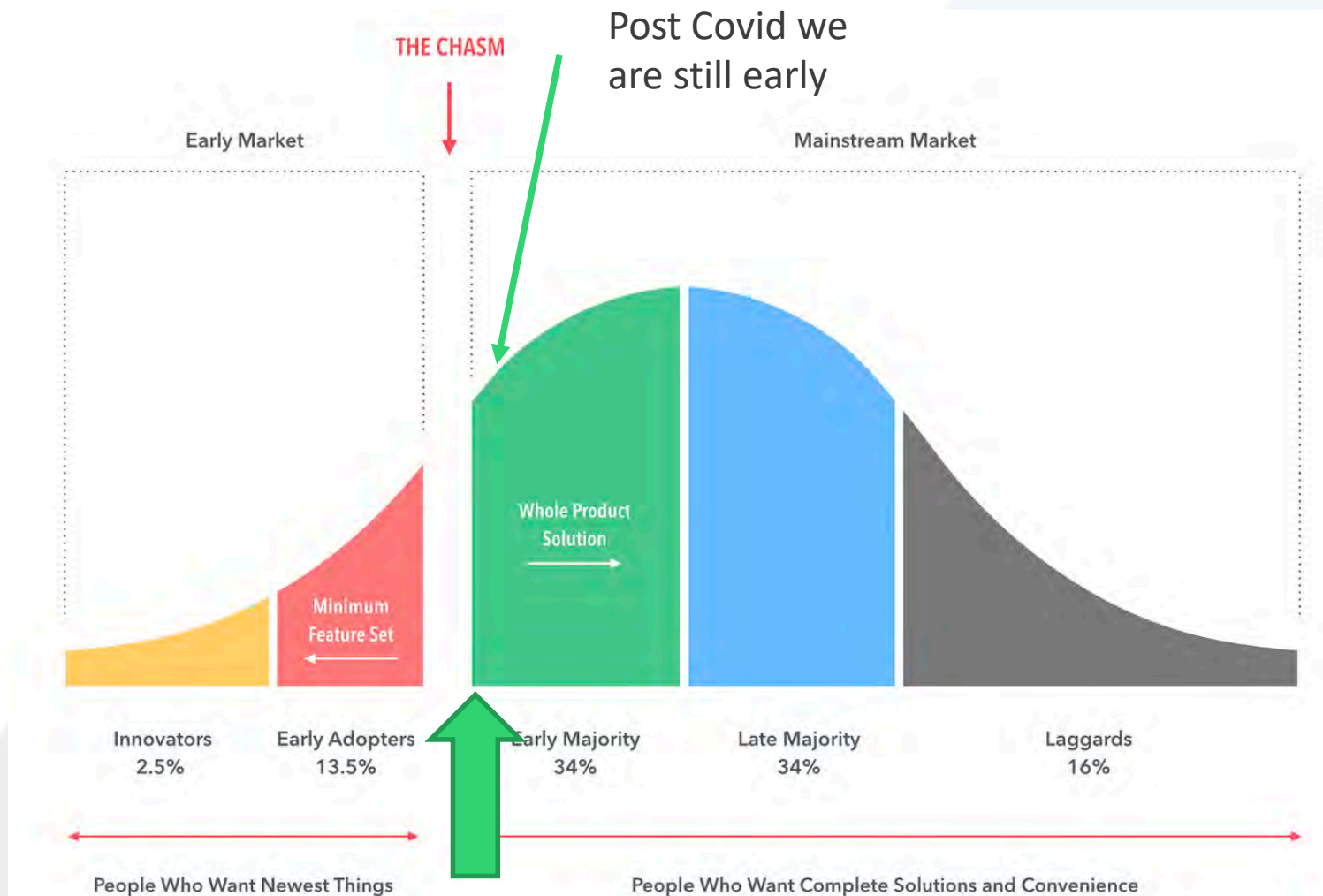
# Crossing the Chasm

Technology adoption essentially goes through five phases

- |                  |                |       |
|------------------|----------------|-------|
| 1.               | Innovators     | 2.5%  |
| 2.               | Early Adopters | 13.5% |
| <i>The Chasm</i> |                |       |
| 3.               | Early Majority | 34%   |
| 4.               | Late Majority  | 34%   |
| 5.               | Laggards       | 16%   |



# Defacto industry standard



Technology becomes the defacto industry standard



# Disruption Needs an Accelerant





# COVID 19 the Ultimate Accelerator

- March 2020
  - Dining room tables became desks and bedrooms became offices
  - Nearly 500% increase in remote workers – 9% to 42%
  - 60% of remote workers are as productive if not more productive
    - ⇒ Should only increase as distractions in the home are removed
  - Reduced Costs
    - Facilities
    - Travel
    - Operations
  - Larger talent pool
  - Business models have changed



# COVID Accelerated Adoption

## Telemedicine

- It took over 20 years for consumer adoption of telehealth to grow to 11%
- With the COVID pandemic, adoption leaped to 46%
- 450% increase in six weeks.
- Covid shook loose sudden changes in laws, regulations and insurance practices.

McKinsey & Company's COVID-19 consumer survey conducted in April.



# COVID Accelerated Adoption

## Schools and Higher Education:

- Most localities pivoted to 100% online learning and digital classrooms
- Universities who have been growing their online education services are now offering 100% online programs.
- The Chronicle of Higher Education:
  - 24% of Universities will be offering classes primarily onsite;
  - 28% primarily online;
  - 16% hybrid
  - 27% to be determined.

David Rogers, author of “The Digital Transformation Playbook”  
Talks about needing “the will”.



# COVID Accelerated Adoption

## Shopping Online:

- Total U.S. online sales reached \$73 billion in June, up 76% compared with \$42 billion a year earlier
- 72% of consumers now use mobile devices to shop online.

Digital Commerce 360, <https://www.digitalcommerce360.com/article/coronavirus-impact-online-retail/>  
Adobe Analytics shows this is down 11.3% from May's \$82.5 million  
Forbes, "How COVID-19 Is Transforming E-Commerce", Apr 28, 2020

## Banking:

- 72% of customers at the four largest U.S. banks used mobile banking applications in April 2020.
- Wells Fargo reported an 81% increase in deposits using mobile devices;
- Wells Fargo also reported a 23% surge in customers signing on to digital banking.





# COVID Accelerated Adoption

## Manufacturers:

- Many are actively developing plans for “lights out” factories and supply chains
- Most factories are simply not designed to be managed remotely
- lack the digital tools and infrastructure needed to support such activities
- because of social distancing and the like, between 40% and 50% of their workforce are unavailable to work on-site, forcing them to act.

Industry Week, “What Will Manufacturing’s New Normal Be After COVID-19?”, Apr 21, 2020

## Grocery:

- Nearly 80% of U.S. consumers shopped online for groceries since the start of the COVID-19 outbreak.

Online ordering and delivery are now the primary shipping channel. Supermarket News, Russell Redman, May 27, 2020





# Big winners

Online – almost everything

The Cloud

Virtual Collaboration (e.g., SLACK)

Video (e.g., Zoom)

Biotech (e.g., CRISPR)

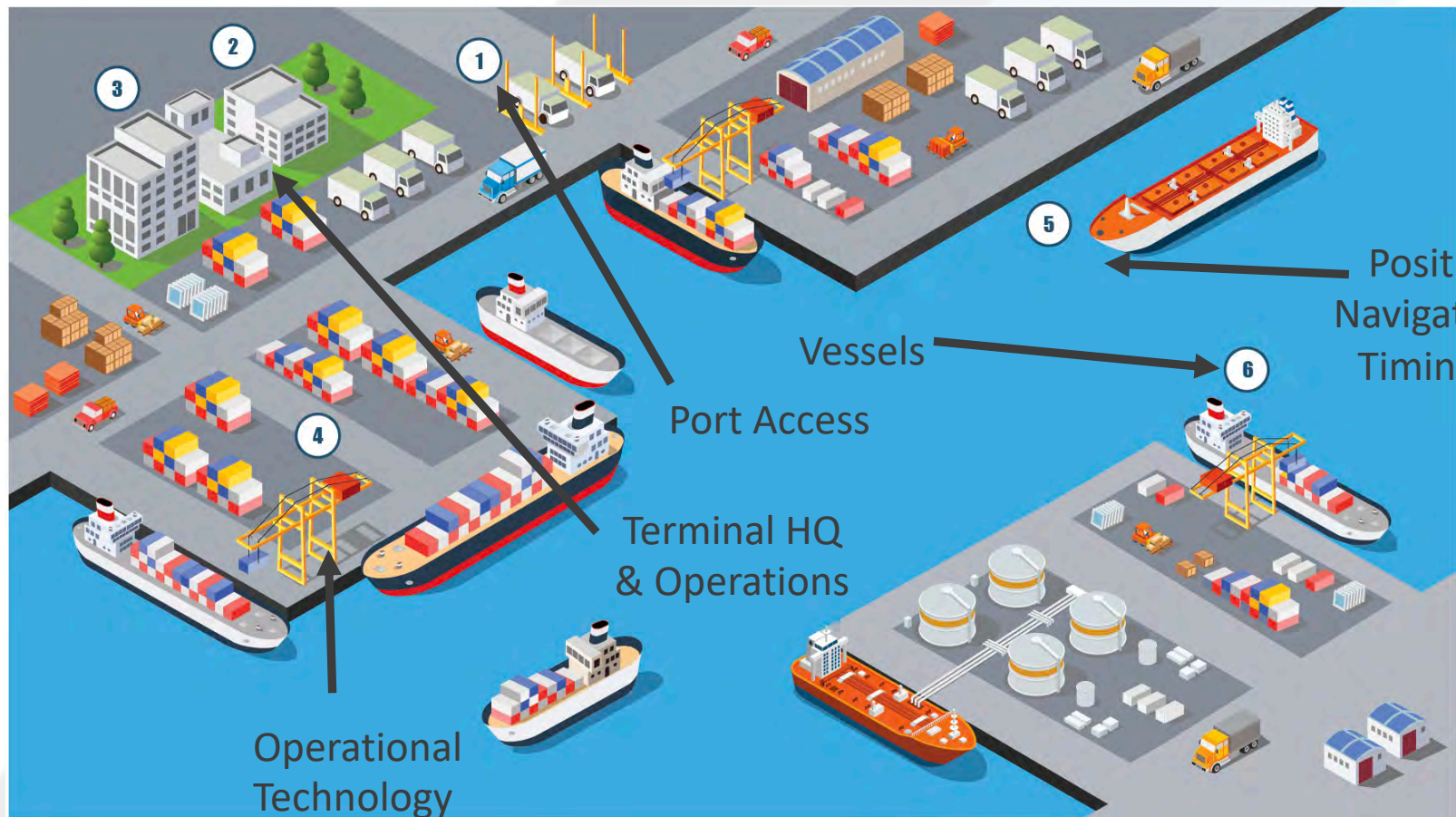
Supply Chain Resilience

Data won before COVID





# Technology Advances at the Ports



## PORT FACILITY CYBERSECURITY RISKS



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# Millions of Unpatched IoT, OT Devices Threaten Critical Infrastructure



<https://threatpost.com/unpatched-iot-ot-devices-threaten-critical-infrastructure/162275/>

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# Suspicious observations up at the ports



The REMUS 600 AUV on the deck of NOAA Ship Okeanos Explorer. Image courtesy of B. Eakins, CU Boulder and NOAA NCEI. [Download image \(pg. 97 KB\)](#).



<https://threatpost.com/unpatched-iot-ot-devices-threaten-critical-infrastructure/162275/>

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# Creative Destruction

- also know as **Schumpeter's gale**
- theory of economic innovation and the business cycle
- “...continuously revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one”
- disruption is painful



[https://en.wikipedia.org/wiki/Creative\\_destruction](https://en.wikipedia.org/wiki/Creative_destruction)

[Schumpeter, Joseph A. \(1994\) \[1942\]. \*Capitalism, Socialism and Democracy\*. London: Routledge. pp. 82–83. ISBN 978-0-415-10762-4. Retrieved 23 November 2011](#)







# Who owned Digital Photography patents?

- held a dominant position in photographic film
- "Kodak moment" part of the common lexicon
- slowness in moving to digital photography
- developed the first self-contained digital camera
- Kodak filed for Chapter 11 bankruptcy protection January 2012



Hiltzik, Michael (December 4, 2011). ["Kodak's long fade to black"](#). Los Angeles Times. Retrieved December 11, 2011.





# Who?

- Laser printing
- Ethernet
- Modern personal computer
- Graphical User Interface (GUI)
- The Desktop Concept
- Object-oriented paradigm
- Ubiquitous Computing
- Advancing very large scale integration (VLSI)
- The Mouse

**XEROX<sup>®</sup>**

**parc<sup>®</sup>**  
A Xerox Company



[https://en.wikipedia.org/wiki/PARC\\_\(company\)](https://en.wikipedia.org/wiki/PARC_(company))

# In contrast

Apple cannibalized the IPOD to create the SMART Phone



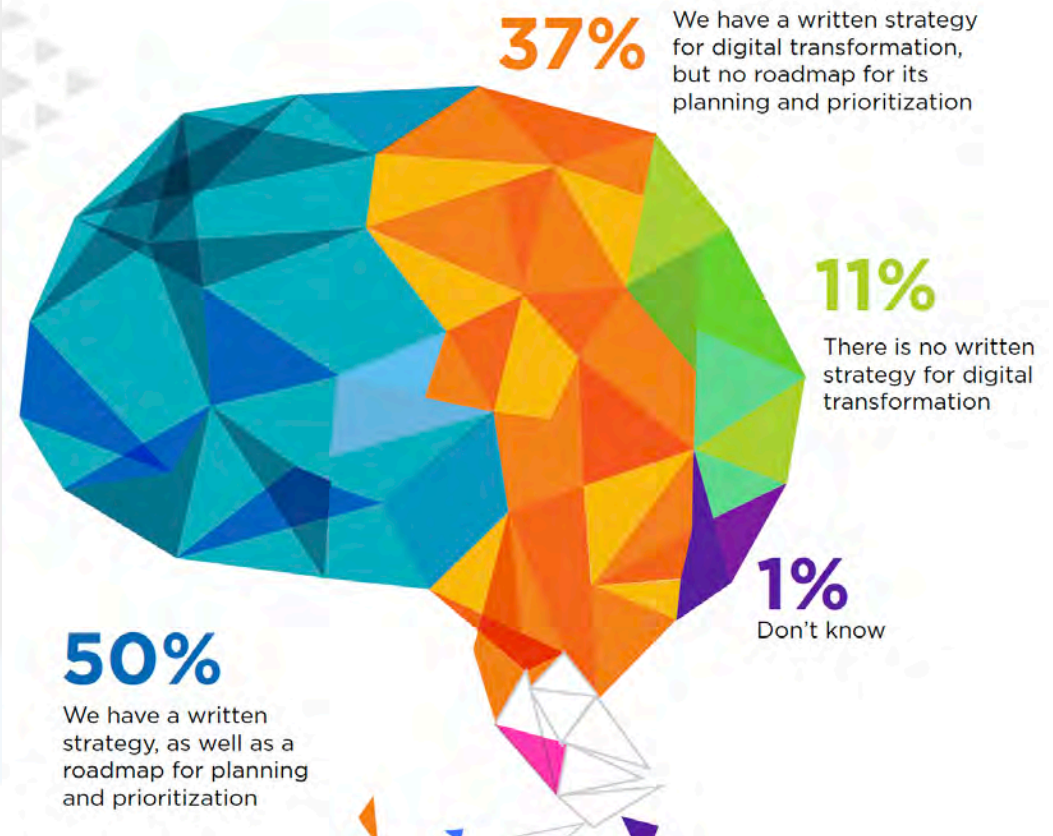
Hiltzik, Michael (December 4, 2011). ["Kodak's long fade to black"](#). Los Angeles Times. Retrieved December 11, 2011.

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# Digital Transformation (aka Digitization)

- 88% have a formal strategy
- 50% have an execution roadmap
- The case is largely understood



“Digital acceleration for business resilience”, HCL and David Rogers

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# Digital Transformation

## Those most impacted:

The **Manufacturing** sector has been most negatively impacted on both supply and demand sides, with

**68%**

of that sector's respondents reporting a decrease in demand and

**89%**

reporting a disrupted supply chain.

### Professional Services

is heavily impacted with

**60%**

reporting a decreased demand for services and

**69%**

reporting a disrupted supply chain.



"Digital acceleration for business resilience", HCL and David Rogers

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# Digital Transformation

“But the disruption has not been uniform. Many businesses, for example, have struggled to meet surging customer demand amidst disruptions in their operations or supply chain.”

The **Retail & CPG** sector has benefitted from the greatest positive change in demand, with

**60%**

of respondents reporting increased demand for products and services. But disruption in their operations/supply chain was reported by

**60%**

of those respondents as well.

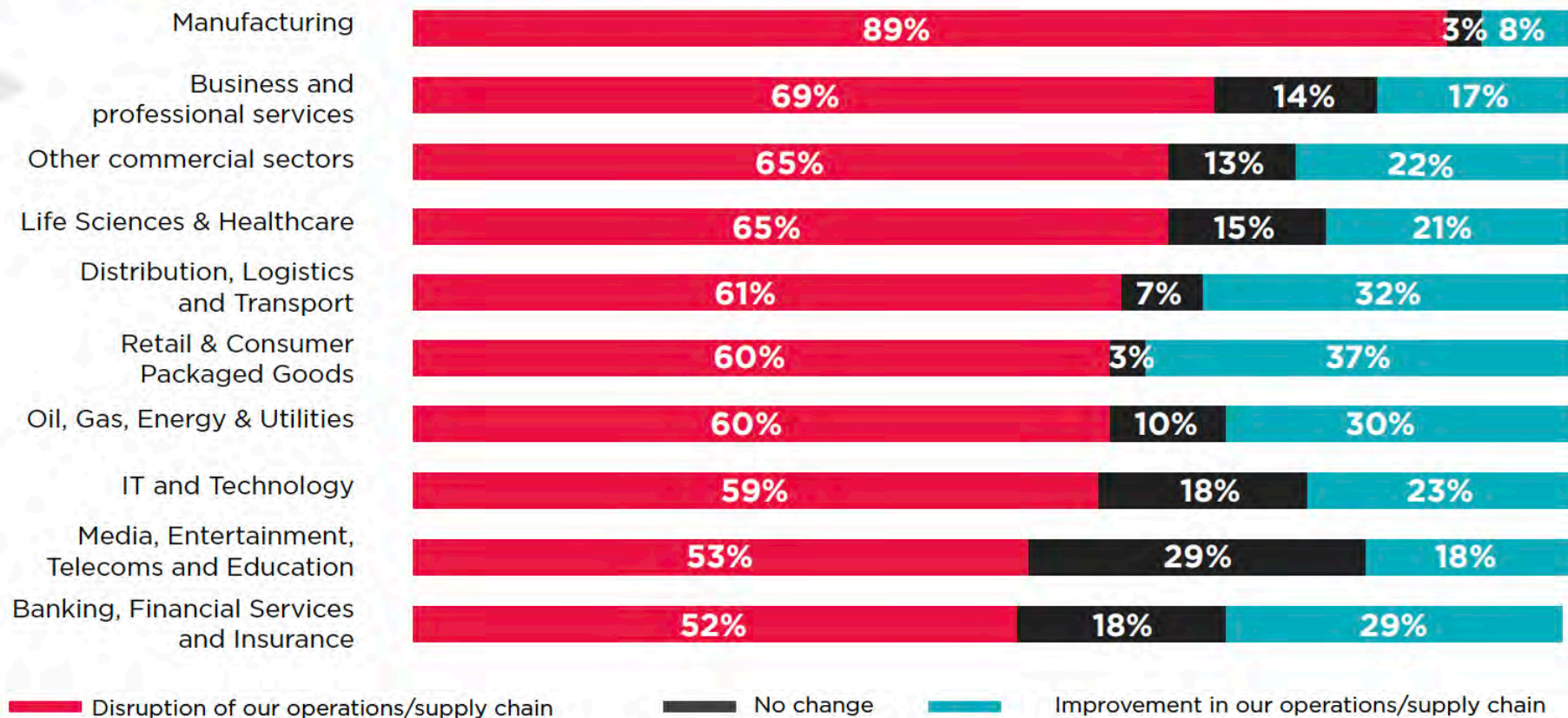


“Digital acceleration for business resilience”, HCL and David Rogers

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## Supply-Side Disruption Caused by COVID-19



**Figure 3:** What is the overall nature of the pressure on your business operations and supply chain that your organization is facing due to COVID-19? [420]

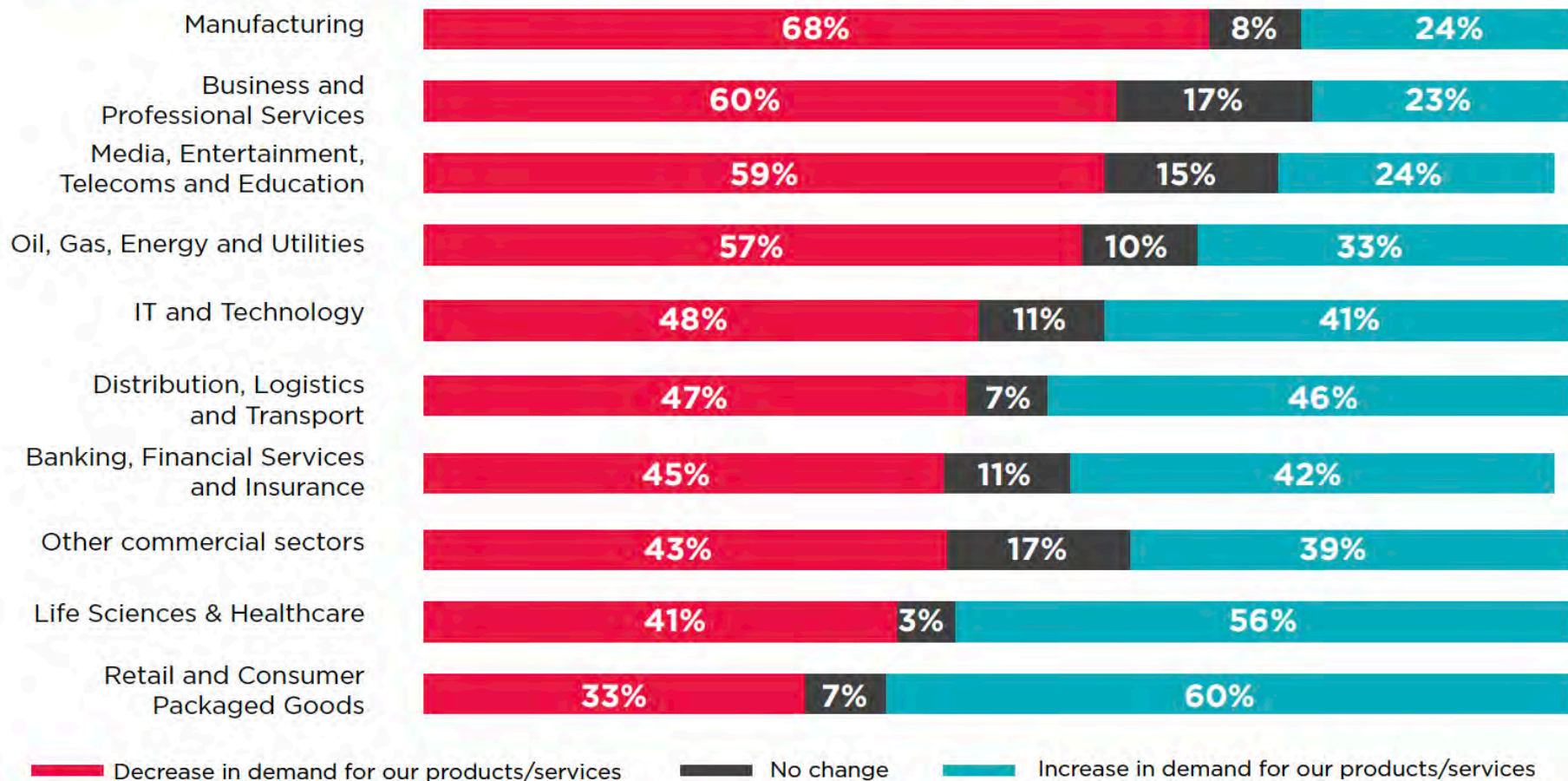


“Digital acceleration for business resilience”, HCL and David Rogers

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## Demand-Side Disruption Caused by COVID-19



**Figure 2:** What is the overall nature of demand-side pressure (across your products & services) that your organization is facing due to COVID-19? [420]



“Digital acceleration for business resilience”, HCL and David Rogers

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# Data is the new oil

- Ada Lovelace
- first to recognize to applications beyond pure calculation
- “first” computer programmer
- examined technology as a collaborative tool

Pre US Civil War

[https://en.wikipedia.org/wiki/Ada\\_Lovelace](https://en.wikipedia.org/wiki/Ada_Lovelace)

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# AI Supremacy: Russia, China Could Edge Out US, Experts Warn

"AI is deepening the threat posed by cyberattacks and **disinformation** campaigns that **Russia, China** and others are using to infiltrate our society, **steal our data** and **interfere in our democracy**,"

"The limited uses of AI-enabled attacks to date represent the tip of the iceberg."



# Data the new oil

- It's only a matter of time before a foreign power hostile to democracy acquires large chunks of [Social Media] data, and starts looking for ways to weaponize it against us."

- Aziz Huq



"It's only a matter of time before China ends up with our Facebook data". Aziz Huq for [CNN Business](#) Perspectives, December 21, 2018

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# Data the new oil

- China is about capturing our data



If it runs over their technology, they can collect it.



"It's only a matter of time before China ends up with our Facebook data". Aziz Huq for [CNN Business](#) Perspectives, December 21, 2018

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# Data the new oil

- UK Based Cambridge Analytica, acquired Facebook data for tens of millions of users. Accessed by Russia.
- Chinese massive investments in AI and quantum computing
- China is exploiting data against its own people
- Large Data losses are fueling their innovation
  - Office Personal Management (OPM)
  - Marriott
  - Anthem



"It's only a matter of time before China ends up with our Facebook data". Aziz Huq for [CNN Business](#) Perspectives, December 21, 2018

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# Theft of DNA

- 2016, the People's Republic of China announced a 15-year plan worth roughly \$9 billion that was intended to collect, analyze, and sequence genomic data
- Passwords, usernames can be changed
- DNA is who you are
- During COVID China owned BGI “volunteered”
- The new space race
- Ultimate battle for healthcare and biologic warfare





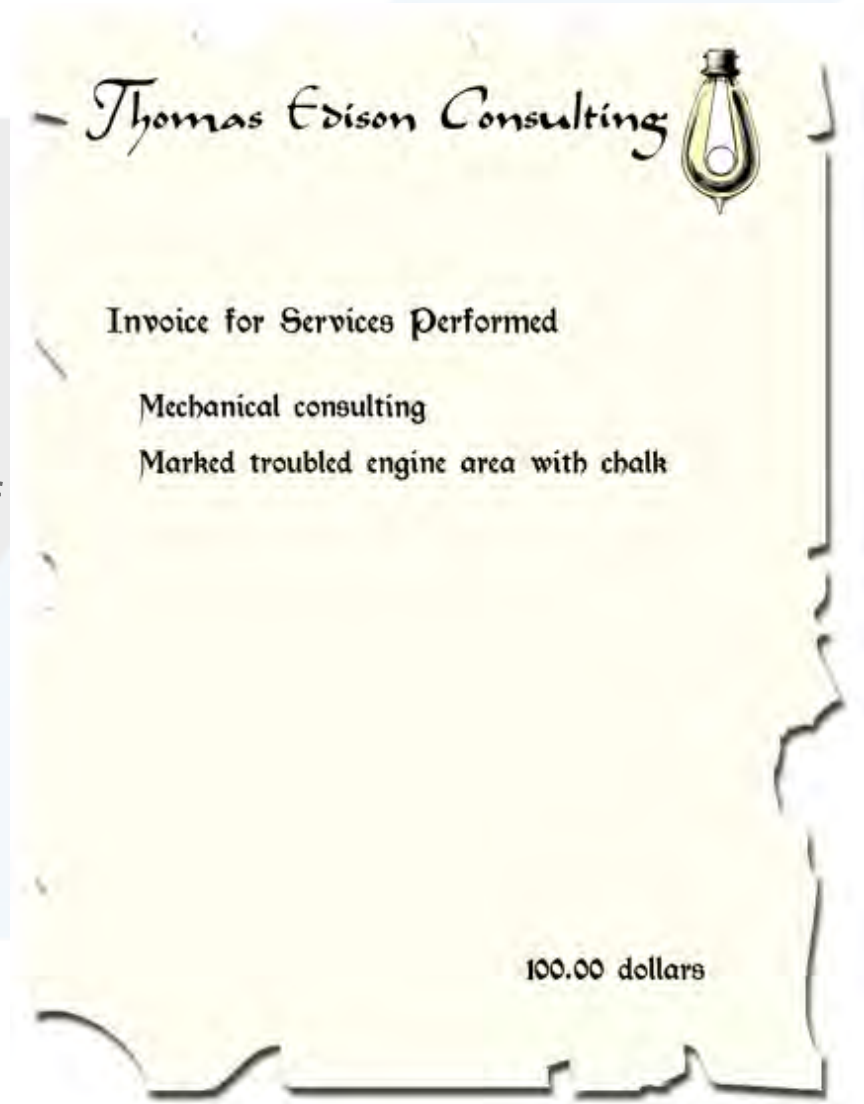
## Value

**“Price is what you pay, value is what you get.”**

**- Warren Buffet**

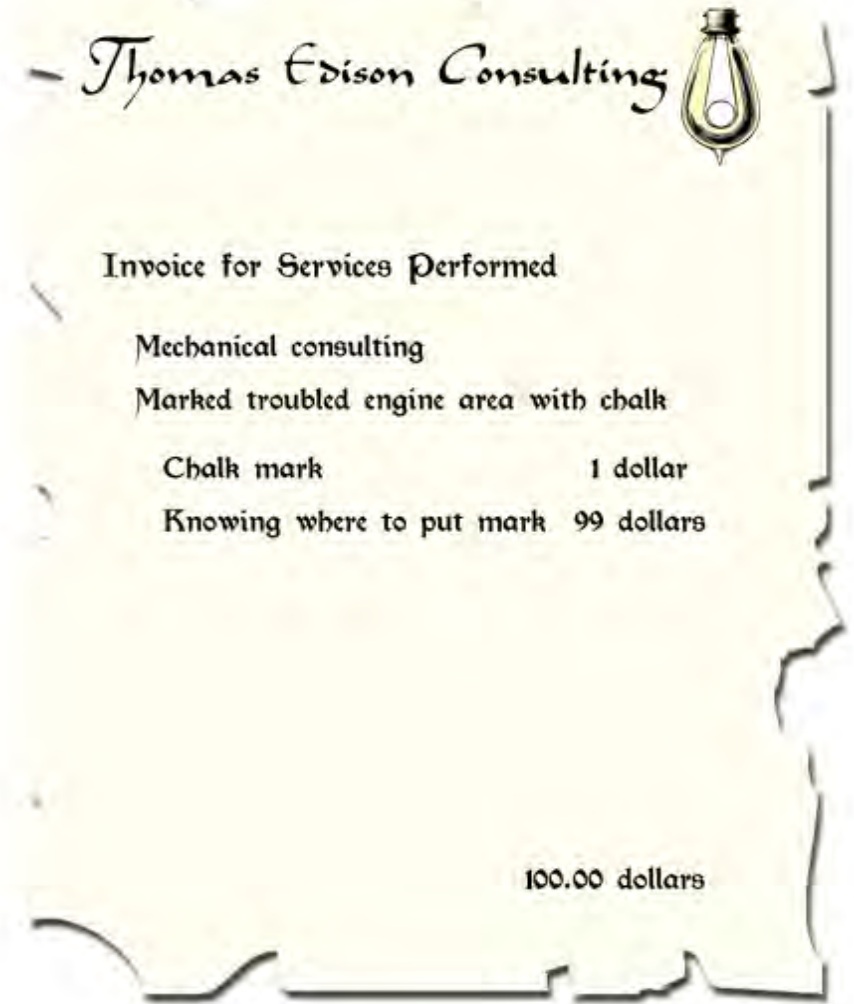
## Thomas Edison on Value

- Thomas Edison was contracted to trouble shoot a motor
- After studying the motor, he marked the trouble spot with chalk
- The customer questioned the cost of making a chalk mark



## What to do?

- Edison rewrote the invoice
- Value is in Knowledge and Credibility







“A bad system will beat a good person every time.”

W. Edward Deming



# Resources

- "Economic Report of the President", March 2019, Chapter 7  
"Adapting to Technological Change with Artificial Intelligence while Mitigating Cyber Threats"
- InfraGard, [www.infragard.org](http://www.infragard.org)
- United States Secret Service (USSS), Electronic Crimes Task Force (now Cyber Fraud Task Forces), [www.secretservice.gov](http://www.secretservice.gov)
- Verizon's Annual Data Breach Investigations Report (DBIR)
- Global Resilience Federation (GRF), [GRF.org](http://GRF.org)
- Center for Internet Security (CIS), [www.cisecurity.org](http://www.cisecurity.org)
- OneTrust for 3<sup>rd</sup> Party Due Diligence ([www.OneTrust.com](http://www.OneTrust.com))
- Need something? We are waiting for your call or email.



# Recommended Readings

"The Cuckoos Egg" by Cliff Stoll

Singer, P.W. and Friedman, Allan ***Cybersecurity and Cyberwar – What Everyone Needs to Know***, Oxford, Oxford University Press, 2014

Buchanan, Ben, ***The Cybersecurity Dilemma: Hacking, Trust and Fear Between Nations***, Oxford, New York, Oxford University Press, 2015

Corera, Gordon, ***Cyber Spies – The Secret History of Surveillance, Hacking and Digital Espionage***, New York, London, Pegasus, 2015

Wittes, Benjamin and Blum, Gabriella ***The Future of Violence***, New York, Basic Books, 2015

Singer, P.W. and Cole, August ***Ghost Fleet***, Boston, New York, Houghton Mifflin Harcourt, 2015

Kaplan, Fred, ***Dark Territory – The Secret History of Cyber War***, New York, Simon and Schuster, 2016

Libicki, Martin C., ***Cyberspace in Peace and War***, Annapolis, Naval Institute Press, 2016

Segal, Adam ***The Hacked World Order – How Nations Fight, Trade, Maneuver, and Manipulate in the Digital Age***, New York, PublicAffairs (A Council on Foreign Relations book), 2016-7

Klimburg, Alexander ***The Darkening Web – The War for Cyberspace***, New York, Penguin Press, 2017

Sanger, David E, ***The Perfect Weapon – War Sabotage and Fear in the Cyber Age***, New York, Crown Books, 2018

Singer, P.W. and Brooking, Emerson T, ***LikeWar – The Weaponization of Social Media***, Boston, New York, Houghton Mifflin Harcourt, 2018.

Clarke, Richard A. and Knake, Robert K., ***The Fifth Domain: Defending Our Country, Our Companies, and Ourselves in the Age of Cyber Threats***, New York, Penguin Press, 2019



# Do not hesitate to call

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Free Consultation

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ideas







BIG ENOUGH TO DO THE JOB  
AGILE ENOUGH TO DO IT *RIGHT*

THANK YOU.



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