Some Notes on Data Analytics in Business Settings

16 April 2020 @ MCRHRD

Program for IPS and IFtS Officers

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Motivating Example for Predictor Discovery

- Horse-racing has long been a popular, high-stakes game in many parts of the world.
- Of the ~ 1000 young horses auctioned yearly in the US, only 0.5% will win significant races.
- Q then is, how best to identify which horse has potential years before its trained and reached adulthood.
- Traditional horse experts use [1] the horse's pedigree, [2] the horse's gait, [3] etc. to guess about a horse's potential.
- Detailed records exist on horse races, participating horses, their pedigree, videos on gait etc.
- Enter Jeff Seder of EQB, a boutique consulting firm.

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A Motivating Example

- Traditional methods were poor predictors of racing success for a horse. So Seder went beyond them.

- Starting 1990, Seder invests in data collection on all manner of horse characteristics or *attributes*.

- He measured things like horse nostril sizes, gave EKGs to measure heart health, fast-twitch muscle volume, weight of dung shed before a race etc.

- Then in the early 2000s, Tech changed and portable ultrasounds became available - he could measure internal organ sizes.

- And soon enough, he struck gold. He found one strong predictor variable among 100s for racing success.

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A Motivating Example

- The size of the horse's heart's left ventricle. Larger the better. *(Why?)*
- Another important predictor - the size of a horse's spleen. Larger the better.
- In 2013, An Egyptian Sheik Ahmad Zayat hired EQB to help him pick the best horse at that year's auction.
- EQB *strongly* recommended a particular one-year old foal that seemed unremarkable by traditional measures.
- Putting faith in Seder's strong reco, Zayat bought Horse no. 85 for $300,000. And named it 'American Pharaoh'. *So, did it work?*
- 18 months later, American Pharaoh became the first horse in 37 years to win the *Triple Crown*.

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A Motivating Example: Concluded

- So, what is the example trying to motivate?
- [1] Importance of having a clear **Objective** to pursue or **Question** to answer.
- [2] **Data is paramount**, when studying, measuring, modeling or understanding any phenomenon of interest.
- [3] Good predictors of an outcome *can* show up in unexpected places - where nobody thought to look, **overtaking theories & explanations** - involves **trial-&-error**, guesswork & analytics.
- [4] Important to keep an eye out for **new tech**, which may enable new data to be collected & analyzed.
- [5] Data alone is NOT enough. **Analytics is required**, and an open mindset.

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Session Outline

- Motivating Example for Data Analytics
- Preliminaries
- Introduction to Problem Formulation
- Determining Data Requirements
- Some Thoughts on Report Writing: Best Practices
- Session Wrap-up

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Some Preliminaries

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Preliminaries: About me…

- **Academic Credentials:**
  - PhD in Marketing – Univ of Rochester (2009)
  - MS in Applied Statistics – Univ of Rochester (2006)
  - PGDM – IIM Calcutta (2001)
  - B.E. – BIT Mesra (1998)

- **Industry Experience:**
  - Software Programmer with Cognizant 1998-99
  - Management Consultant with Accenture 2001-02
  - Data Analyst – Daymon Consumer Insights Division 2006-08
  - Academic Faculty with ISB – 2009 onwards
  - Been involved in a Tech Startup – Modak Analytics – 2012

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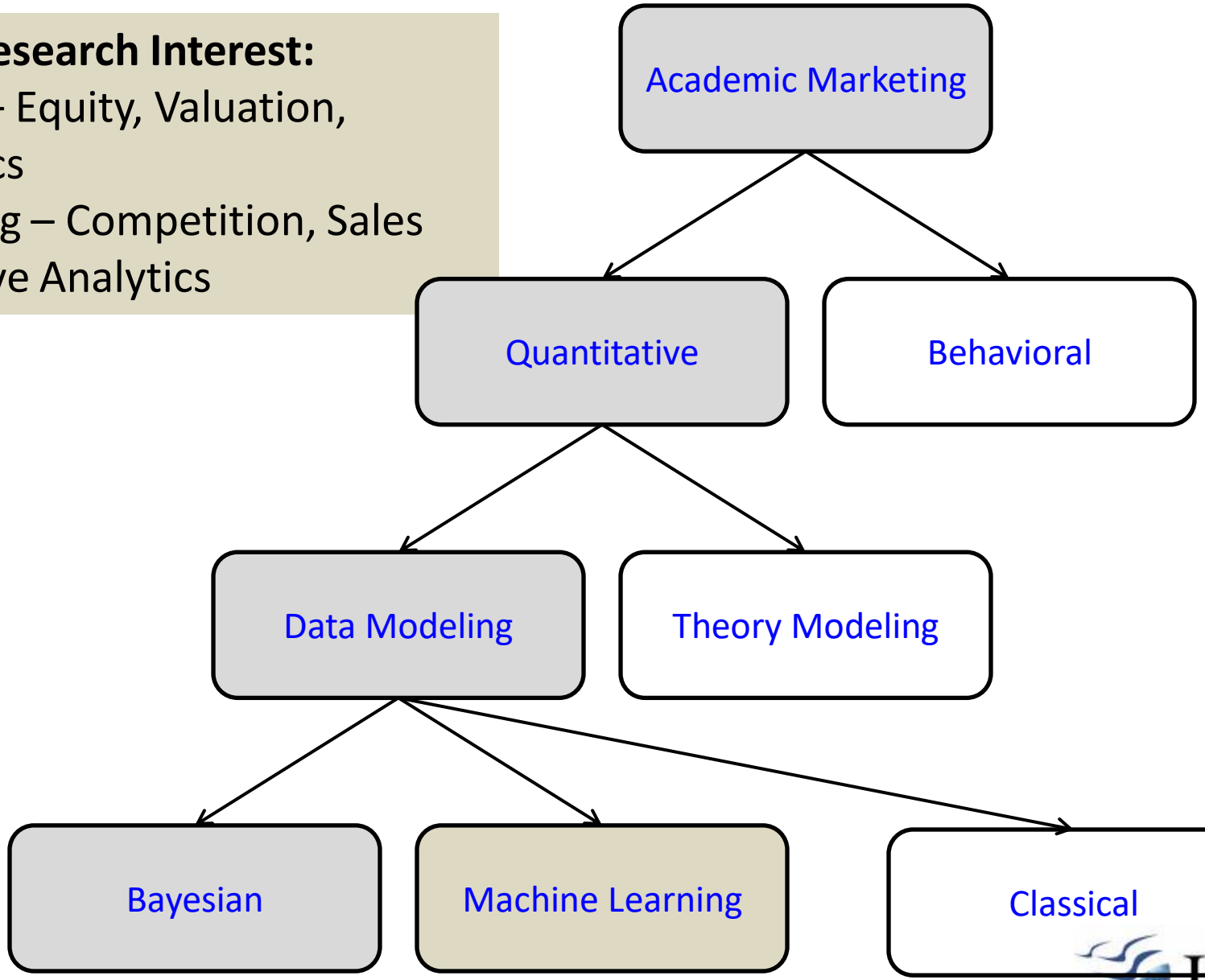
Preliminaries: About my Research…

Topics of Research Interest:

1. Brands – Equity, Valuation, Dynamics
2. Modeling – Competition, Sales
3. Predictive Analytics



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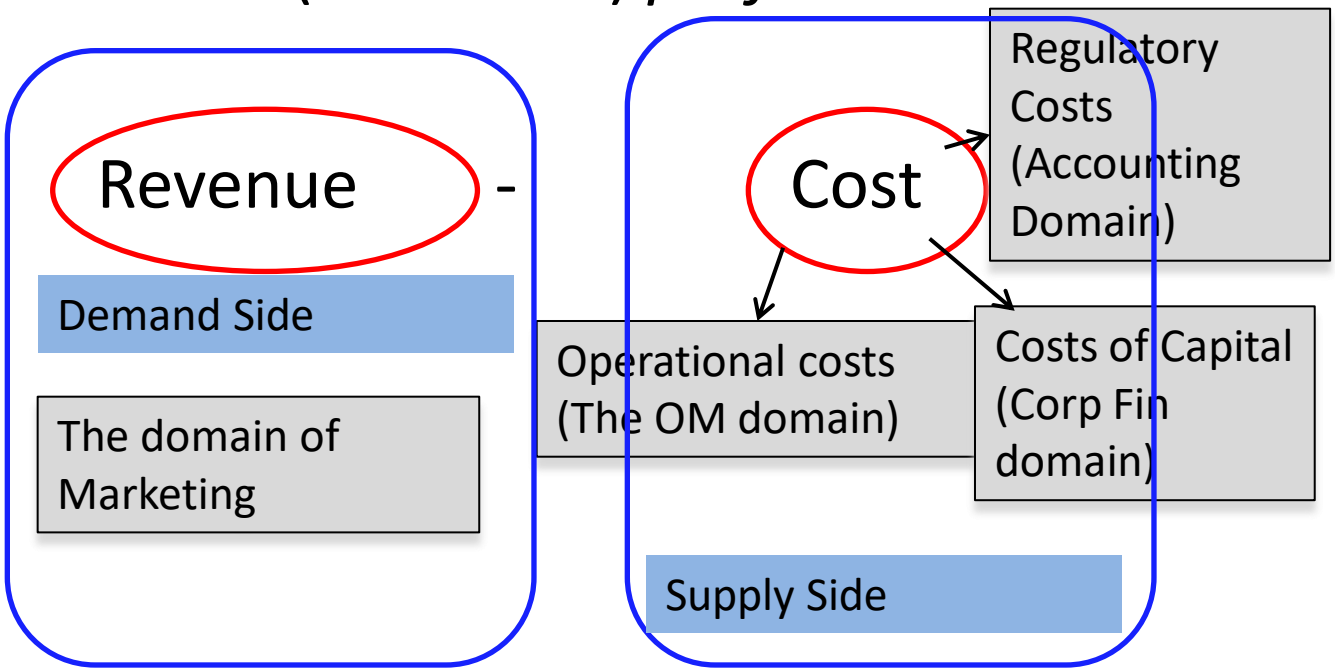
Preliminaries: The Objective of a Business

- Firms exist to maximize (economic) *profits*
- Profit = Revenue - Cost



- Business functions represent a logical way to deconstruct the enterprise → yield analytics that is function-specific.

- Market power derives from competencies on either the demand or the supply side.

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Preliminaries: The Objectives of Government

- What should government aim for?
- $$\begin{pmatrix}\text{Net Societal}\\ \text{Welfare}\end{pmatrix} = \begin{pmatrix}\text{Consumer}\\ \text{Surplus}\end{pmatrix} + \begin{pmatrix}\text{Producer}\\ \text{Surplus}\end{pmatrix}$$

  Ease of citizenry to improve consumption → living standards, at a given price level.

  Ease of business to improve production, productivity → profit, at a given price level.

- There is a *tradeoff* between consumer and producer surpluses. If social welfare is constant then raising one means lowering the other.
- Extent of control by government gives us different systems.

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The Age of Data

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The Age of Data

"If *Land* was the primary raw material of the agricultural age,

and *Iron* that of the industrial age,

then *Data* is the primary raw material of the information age."

Nice quotation. But what's its practical significance?

Consider this Q:

"How many of our present day laws, institutions, societal norms and governance structures actually derive from the agricultural age?"

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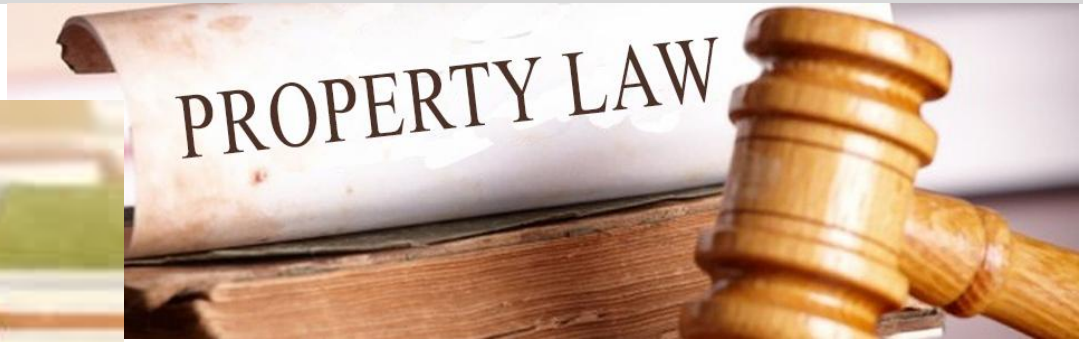
The Agricultural Age, Data and Governance

Q: How many of our present day laws, institutions, societal norms and governance structures actually derive from the agricultural age?



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The Industrial Age, Data and Governance

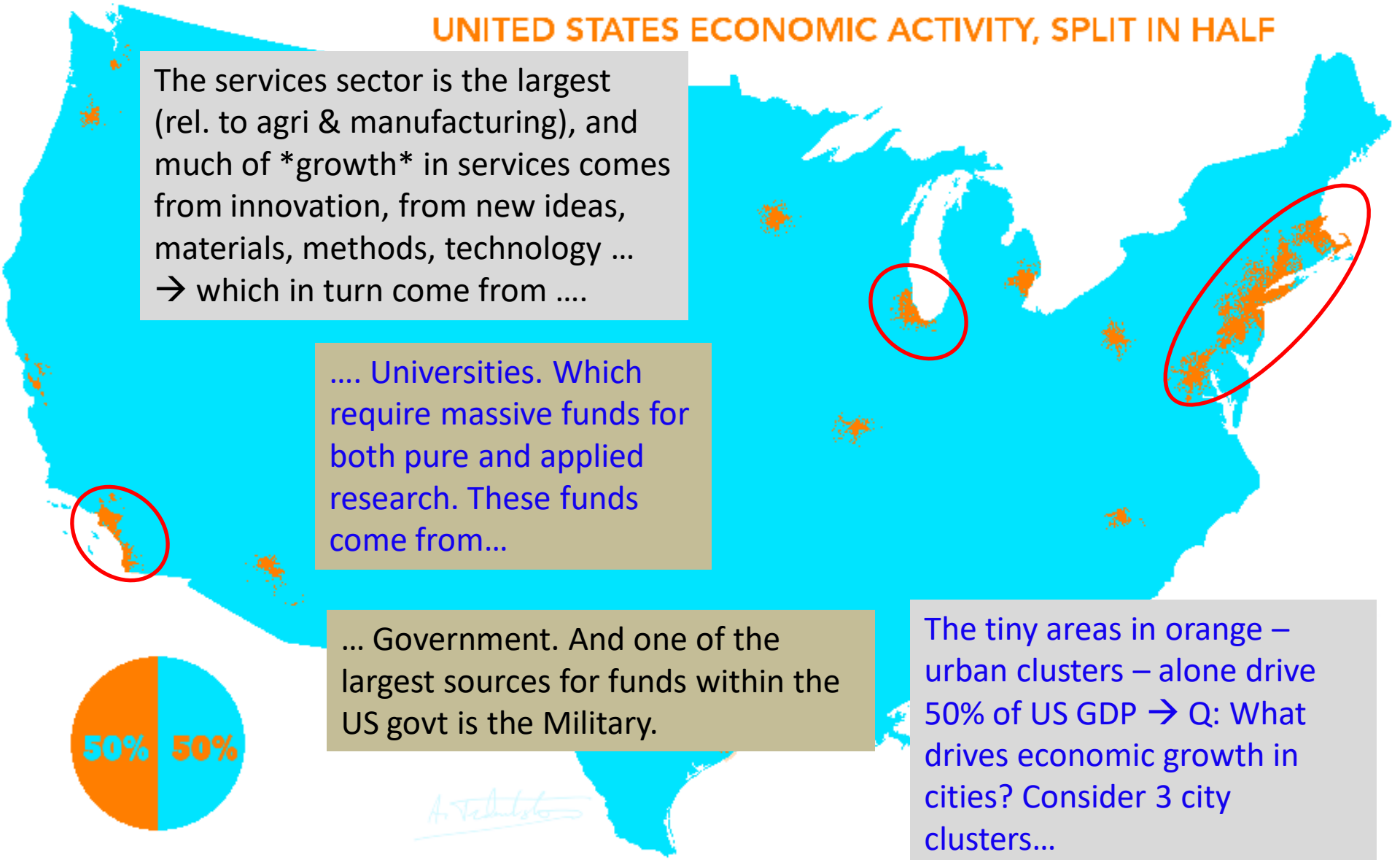
Q: How many of our present day laws, institutions, societal norms and governance structures actually derive from the **Industrial** age?

China Tops Global Startup Growth

The government's business-friendly policies aim to counter an economic slowdown

Percentage Increase in New Businesses Since 2010

Q: What Drives [US] Economic Growth?



The services sector is the largest (rel. to agri & manufacturing), and much of *growth* in services comes from innovation, from new ideas, materials, methods, technology …
→ which in turn come from ….

…. Universities. Which require massive funds for both pure and applied research. These funds come from…

… Government. And one of the largest sources for funds within the US govt is the Military.

The tiny areas in orange – urban clusters – alone drive 50% of US GDP → Q: What drives economic growth in cities? Consider 3 city clusters…

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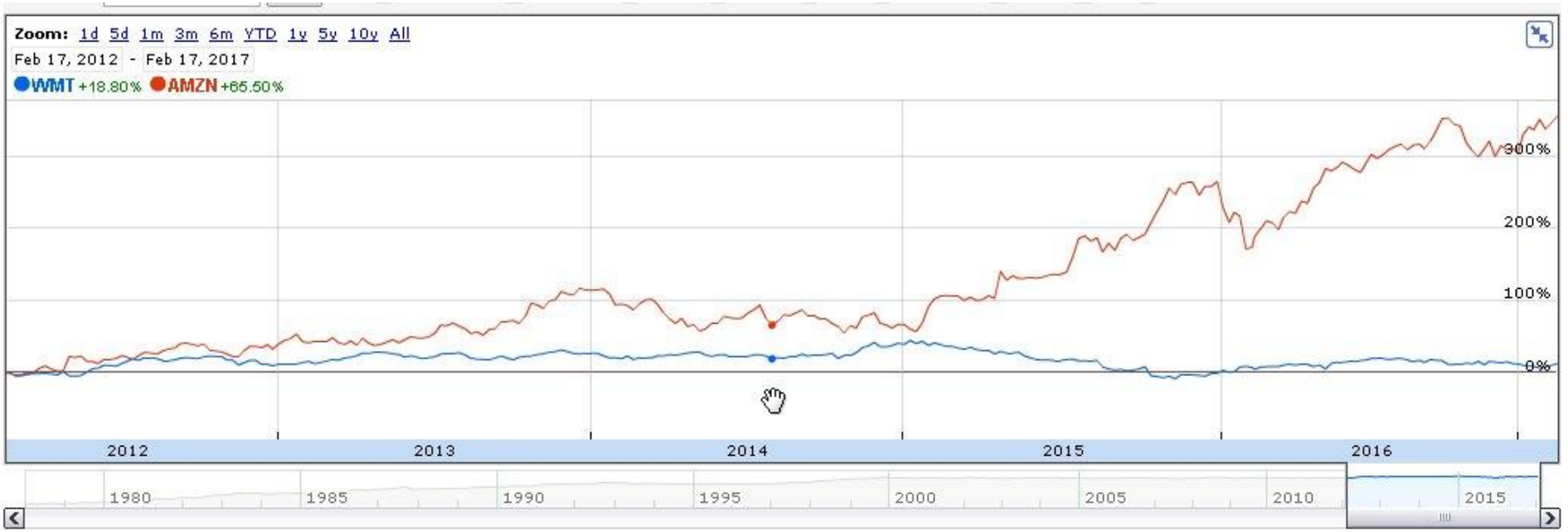
The Information Age, Data and Governance: Example

- Consider the stock performance of Amazon (AMZN) vs Walmart (WMT)



- Valuation, February 2012:
- Walmart: $202 billion; Amazon: $82 billion

- Valuation, February 2017:
- Walmart: $210 billion; Amazon: $400 billion

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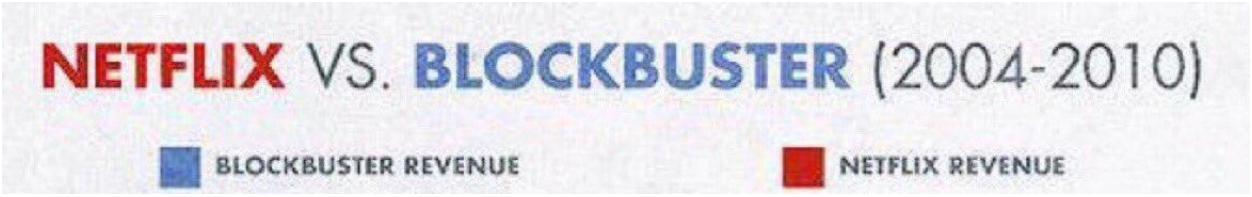
Cost of Lost Opportunity: Quick Example

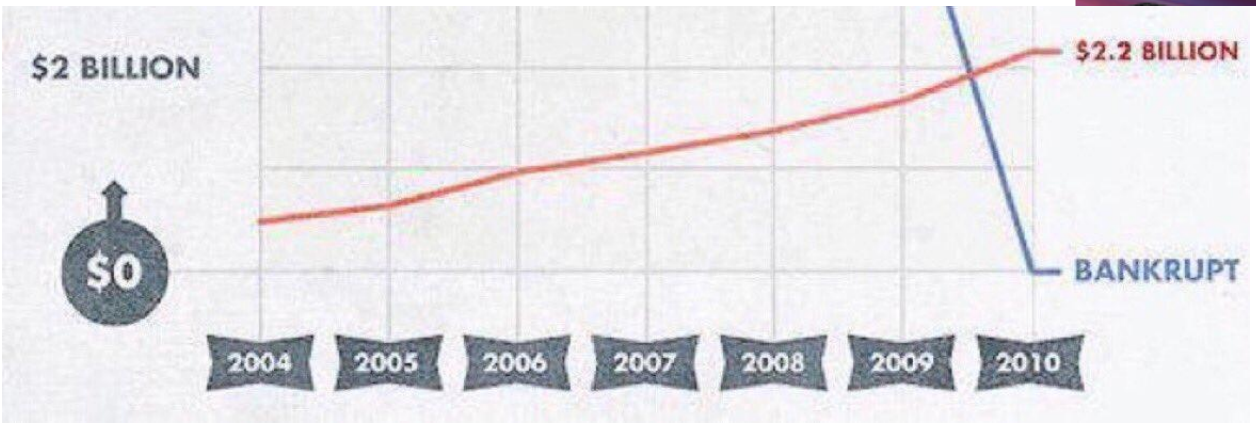
- 2000: Blockbuster had the opportunity to buy Netflix for $50M



Netflix's Market Cap Is Now Greater Than Disney's and Comcast's

The three companies still have dramatically different fundamentals, though.

Evan Niu, CFA (TMFNewCow)
May 24, 2018 at 2:48PM



- 2017: @Netflix worth $61 Billion. Today, it's $151 billion.

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Disruption in Action …

- The world's largest taxi company owns no taxis (Uber)
- The largest accommodation provider owns no rooms (Airbnb)
- Largest phone co.s own no telco infra (Skype, WeChat)
- World's most valuable media firm creates no content (Facebook)
- The world's largest Movie house owns no theatres (Netflix)
- The world's largest software vendors don't write their own code (Apple, Google)
- Etc.

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How does Disruption happen?

The next big thing will start out looking like a toy

One of the amazing things about the internet economy is how different the list of top internet properties today looks from the list ten years ago. It wasn't as if those former top companies were complacent – most of them acquired and built products like crazy to avoid being displaced.

The reason big new things sneak by incumbents is that **the next big thing always starts out being dismissed as a "toy."** This is one of the main insights of Clay Christensen's "disruptive technology" theory. This theory starts with the observation that technologies tend to get better at a faster rate than users' needs increase. From this simple insight follows all kinds of interesting conclusions about how markets and products change over time.

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Thank You

Q & A

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