

# OPERATIONS ANALYTICS: RECAP

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# OUR ASPIRATION/AMBITION



Improvement



Innovation, Disruption

# THE GOAL

► *What's the goal of any company?*

► *Ways to measure it? Metrics?*



Maximize  
Shareholder  
Value

Increase  
Earnings

Sales – Operating Expenses – Capital Expenses

**THROUGHPUT:** The rate at which the system generates revenue/sales

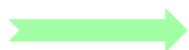
- Production is not Sales; Sales = Min {Production, Demand}
- Capacity utilization is not the goal, only a possible means to achieve the goal

**OPERATING EXPENSE:** The rate at which the system generates costs

**INVENTORY:** The level of capital invested in system

- It costs money to make money... just don't take too much
- Money costs money
  - Debt: Interest, shareholder risk increases
  - Equity: Dilution of shareholding

\$\$ Going in the System =  
Operating Expense



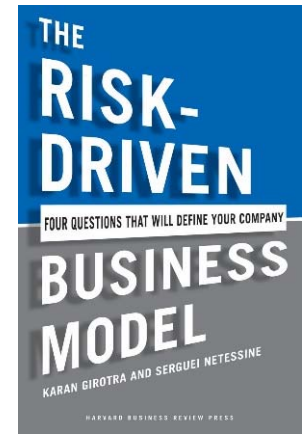
\$\$ Sitting in System= **Inventory**



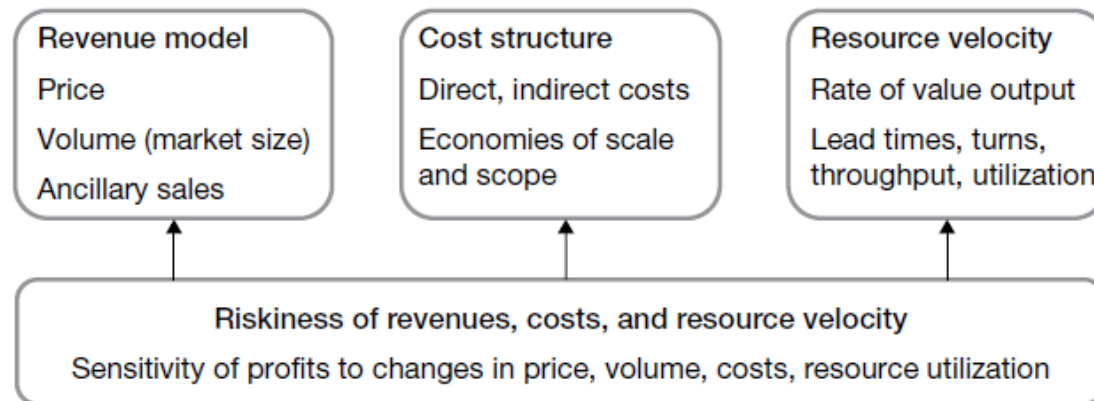
\$\$ Coming from the  
System = **Throughput**

# EVALUATING BUSINESS MODELS

- ▶ *What's the goal of any company?*
  - ▶ *Ways to measure it? Metrics?*
- ▶ *How do you evaluate a company?*



## The new profit formula



Never ignore risks in your business model

# MANAGING BOTTLENECKS



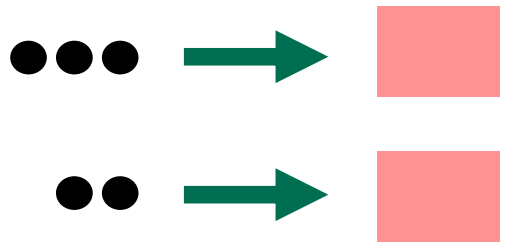
© UFS, Inc.

- ▶ The **Bottleneck Step** determines the performance of the whole process
- ▶ A general approach to **Manage Change**
  - ▶ Identify the goal
  - ▶ Identify the obstacles to achieve it (bottlenecks)
  - ▶ Manage the bottlenecks

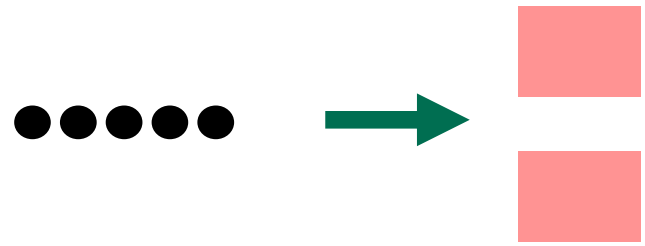
Key in any process analysis: Find and improve the bottleneck

# QUEUEING

*2 SINGLE SERVER SYSTEMS*

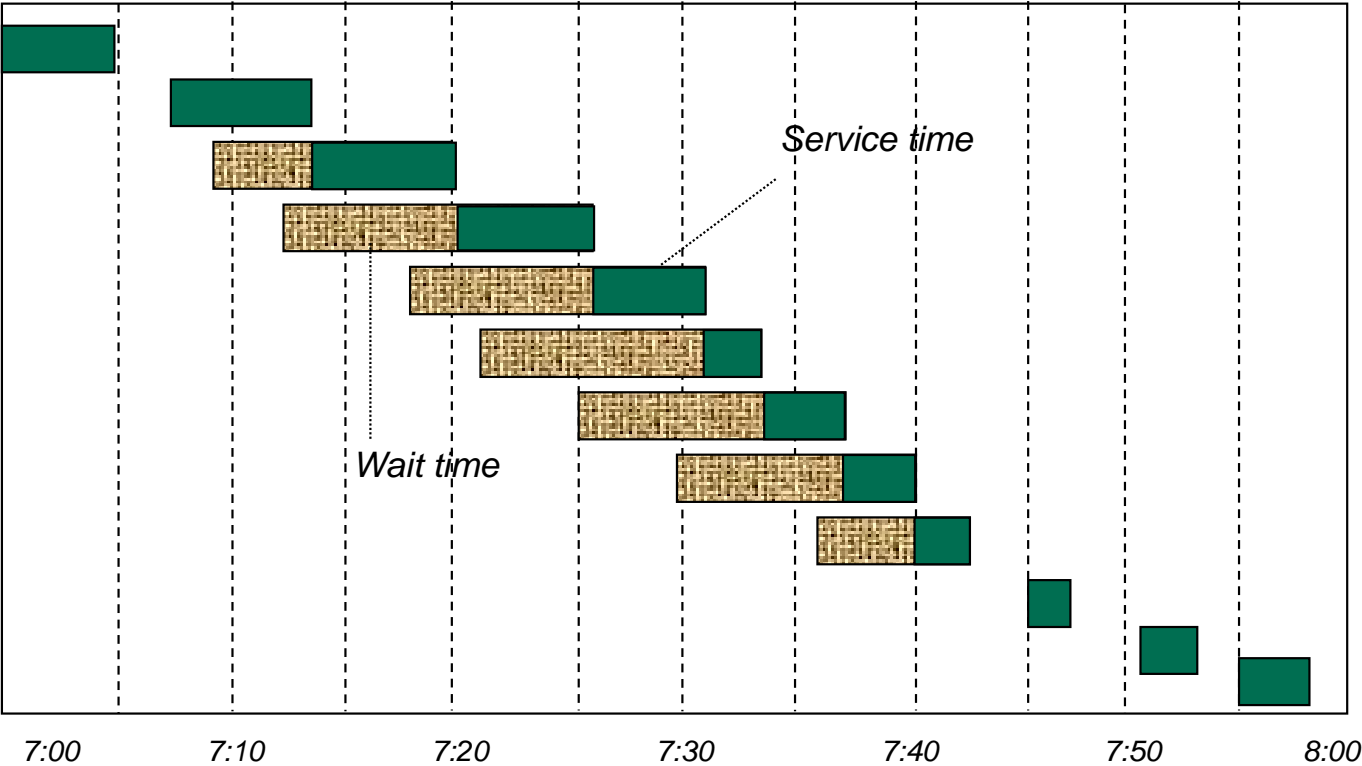


*A 2 SERVER SYSTEM*



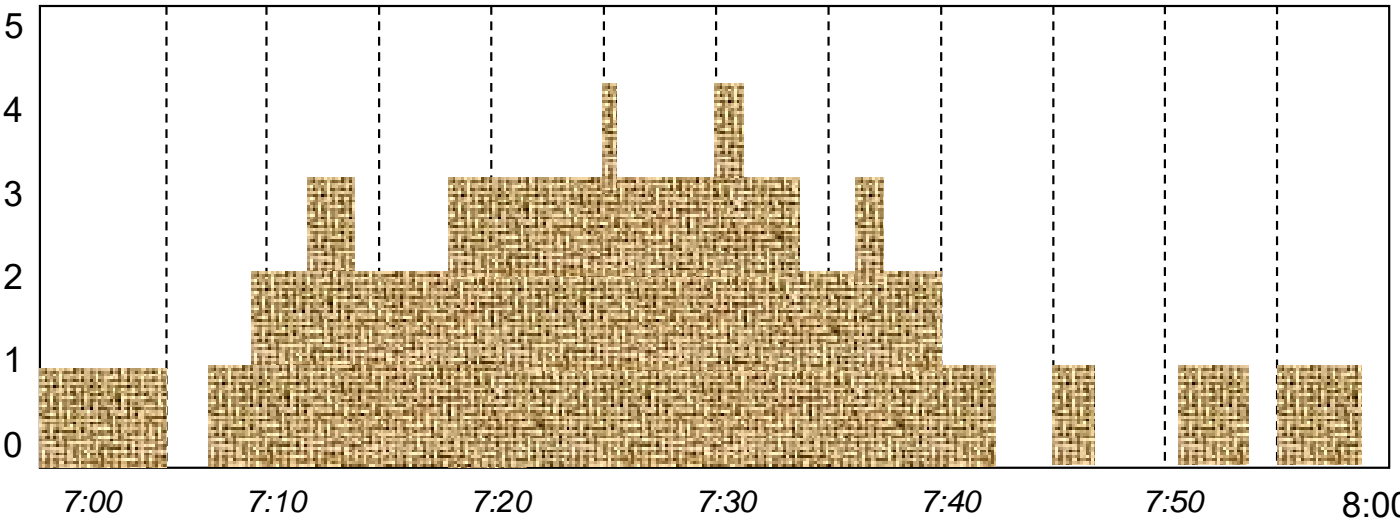
# VARIABILITY LEADS TO WAITING TIME

Patient	Arrival Time	Inter-Arrival Time	Service Time
1	7:00		5
2	7:07	7	6
3	7:09	2	7
4	7:12	3	6
5	7:18	6	5
6	7:22	4	2
7	7:25	3	4
8	7:30	5	3
9	7:36	6	4
10	7:45	9	2
11	7:51	6	2
12	7:55	4	2



Variability is Evil!

Inventory  
(Patients at lab)



# WHAT CREATES QUEUES?

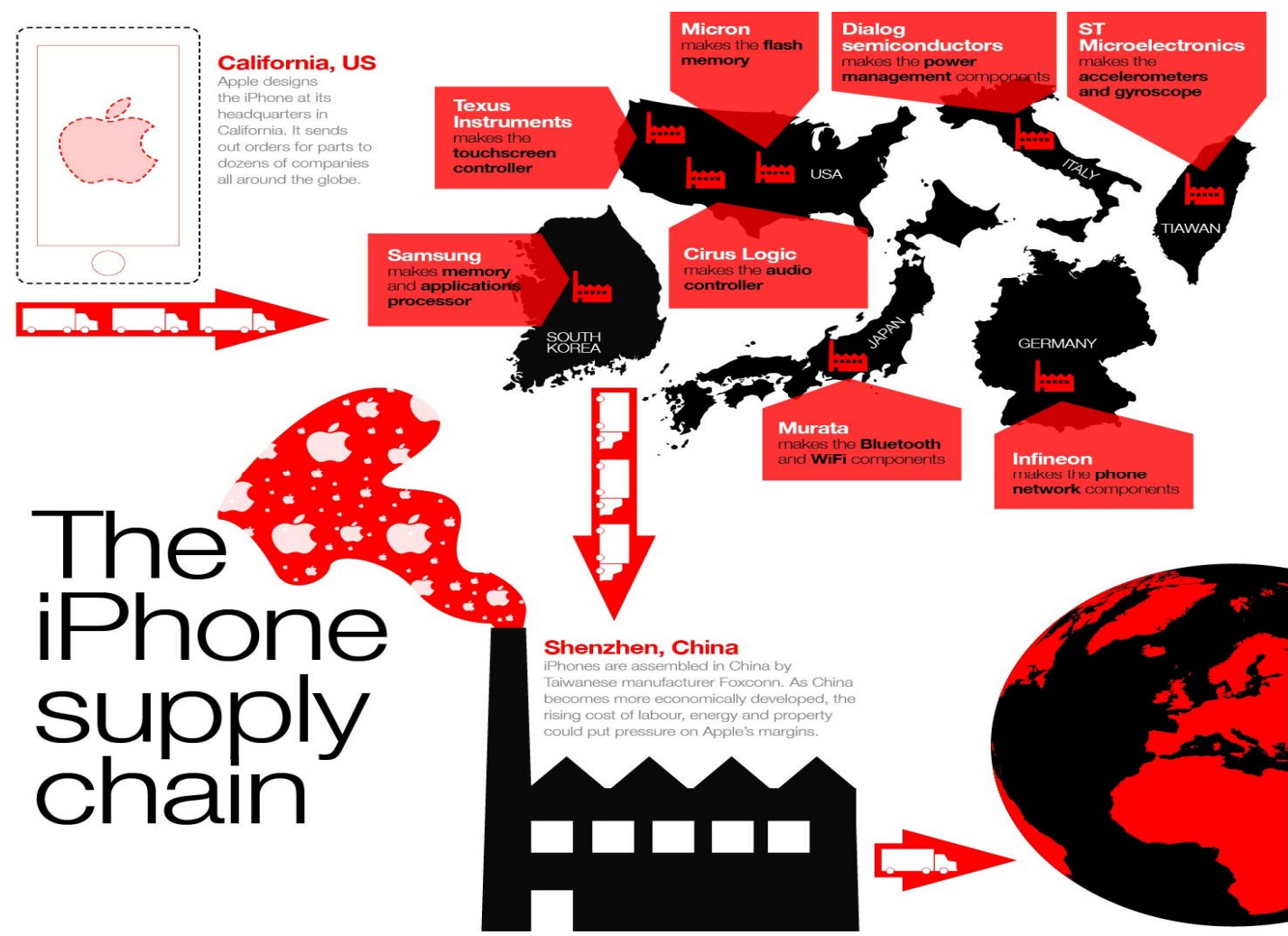


Phantom Q: <https://youtu.be/goVjVVaLe10?t=19>





# APPLE IPHONE SUPPLY CHAIN



# RISK!

1) Information risk: Decisions made with poor information



2) Alignment risk: Decisions made with self-interest (as opposed to group's interest)



Managing Information and Alignment Risks is key to success

# THE NEWSVENDOR MODEL



Order newspapers overnight to sell tomorrow in the face of uncertain demand.



High demand



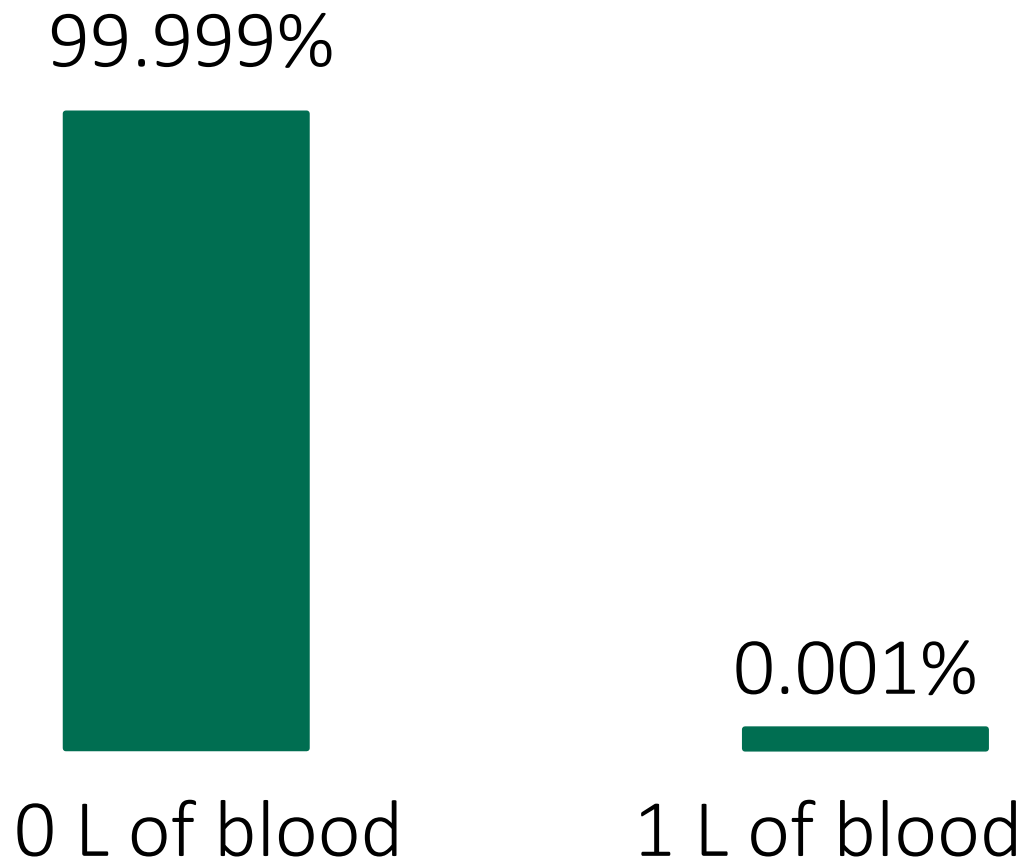
Low demand

Key features of model: **Place a bet** in the face of uncertainty, **no recall** to your decision, the product is **perishable**

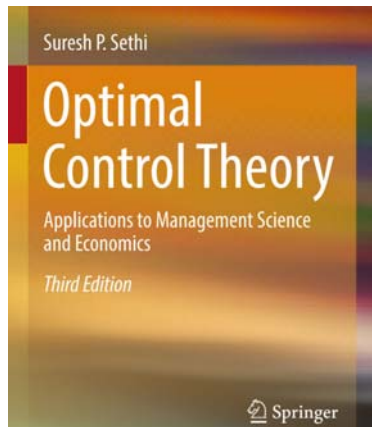
# TWO KEY EXAMPLES



Doctor's decision: How much blood to carry when Justin is on a trip?



## TWO KEY EXAMPLES



Bookstore's decision: How many such books to stock?

99.999%



No books



0.001%

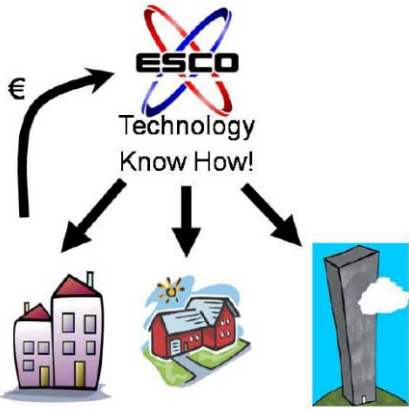


1 book

# OTHER EXAMPLES



# CHANGING WHY DECISIONS ARE MADE THE WAY THEY ARE MADE

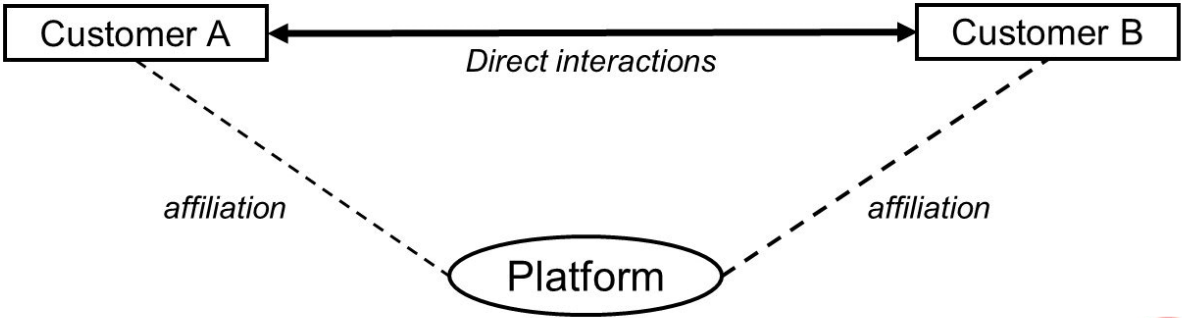


*Align Time Horizons*

*Change Revenue Streams*



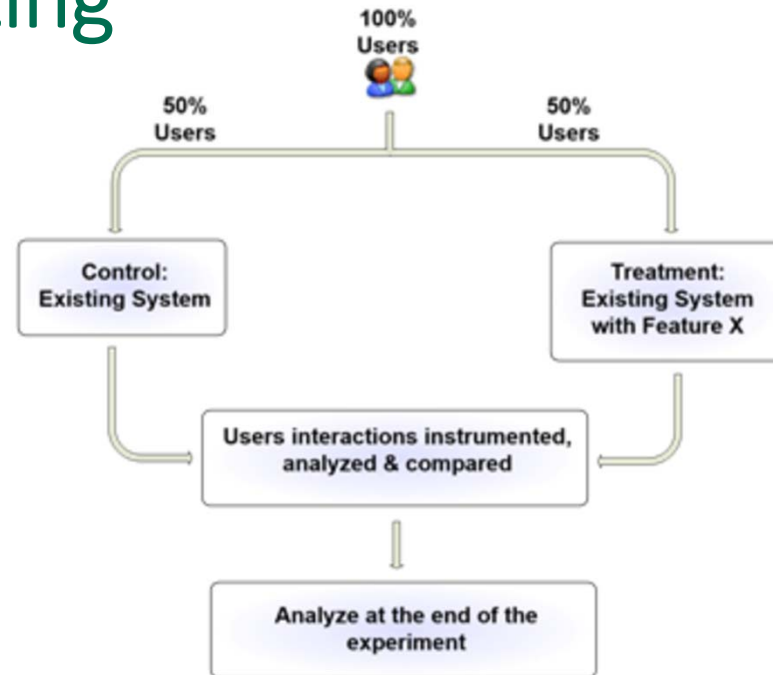
MARKETPLACES





WHAT'S NEXT?

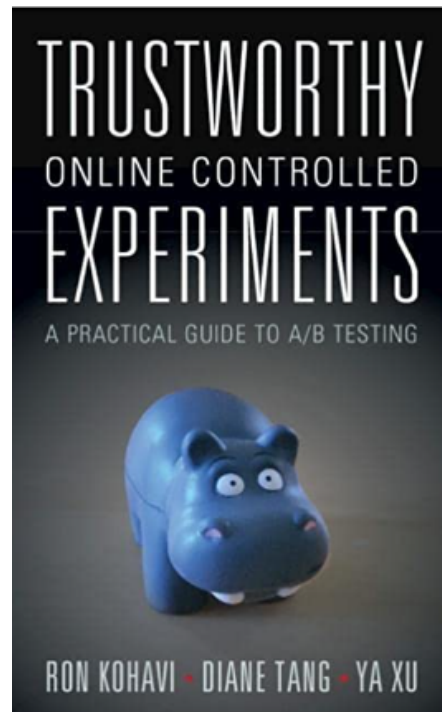
# Learn A/B testing



Data Min Knowl Disc (2009) 18:140–181  
DOI 10.1007/s10618-008-0114-1

**Controlled experiments on the web:  
survey and practical guide**

Ron Kohavi • Roger Longbotham •  
Dan Sommerfield • Randal M. Henne



WHAT'S NEXT-18

**Exp Experimentation Platform**

Accelerating software innovation through trustworthy experimentation

<https://exp-platform.com/>

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# BUSINESS MODELS I AM EXCITED ABOUT!



## How to pay on-demand workers a Fair Wage?

- There are drivers who spend 8+ hours on the road but on paper they are paid for a fraction of it.
- Ride cost 2018-2021: +92%! And customer waits have doubled!
- If you are smart about accommodating drivers' preferences, you can have decent performance guarantees on how much profit you can reap from the system.

## Idea:

Run a behavioral experiment to test different mechanisms and their impact on drivers, customers, and for such marketplaces.



# STUFF I AM EXCITED ABOUT: GROCERY DELIVERY



## Step 1



Select your groceries from 30,000+ items at stores like **Whole Foods**, **Trader Joe's**, **Safeway**, and **Costco**.

## Step 2



Instacart routes your order to a vetted Personal Shopper who collects your items.

## Step 3



Your order is delivered in as little as 1 hour!

Stouras K. and Ozlem Yildiz, "Grocery Delivery Operations: Marketplace or Re-seller?", Working Paper, 2021

Goldberg R., K. Stouras, O. Yildiz and E. Weiss, "GidaTez: Grocery Delivery in Turkey", Darden Business School Case, 2019



# THE BIKE SHARE BUSINESS MODEL: PRODUCT AND REVENUE MODEL

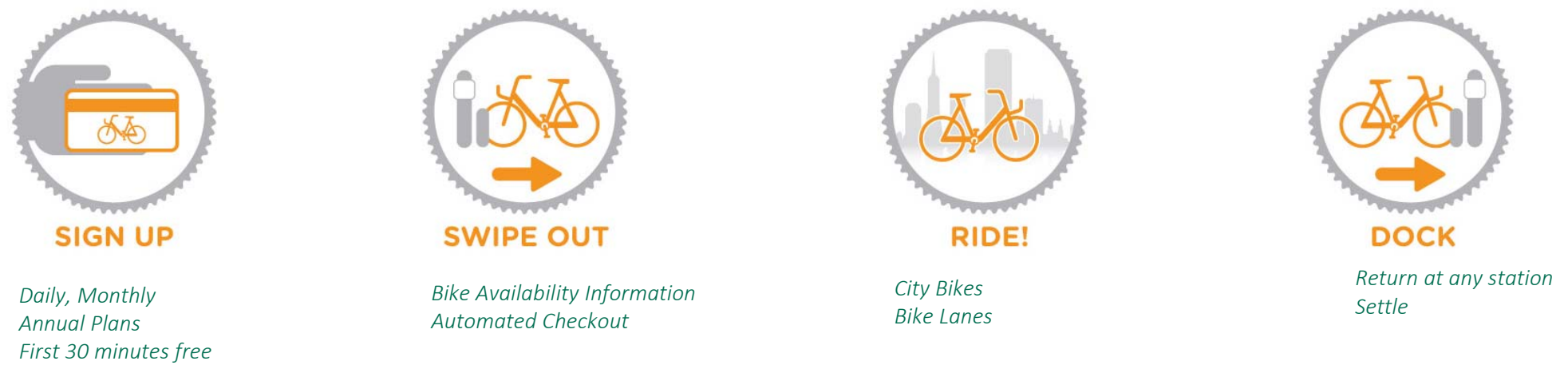
## Sturdy, Reliable Bikes



## Convenient Parking Stations



## Shared Consumption by Consumers



NOT JUST ABOUT MAKING MONEY...



globalgiving

BUSINESS MODEL INNOVATIONS HAVE IMPACT!

HUMANS FIRST, BUSINESSPERSONS SECOND

# A NEW (SUPERIOR) WAY TO INNOVATE: BUSINESS MODEL INNOVATION



# ONLINE FINAL EXAM

- ▶ Preparation:
  - ▶ Book Chapters
  - ▶ Lecture slides and your lecture notes
  - ▶ Recipes
  - ▶ Solved Exercises
  - ▶ If you run out of problems to solve it means you are ready!
  
- ▶ While in the exam:
  - ▶ Do not overthink!
  - ▶ Questions are marked for difficulty and time allocation. Act strategically.
  
- ▶ Exam structure
  - ▶ Part A: Qualitative questions and business intuition
  - ▶ Part B: Quant questions at the level of the tutorial exercises
  
- ▶ Online exam date: TBC, 2h long
  - ▶ 2h to solve + upload a single PDF with your Name and ID on Blackboard.
  - ▶ Type solutions to each question directly in the Answer Sheet (in MS Word).
  - ▶ Make sure everything is converted and included in a *single* PDF file.



# OPS AWARD

- ▶ Sponsored Award for academic contribution
- ▶ Observer
- ▶ Serious Nominations...
- ▶ Kindergarten Voting
- ▶ Super Duper Mega Awesome Prize!!!!

## MODULE EVALUATIONS



Please support my work by filling up this form

# MODULES END BUT MEMORIES LAST FOREVER : )



# KEEP IN TOUCH!

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