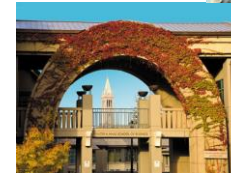




# Introduction

**Thomas Y. Lee**

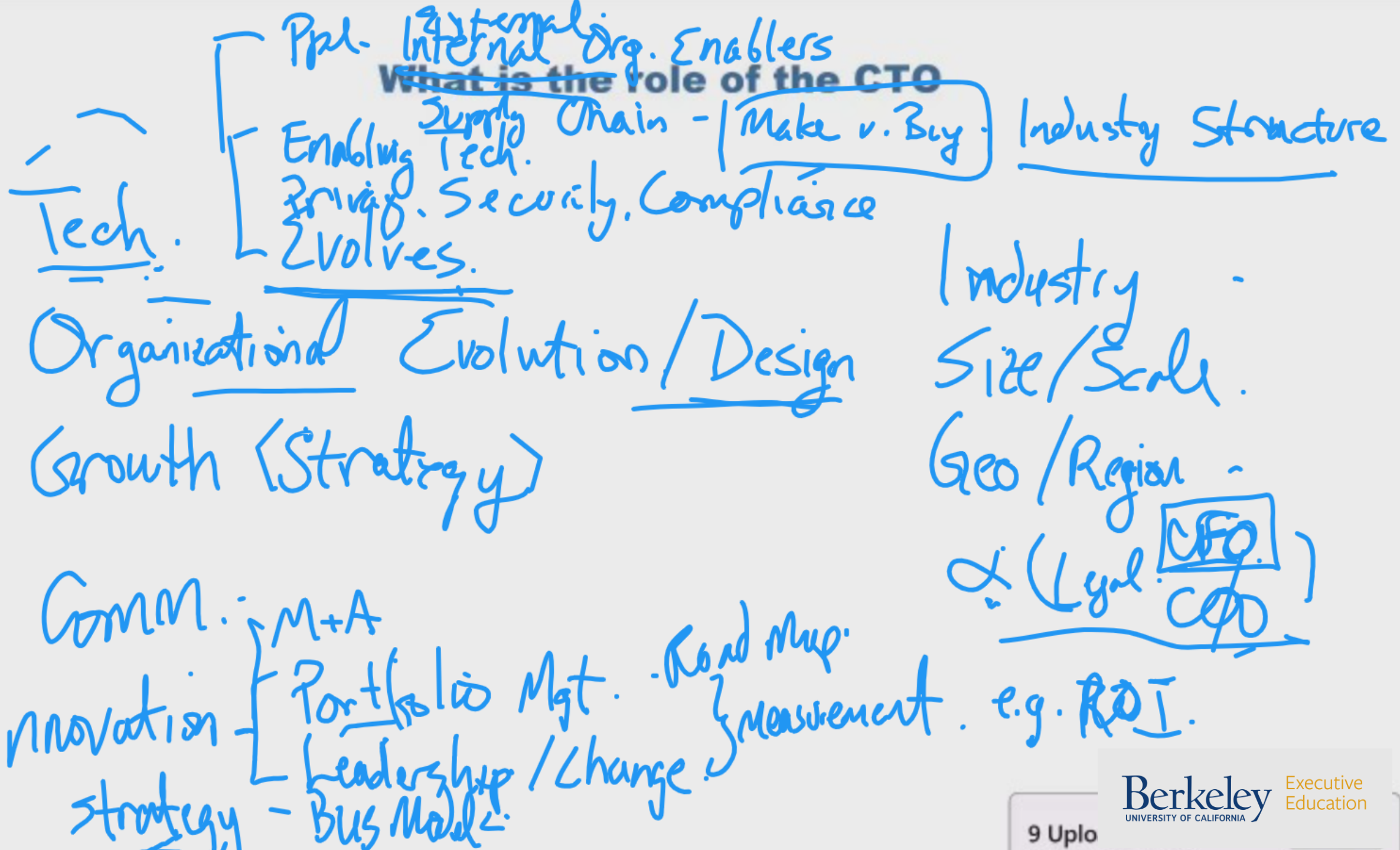
**Berkeley CTO Program**



# Big Ideas

- Role of CTO
- Course overview
- Innovation

# What is the role of the CTO



# What is the role of the CTO

## Technology

People (external, internal ppl enablers)

Supply Chain (Make v. Buy)

Industry Structure

Privacy, Security, Compliance

## Organizational Evolution/Design

Size and Scale

Industry

Region/Geo coding

CTO relation to (e.g. CFO, CO, etc.)

## Strategy

Growth

Business Model

## Innovation

Mergers and Acquisition (Not Invented Here)

Portfolio Management (Roadmapping;

Measurement e.g. ROI)

Leadership

Change

## Communicate

internally – organization

externally – investors, customers, suppliers

\*from in-class discussion

## CTOs Contribute to Overall Business Strategy

- *“The CTO’s key tasks are [those] of a technical businessperson deeply involved in shaping and implementing overall corporate strategy.”*

R. D. Smith, VP and Group CTO, Titan Systems Corporation

- *“First and foremost, a CTO must care about and understand the business, and have the ability to shape business strategy through the lens of technology. **The CTO is an executive first, a technologist second.**”*

Camille Fournier, CTO of Rent the Runway

# CTOs Lead and Align Technology Strategy

- Fiduciary for Long-Term Technical Strategy
- The CTO must effectively hold, develop, articulate, and continually evolve the company's strategic technical direction.
- Advise the CEO (and CFO/COO) on the long-term technical strategic direction of the company....

Amr Awadallah, Founder/CTO, Cloudera

## CTOs Define Data and Product Architecture

- We are reaching a size where we need to communicate better in terms of architecture. I like to advocate standards.
- There are going to be many times ... where you have to pick between a good solution that takes a lot of time or a solution you can do in a short time. None of us like to leave technical debt behind, but sometimes it's a reality that we face.

Morton Primdahl, Cofounder and CTO, Zendesk

- Everybody is in the data business, whether they realize it or not. Everything we touch turns to data. Business is transforming from analog to digital. No matter what your product is, data is your product. Business is changing because of data, and data is power.

Scott Taylor, MetaMeta Consulting, formerly Dun and Bradstreet

## CTOs Innovate

- “The CTO may identify areas where technology can be used to create new or bigger lines of business for the company that align with the overall company strategies.”

Camille Fournier, CTO Rent the Runway

- Know how to ask questions. The first question is always, “What problem are you trying to solve?” If you don’t know what problem you’re trying to solve — whether it’s a technical, product, or people problem — you won’t know if you’ve accomplished your goal.

Peter Van Hardenberg Founding Dev of Heroku Postgres



## CTOs Help Define Culture

- The CTO is the spiritual leader of the technology team, defining process and culture: *“People on the engineering team need to be happy and productive. Lagging indicators are attrition of engineering talent or inability to hire.”*

Amr Awadallah, Founder/CTO, Cloudera

- *“The CTO should initiate activities and policies that create a technology-friendly culture aligned with the company’s business strategy.”*

R. D. Smith, VP and Group CTO, Titan Systems Corporation

## CTOs Communicate

- *“Most careers turn into sales jobs when you get senior enough”*

Sam Altman, Chairman of Y-Combinator and co-chair of Open AI

- *It’s my job to be able to communicate our company’s technical aspects to people who perhaps don’t come from a great technical background. Learning to cross that language barrier has been tough, especially when you’re working in an industry like machine learning. Learning to communicate some of the same concepts in everyday language is critical.*

Madison May CTO Indico

## Lessons Learned: CTO Role

- Contribute the lens of “enabling technologies” to the transformation of business strategy and organizational policy.
- Lead (data and full-stack) technology strategy
  - Identify and prioritize opportunities to innovate (Module 1)
  - Define and align tech policies and processes with org culture (Module 2)
  - Define and align product arch w/ industry and org structure (Module 3)
- Communicate (data) and technology strategy
  - Internally to the rest of the organization (Module 1 and 2)
  - Externally to customers and the marketplace (Module 1 and 3)

# Berkeley CTO Program

## Enterprise Tech Strategy

Module 1

(Digital) Innovation

Emerging Technologies

Creating Value

Managing & Communicating Innovation

## Management of Organizations

Module 2

Organizational Change

Leaderless Change

Group Decision-Making

Negotiations

## Operations, Measurement, & Policy

Module 3

CTO and Operations/Finance

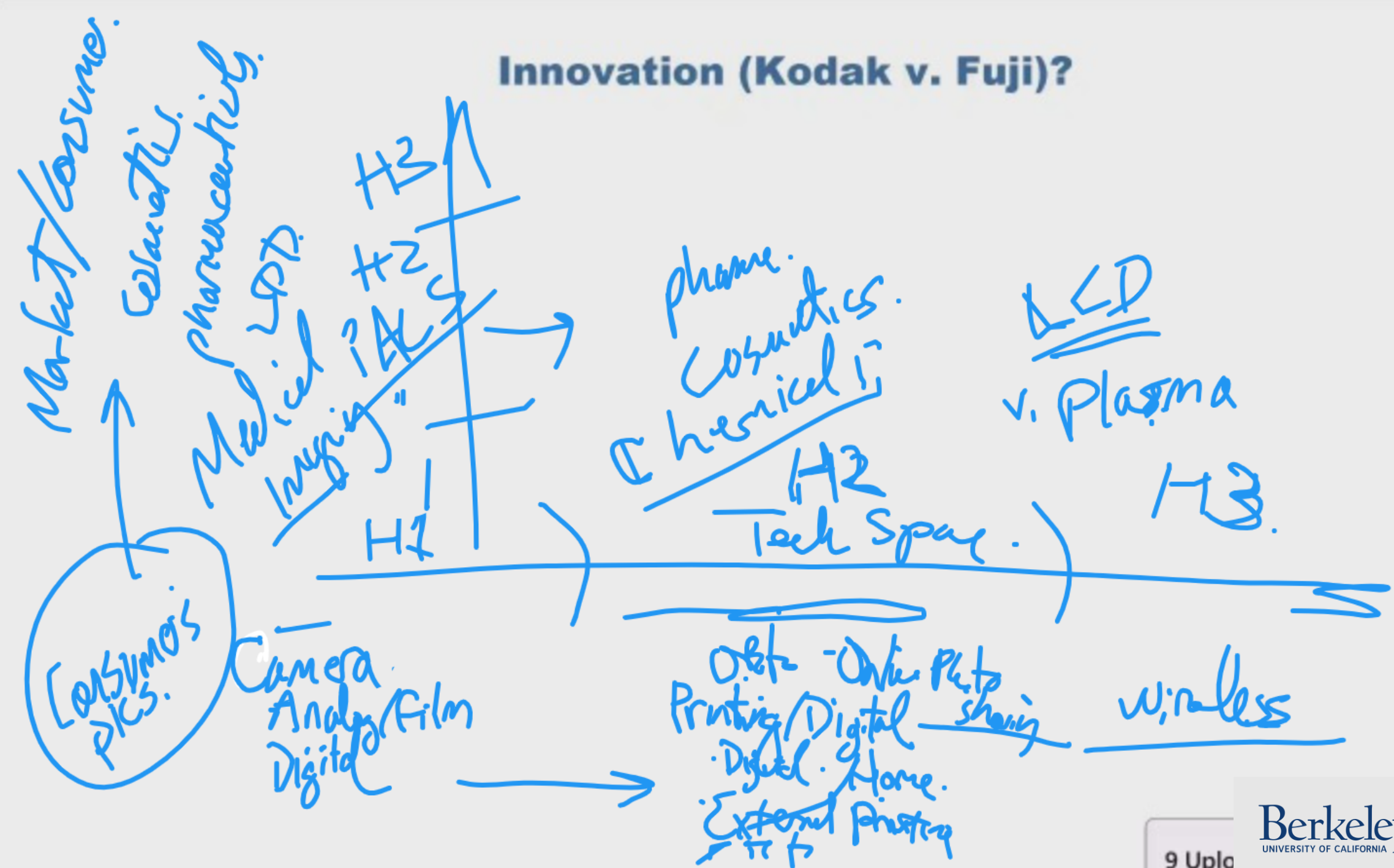
CTO and Marketing

CTO and Security and Privacy

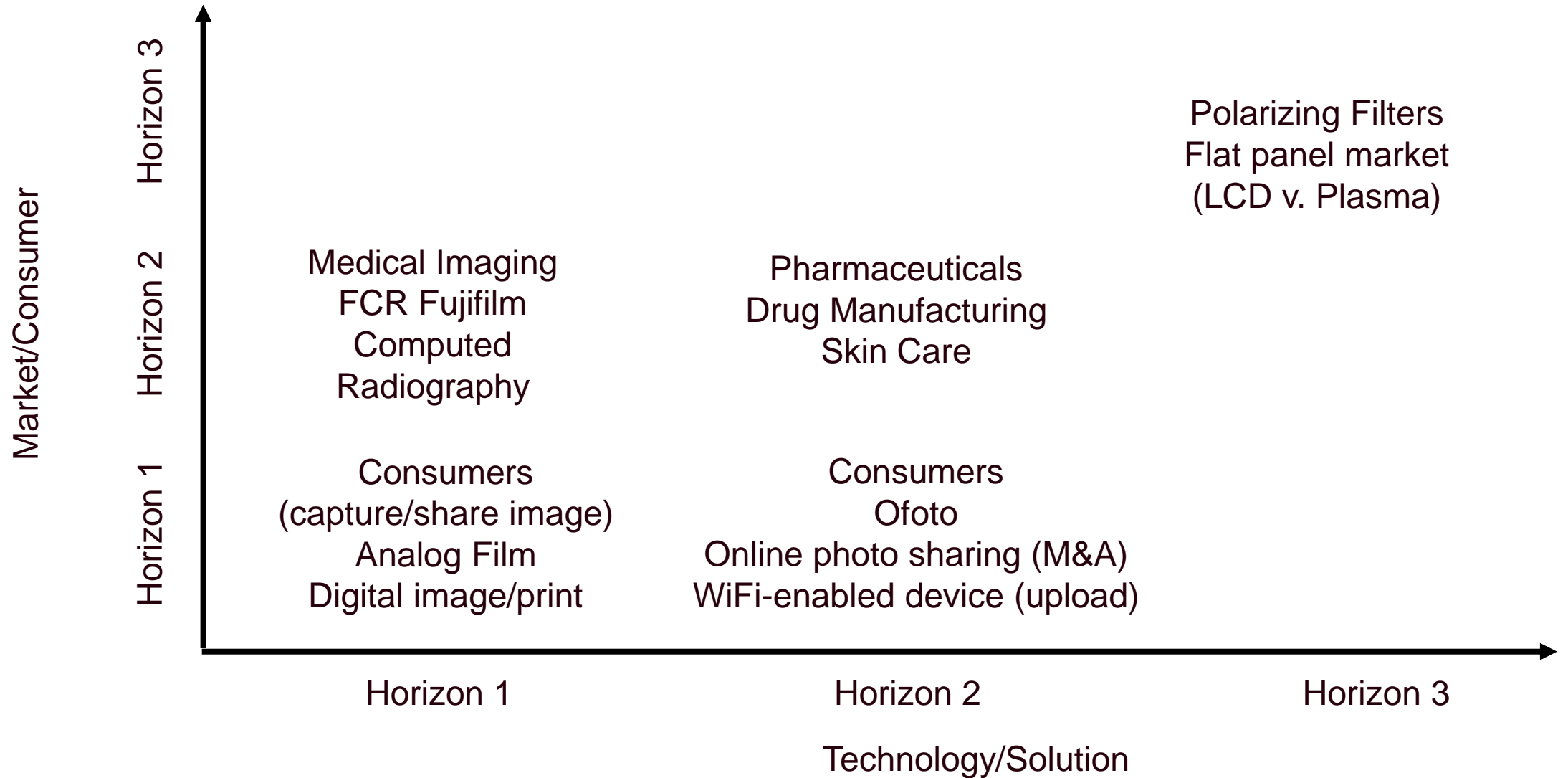
# Leading Through Digital

Week 1	What is Innovation	What is Digital Transformation
Week 2	Data Pipeline: Core Principles	Agency: Innovating with/for AI
Week 3	Computer Vision Case	Data Enabling Technologies
Week 4	ML and Neural Networks	Robotics Principles
Week 5	Industrial Robotics Case	Creating Value
Week 6	Innovation Cycle: Sense-Making	Innovation Cycle: Solution-Making
Week 7	Open Innovation	Innovation Portfolio Management

# Innovation (Kodak v. Fuji)?



# Innovation (Kodak and FujiFilm)



# Innovation (Kodak and FujiFilm)

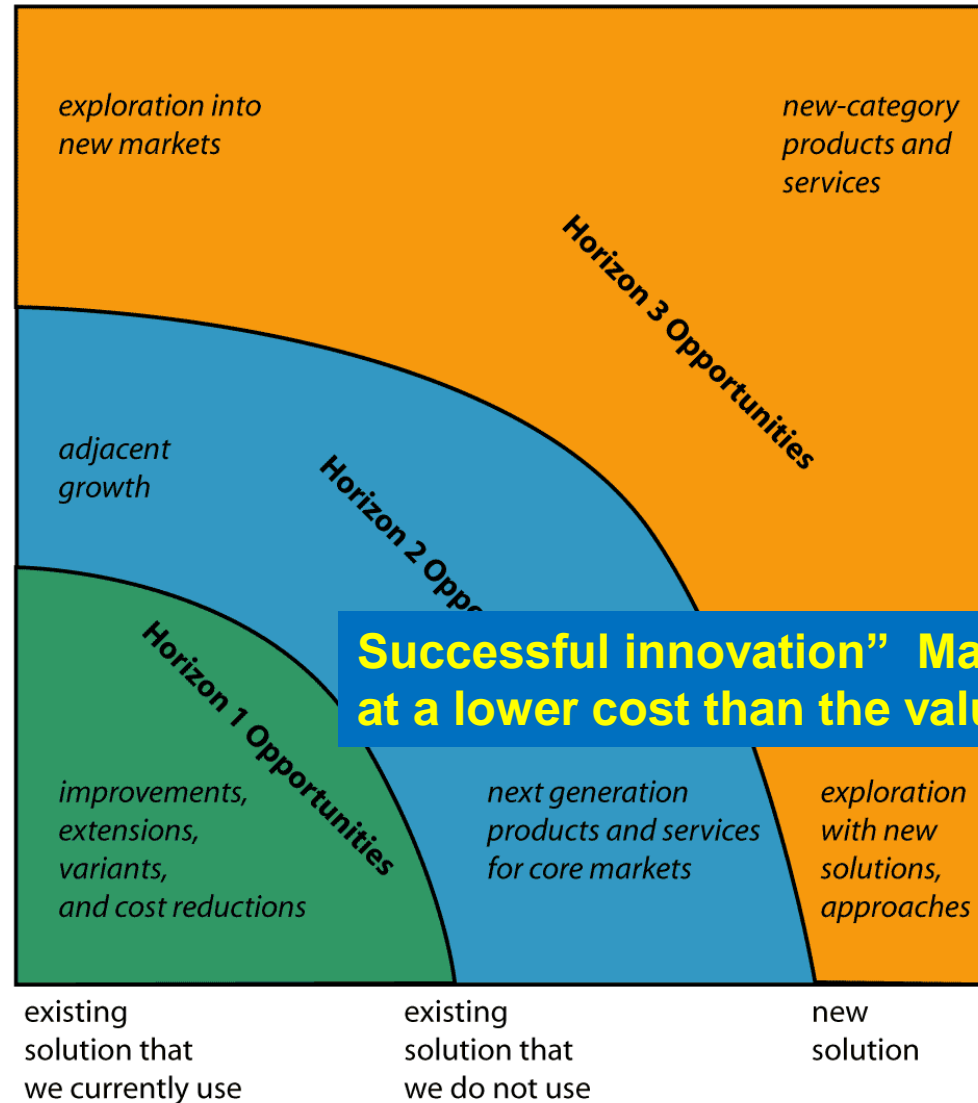


Knowledge of Problem Space (e.g., user/market/job)

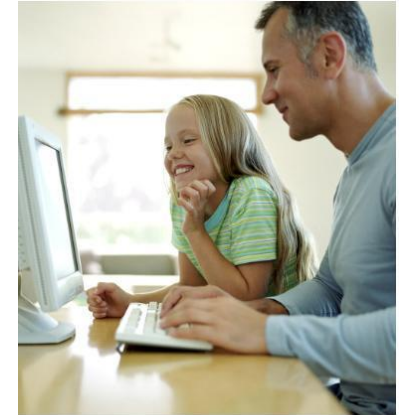
new  
need/market

existing  
need/market  
that  
we do not  
address

existing  
need/market  
that  
we currently  
serve



**Successful innovation” Matching a solution to a need at a lower cost than the value created and captured**



Knowledge of Solution (e.g., technology/method/process)



# Lessons Learned

- Innovation Landscape

- Three Horizons in Innovation Portfolio Planning:
  - Horizon 1. Existing Problem Space and Known Solutions (technologies)
  - Horizon 2. Adjacent Problem Spaces and Adjacent Solutions (technologies)
  - Horizon 3. Novel Problem Spaces and Novel Solutions (technologies)
- Successful Innovation: Matching a solution to a problem at a lower cost than the value created and captured.