Commercialization Follow-up with Q&A

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Class 22

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Charlie’s Conflict of Interest Statement

Dr. Kemp is both an associate professor at Georgia Tech and the chief technology officer (CTO) of Hello Robot Inc. where he works part time. **He owns equity** in Hello Robot Inc. and is an inventor of Georgia Tech intellectual property (IP) licensed by Hello Robot Inc. Consequently, **he receives royalties** through Georgia Tech for sales made by Hello Robot Inc. He also benefits from increases in the value of Hello Robot Inc.

Summary: If Hello Robot does well, Charlie does well.

Georgia Tech

hello robot™

Addendum to Personal Savings

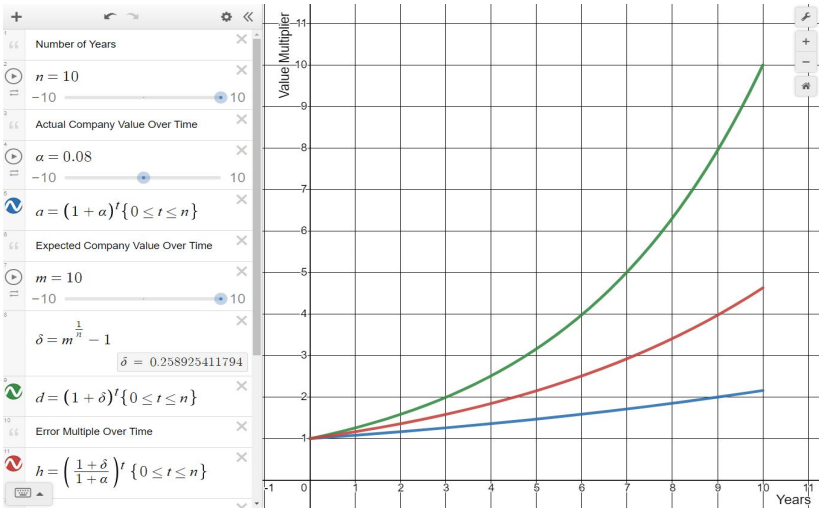
- Your income prospects are very good!
  - “What Can I Expect to Earn After College?”

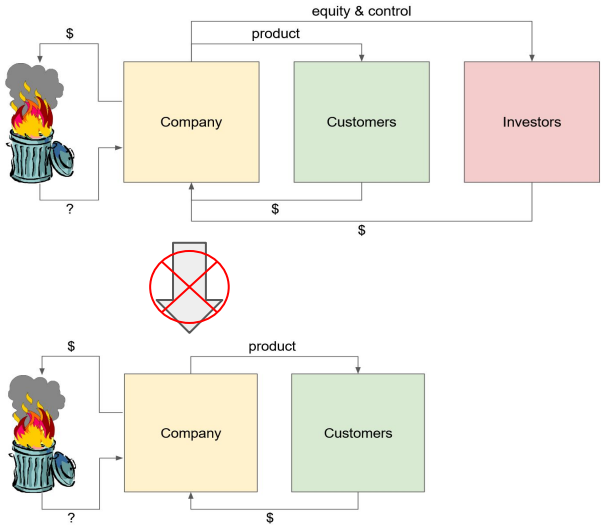
	Age 25	Age 35	Age 45
GT BME	$68,955	$134,627	$147,403
GT ME	$72,202	$121,193	$140,198
GT CoC	$91,048	$150,249	$179,142

- My wife and I made an explicit decision to live on one of our two incomes when we came to Georgia Tech in 2006.

Death of a Startup

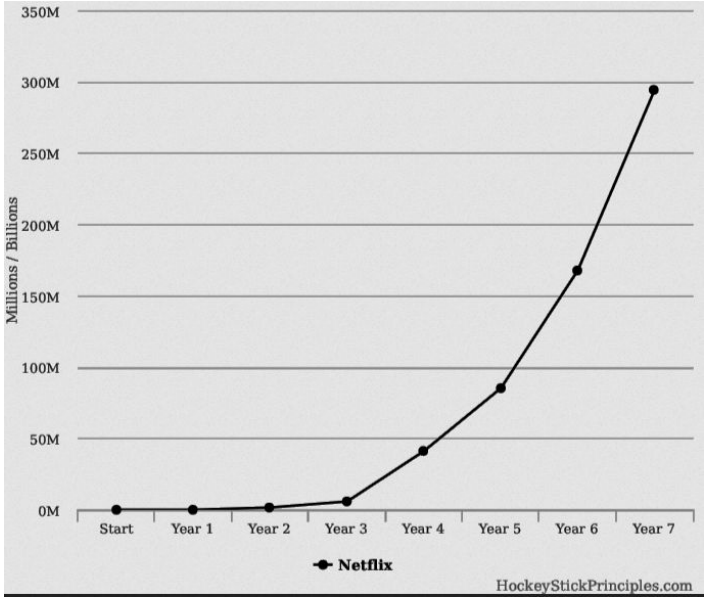
- Valuation too high for new investors
- Unable/unwilling to switch to revenue-based business
- Reduced options due to lack of control
- There can be a real business inside with too many obligations





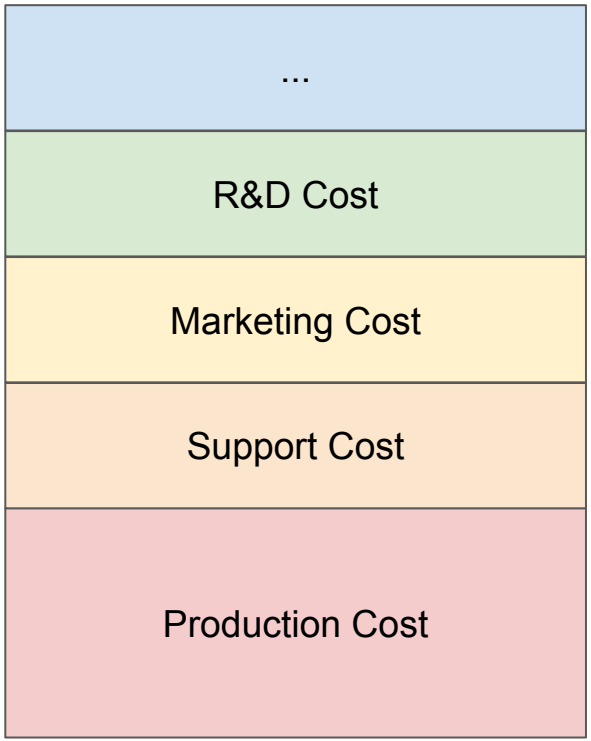
Do all investors expect a 10x return in 10 years?

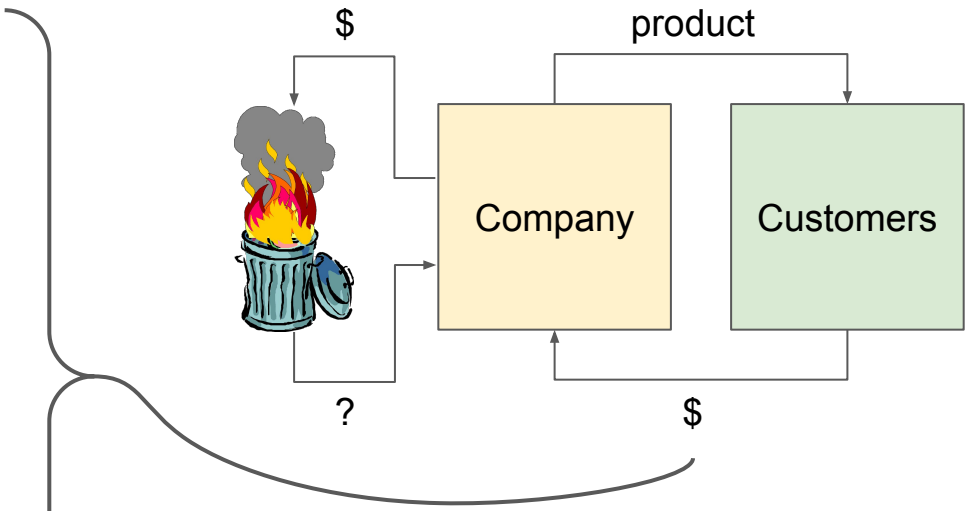
- They expect most startups to die
- Their goals vary
  - Don’t just sell them on your company
  - Ask the hard questions
  - Assess how well your goals are aligned with theirs
  - Be honest with yourself about the match, it’s a long journey
- Most are looking for extreme returns
  - High-risk implies many investments go to zero
  - They need big wins for the numbers to work
  - 10x or greater is typical for venture capitalists
    - https://kruzeconsulting.com/blog/post/what-VCs-Return-Expectations/



A Common Goal: The Hockey Stick Chart

What's in a price?





$$\int_0^T \$_{burned}(t) < \int_0^T \$_{from_customers}(t)$$

Is the price right?

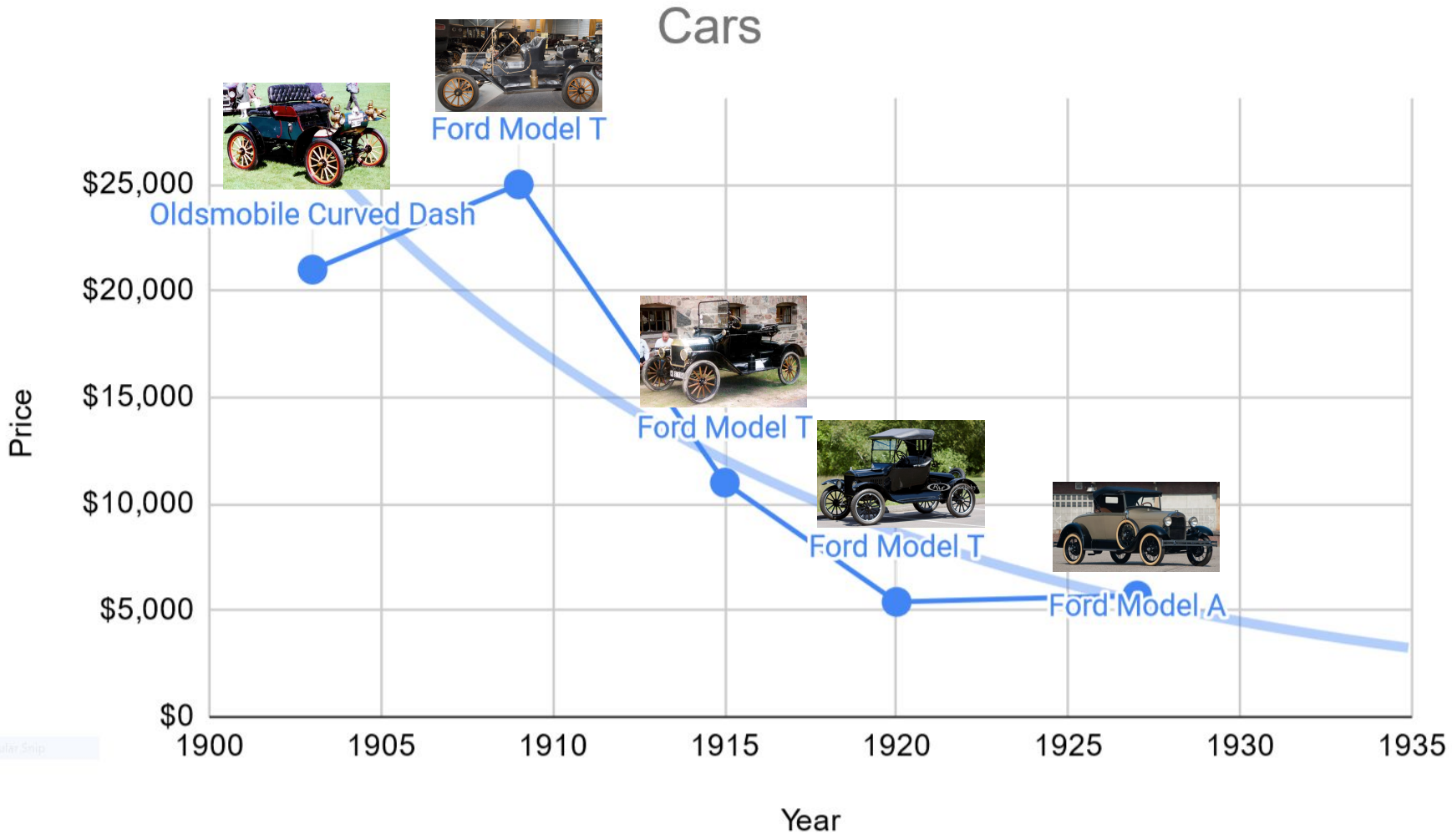
- Take your customers' perspective when selecting a price
  - What is their price sensitivity?
  - What are their alternatives?
  - Will they decide to buy and be happy with their purchase?
- Too high
  - Not enough people buy the product
  - Limited growth in terms of revenue and profit
  - Risk of competitor capturing the market
- Too low
  - Risk of selling the product at a loss
  - Risk of misestimating the true cost
  - Customers have less incentive to make a careful decision, so they may be a poor match for your product.

https://en.wikipedia.org/wiki/The_Price_Is_Right_(American_game_show)
Image from: https://www.buzzfeednews.com/article/terripous/showcase-showdown

Prices for Emerging Technologies

All prices inflation adjusted to 2020-2021 US dollars

Google Spreadsheet Used to Generate Graphs


Cars
Ford Model T
Oldsmobile Curved Dash
Ford Model T
Ford Model T
Ford Model A
$25,000
$20,000
$15,000
$10,000
$5,000
$0
Price
1900
1905
1910
1915
1920
1925
1930
1935
Year

Cars

Oldsmobile Curved Dash

Ford Model T

Ford Model T

Ford Model T

Ford Model A

$20,000
$15,000
$10,000
$5,000
$0

Price

1900
1905
1910
1915
1920
1925
1930
1935

Year

Ford Model T Runabout

Price

$25,000
$20,000
$15,000
$10,000
$5,000
$0

1908 1910 1912 1914 1916 1918 1920 1922 1924 1926 1928

Year

Computers

DEC PDP-8

DEC PDP-11

Apple II

IBM PC

Apple IIe

Price

$160,000
$140,000
$120,000
$100,000
$80,000
$60,000
$40,000
$20,000
$0

1965
1970
1975
1980

Year

Mobile Phones

Motorola DynaTAC

Nokia 1011

Treo 650

iPhone

Price

$11,000
$10,000
$9,000
$8,000
$7,000
$6,000
$5,000
$4,000
$3,000
$2,000
$1,000
$0

1980
1985
1990
1995
2000
2005

Year

Robot Arms

Unimate

PUMA

Kinova Jaco

Panda

Price

$280,000
$260,000
$240,000
$220,000
$200,000
$180,000
$160,000
$140,000
$120,000
$100,000
$80,000
$60,000
$40,000
$20,000
$0

1970
1980
1990
2000
2010
2020

Year

Mobile Manipulators

PR2

Fetch

PAL Tiago

Stretch

Price

$450,000
$400,000
$350,000
$300,000
$250,000
$200,000
$150,000
$100,000
$50,000
$0

2010
2012
2014
2016
2018
2020

Year

Not All Emerging Technologies Become Personal

1903,The Wright Flyer
https://en.wikipedia.org/wiki/Wright_Flyer

Only 16 years!

1919 - Today
https://en.wikipedia.org/wiki/Airliner

2018 - Today, Volocopter 2X
https://en.wikipedia.org/wiki/Volocopter_2X

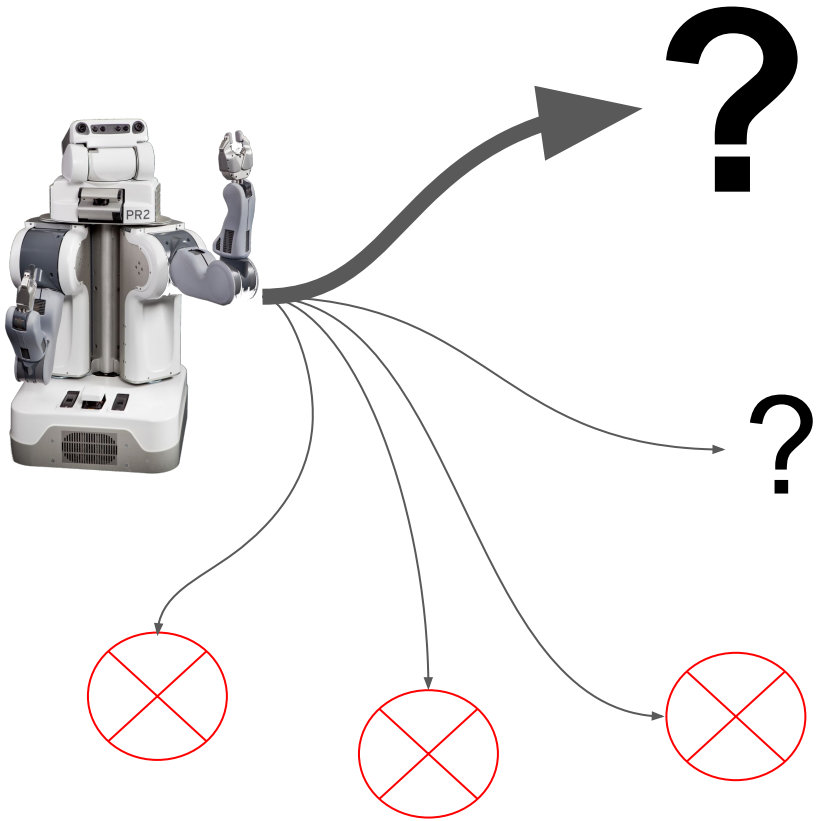
1940, Jess Dixon's flying automobile
https://en.wikipedia.org/wiki/Flying_car

1947, Convair Model 118
https://en.wikipedia.org/wiki/Convair_Model_118

1973, AVE Mizar
https://en.wikipedia.org/wiki/AVE_Mizar

https://en.wikipedia.org/wiki/Flying_car
https://en.wikipedia.org/wiki/The_Jetsons

Society has to Discover Where An Emerging Technology Fits In



New Devices are Just the Foreground

Chicken-or-Egg Problems

- Which comes first?
  - Supply or demand?
  - The problem or the solution?
  - Applications or the robot?
- Emerging technologies
  - Are novel, reducing understanding
  - Are scarce, inhibiting learning and exploration
  - Have uncertain value, reducing demand that could increase prevalence
- Iteration is a useful heuristic for solving these types of problems

Question & Answer Session

Additional Sources

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1981 "The machines will not be nearly as sophisticated as Unimation Inc.'s $38,000 Puma," => (2021 $114,673) :
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