Data Driven Business Models
Berkeley Method of Entrepreneurship

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My Background: Ikhlaq Sidhu

All Degrees in Electrical Engineering through Ph.D
HP – Laser Printer Design
US Robotics/3Com – Created Advanced Development Center
Awarded 3Com’s “Inventor of the Year” award in 1999, and granted over 60 US Patents
CTO Cambia – Wireless Infrastructure
Professor in IEOR at UC Berkeley
2005 Founded Center for Entrepreneurship & Technology (CET), Venture Lab, Global Venture Lab, SkyDeck Accelerator
Founding Chief Scientist, Fung Institute for Engineering Leadership
Engineering Leadership Professional Program (ELPP)
Quick Outline

- Understanding Data-driven Business Models
- Key elements of every data driven business model
- Strategic value to firms
- Related issues: lean models and learning cycle
Case: How Target Figured Out A Teen Girl Was Pregnant Before Her Father Did - Kashmir Hill, Forbes

• Father to Target Customer Service: “My daughter got this in the mail!” he said. “She’s still in high school, and you’re sending her coupons for baby clothes and cribs? Are you trying to encourage her to get pregnant?”

• Later:

  • Father on phone: On the phone, though, the father was somewhat abashed. “I had a talk with my daughter,” he said. “It turns out there’s been some activities in my house I haven’t been completely aware of. She’s due in August. I owe you an apology.”
Case: Target Measurement Process

• Target assigns every customer a Guest ID number:
  
  – Tied to credit card, name, or email address, and any demographic information (bought or collected)
  
  – Bucket that stores a history of everything they’ve bought

• Assignment: Find the unique moments in consumers’ lives when their shopping habits become particularly flexible. (Alan Andreasen  UCLA Study)

• Target assigns: “pregnancy prediction score,” with an estimate of the due date, so that coupons can be timed to the right stage of pregnancy.
Case: How Does Target Know- Kashmir Hill, Forbes

Hypothesis-based model formation:

• Noticed: that women on the baby registry were buying larger quantities of unscented lotion around the beginning of their second trimester.

• First 20 weeks: supplements like calcium, magnesium and zinc. Also, soap and cotton balls.

• Example signal of close to delivery: suddenly buying lots of scent-free soap, extra-big bags of cotton balls, hand sanitizers and washcloths, it

• Pole found about 25 products, when analyzed together, allowed him to assign each shopper a “pregnancy prediction” score.

• Take a fictional Target shopper named Jenny Ward, 23, Atlanta:
  – In March bought cocoa-butter lotion, a purse large enough to double as a diaper bag, zinc and magnesium supplements and a bright blue rug.
  – There’s, say, an 87 percent chance that she’s pregnant and that her delivery date is sometime in late August.
Target Case as a Data Driven Business Model

- **Value**: Know customers' life change events.
- **Key Algorithm**: Scoring and regression
- **Decision/process**: Targeted coupons at the right time.
- **Goal**: Increase wallet share from existing customers

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Target as a Measurement Process: Continuous Learning Model

Current state, model, system

1. Interpret, decide implement (will affect current state)
2. What decision do you want to affect, what business case for measurement, (know why to avoid bias)
4. Filter by value of information and risk orientation (another bias)
5. Data collection, samples, Bayes’, correlations, machine learning, etc
6. Does not need to take a long time.

It’s a process, not a one time measure

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Target as a Measurement Process: Continuous Learning Model

1. Current State: Guest ID + Shopper Info
2. Decision: targeted coupons during pregnancy
3. Business case: life change events
4. Estimation based on baby registry
5. Hypothesis: product signals
6. Correlation testing.
   Assign Pregnancy Score

Value of Perfect Information, reward biased

Set new coupon strategy, observe results

Business Model

Target as a Measurement Process
Model Examples for things that normally require human judgment

- Wine tasting (Oren Ashenfelter, Princeton)
- Estimated Wine quality
  
  \[
  \text{Estimated Wine quality} = 12.145 + 0.00117 \times (\text{winter rainfall})
  + 0.0614 \times (\text{ave growing season temperature})
  - 0.00386 \times (\text{harvest rainfall})
  \]
Moneyball Concept

- Money Ball: How to measure and predict baseball performance
- Oakland Athletics baseball team and its general manager Billy Beane
- A: Watch and talk with hundreds of players
- B: Runs created = (hits + walks) x Total Bases/(At Bats + Walks)
Collaborative Filtering and Regression Combinations

• Recommendations at Netflix, Amazon, Pandora, ...

• Marriages – match-making at Match.com, Eharmony...

• Employee Selection at Lowes, Walmart, ...
• Service provider of Gambling and Casinos
• Entry Card
• Pain points
• Intervention
Top 8 Business Models Using Data

1. Knowing your customer, leading to better targeting and relationship. E.g. Target, Disney, Netflix

2. Information based better services. E.g. UPS, FedEx

3. Data driven reliability. E.g. GE, BMW, Siemens


5. Improving the customer journey/experience.. E.g. Harrah’s

6. Risk Management, regulation, and compliance

7. Efficiency or Better Performance per dollar cost. General IT, SAP, etc

8. Functional Applications: HR/Hiring, Operations etc.. Eg Walmart

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Any Application: Data Driven Model

- Value: ?
- Key Algorithm: ?
- Decision/process: ?
- Goal: ?

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Top Business Models for Using Data

Usage Models

1. Knowing your customer, leading to better targeting and relationship. E.g. Target, Disney
2. Information based better services. E.g. UPS, FedEx
3. Data driven reliability. E.g. GE and Siemens
5. Improving the customer journey/ experience. E.g. Harrah's
6. Risk Management, regulation, and compliance
7. Efficiency or Better Performance per dollar cost
8. Functional Applications: HR/Hiring, Operations etc..

Value to Business Customers

• Efficiency (save money)
• Wallet Share (top customers spend more time and money with you)
• Brand alignment (It reinforces how people think positively about the company)
Ideation for Data Driven Concepts

Induction, building, story-telling, verification, and adaptation

Take Feedback

Refine Hypothesis (think and learn)
- Which Customer
- What Data if collected or aggregated would help

Demonstrate and Pitch To Customer Target (Collect Stakeholders)

Make/Adjust Demo or Pitch (or backtest)

Develop:
- Value Proposition
- Business Model:

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Inside vs Outside Perspective

Inside Firm Perspective
(Data Intrapreneurship)
- Start sample project
- Get executive sponsor
- Choose Metrics
- Include suppliers and partners
- Realize

Outside of Firm
(Entrepreneurship)
- What is the business model
  (Consulting, data as a service, investment fund, etc.)
- Customer and validation of value proposition
- Product/Service/Competition
- Promotion
- Branding
Data Perspective Change

1999

Information Rules: 1999 book by Carl Shapiro and Hal Varian
- “Information is costly to produce but cheap to reproduce.”

Today

Forbes: 2012, Shomit Ghose, Partner at Onset Ventures
Big Data: The Only Business Model That Tech Has Left
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