Engineering 113

Product Strategy

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About me …

- Joined UCLA in 2007 – Adjunct Professor at School of Engineering & Anderson School of Management.
- Worked for Hughes/Raytheon for 28 years. Retired as an corporate VP & CTO
  - Managed both major functional and business organizations
  - In charge of Raytheon ES technology commercialization
- Ph.D. in Math, University of Michigan
  - Assistant Professor at University of Georgia
  - Member of Institute for Advanced Study at Princeton (1977-1978)
- Born in China, grew up in Taiwan, and immigrated to US in 1979

Teaching Assistant:

- **Anthony Lin:** 1st year graduate student at MAE

My objectives & teaching style

- My objective: Give you an overview on how technology are developed and adopted in product development; how product development are managed and taken to the market: and the evolutions and disruptions of high tech market.

My Style:

- Will introduce to you the selected management theories and frameworks developed recently
  - Caution: They don't always work!
  - Many different perspectives to analyze problems
- Try to ask the right questions
- Together we will find the answers

Changes made to improve course

- Lecture material revised to be more interactive and use newer examples
- Eliminate or minimize "make work"

- Demand full attention

  "No laptop use during lecture !"

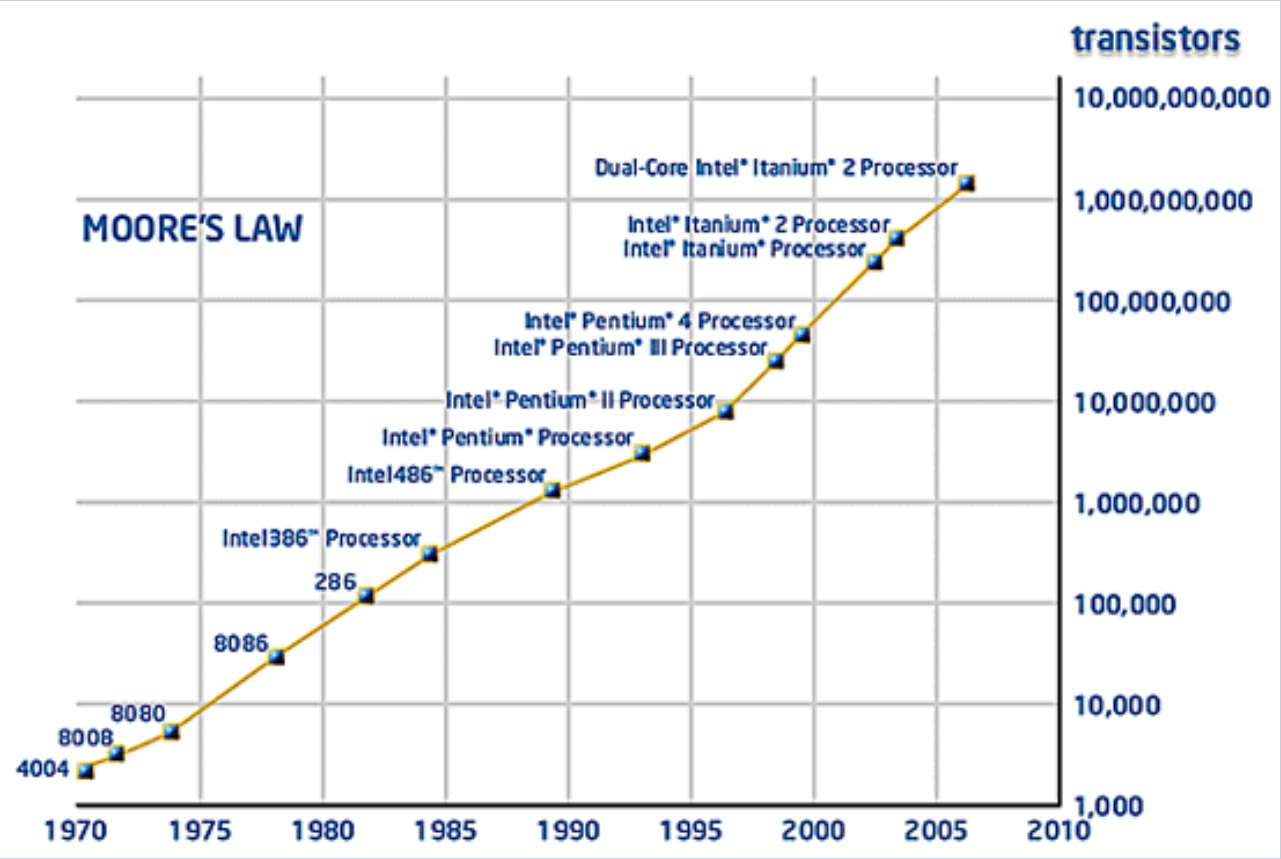
Agenda Today

- 5 drivers of High Tech in the past decade
- Course overview
- Crossing the Chasm, Part I
- Cases for next week
- Team formation

Five Drivers of High Tech Industry in last 20 years

- Moore's Law of microprocessor power
- Metcalf's Law of network utility value
- Coase's Law of transaction costs
- Rapidly decreasing costs of computer data storage and processing
- Rapidly increasing Internet adoption & telecommunications bandwidth capacity

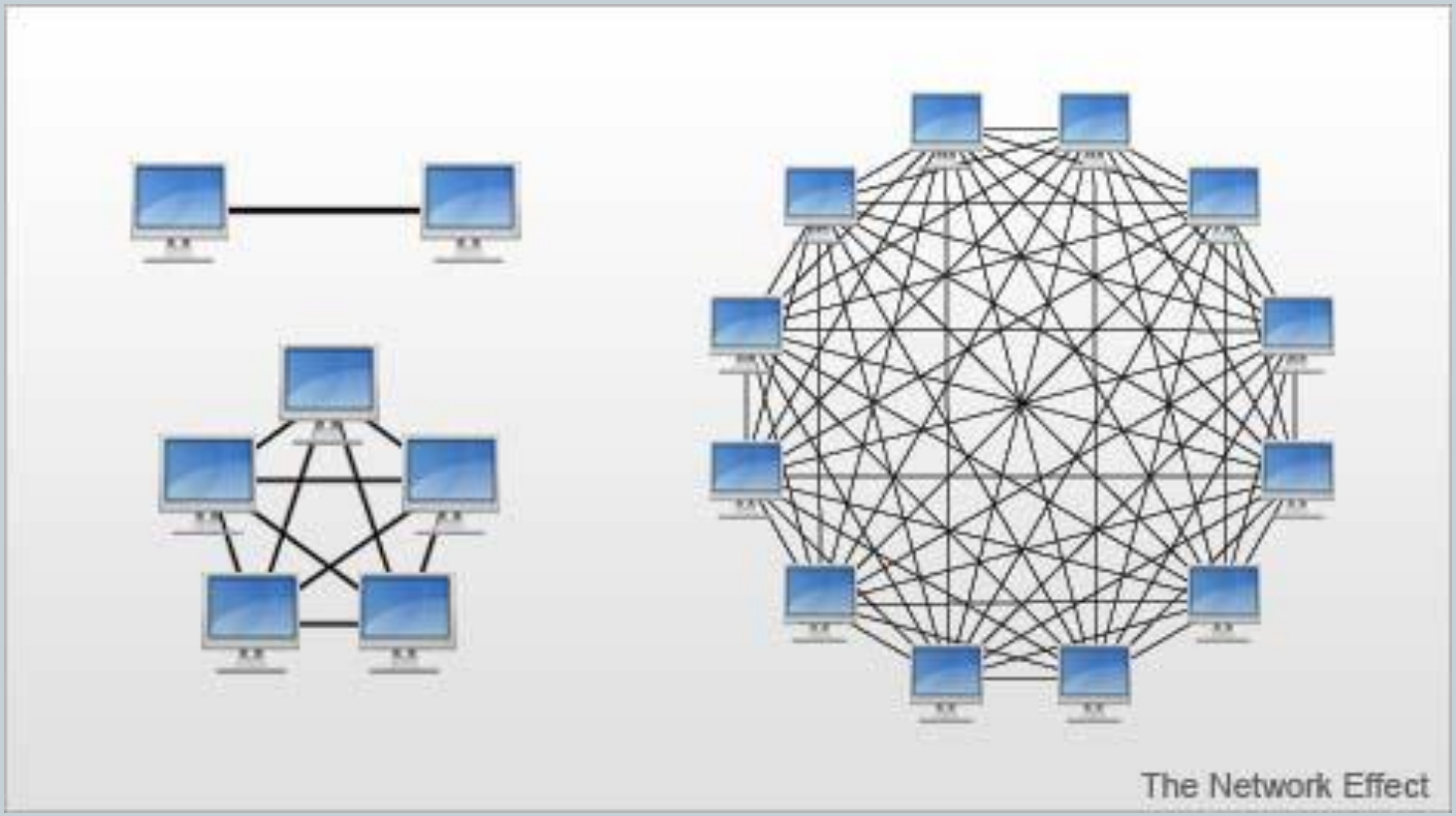
Moore's Law results in continuous improvement & disruption



Processing power up … costs down

- 1970 Intel 4004
  - 2,300 transistors
  - $200 price = 8.7 cents/ transistor
  - $87,000 per 1 million transistors
- 2006 Intel Pentium D Dual Core 64k bit
  - 291 million transistors
  - $316 price
  - $1.09 per 1 million transistors

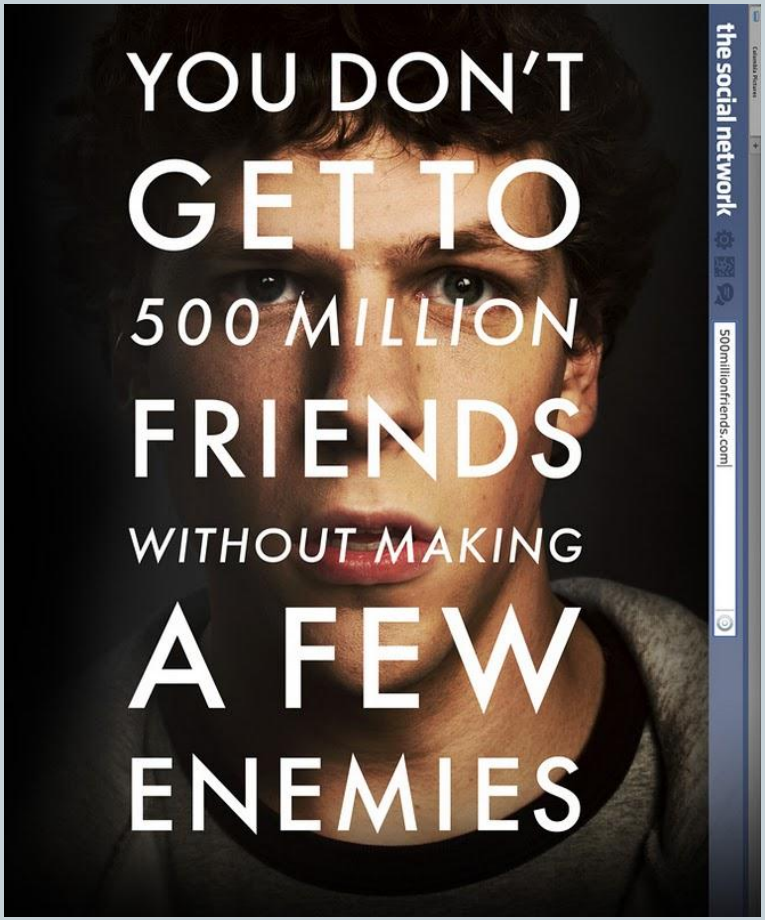
Metcalf's Law: value of a network is exponential



The number of unique connections in a network of n nodes is n(n-1)/2

When n is a very large number, it is in the magnitude of n^2

What would Facebook be with just 2 friends



- Value of Internet increased significantly as probability increased that a person, business, organization also on the web

- Also called "*network effect*" or "*network externalities*"

US lags behind other developed countries in broadband penetration, inhibiting innovation

S. Korea	95%	Australia	72%
Singapore	88%	Finland	69%
Netherlands	85%	France	68%
Denmark	82%	UK	67%
Taiwan	81%	UAE	65%
Hong Kong	81%	Japan	64%
Israel	77%	Sweden	63%
Switzerland	76%	Estonia	62%
Canada	76%	Belgium	62%
Norway	75%	USA	60%

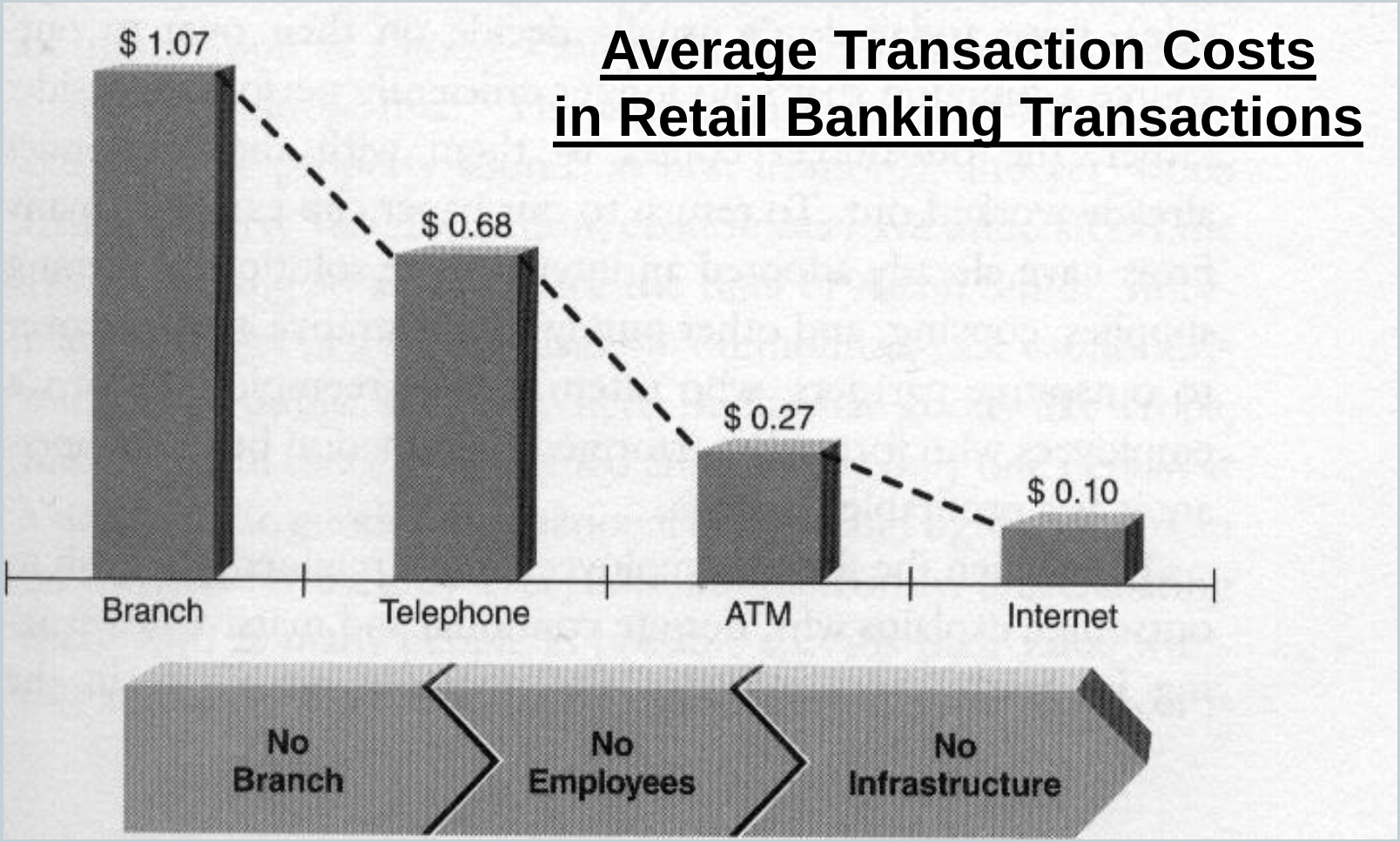
Coase's Law

- Dr. Ronald Coase
  - *PhD in economics from LSE*
  - *1937 wrote "The Nature of the Firm"*
  - *1991 Noble prize for economics…54 yrs*
- Inefficiencies in the purchasing process adds additional costs to produce products
- Focused on purchasing transactions

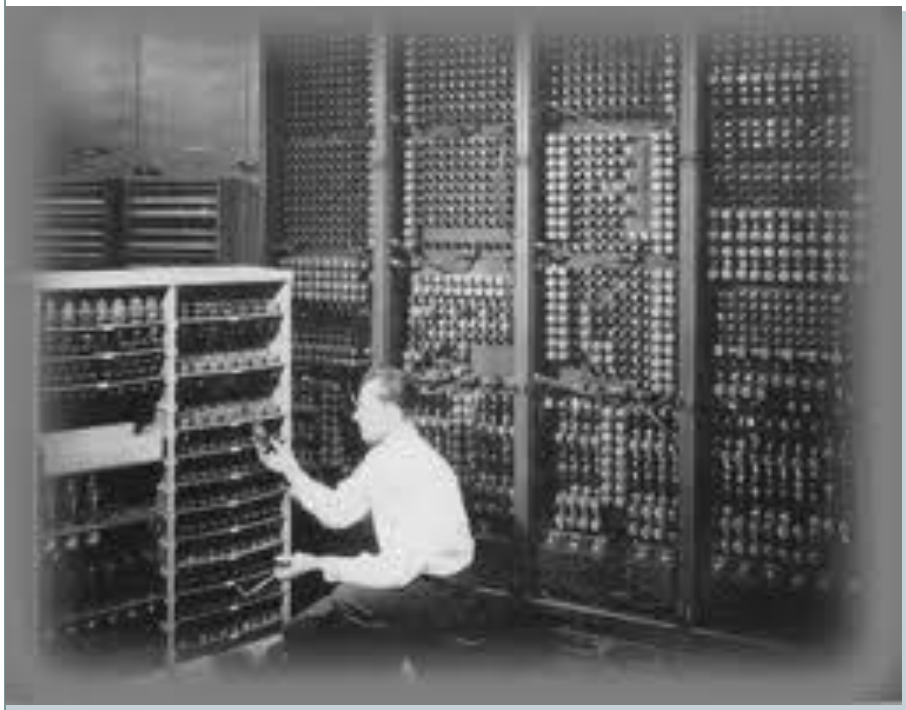
Costs for purchasing activities:

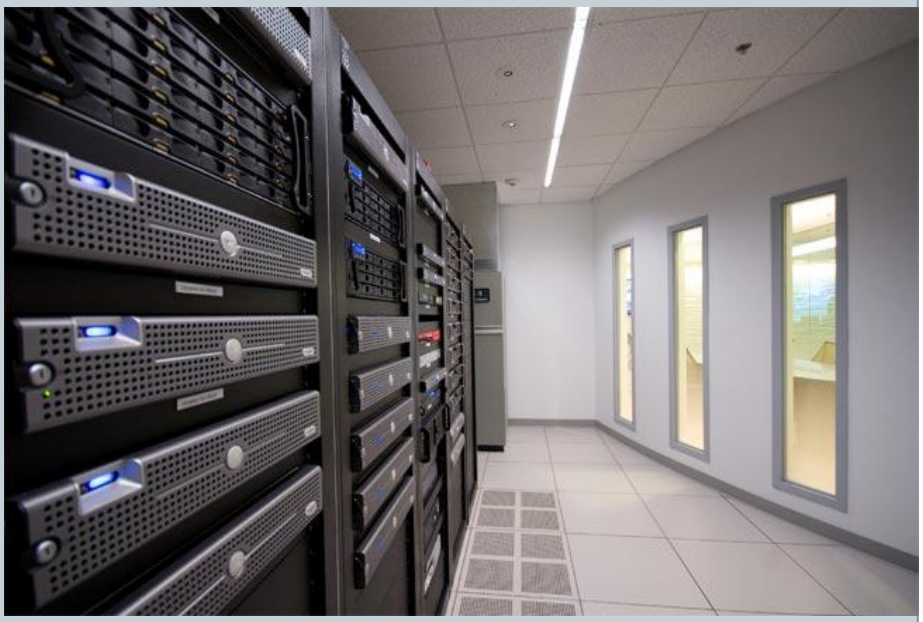
amazon.com
and you're done.™

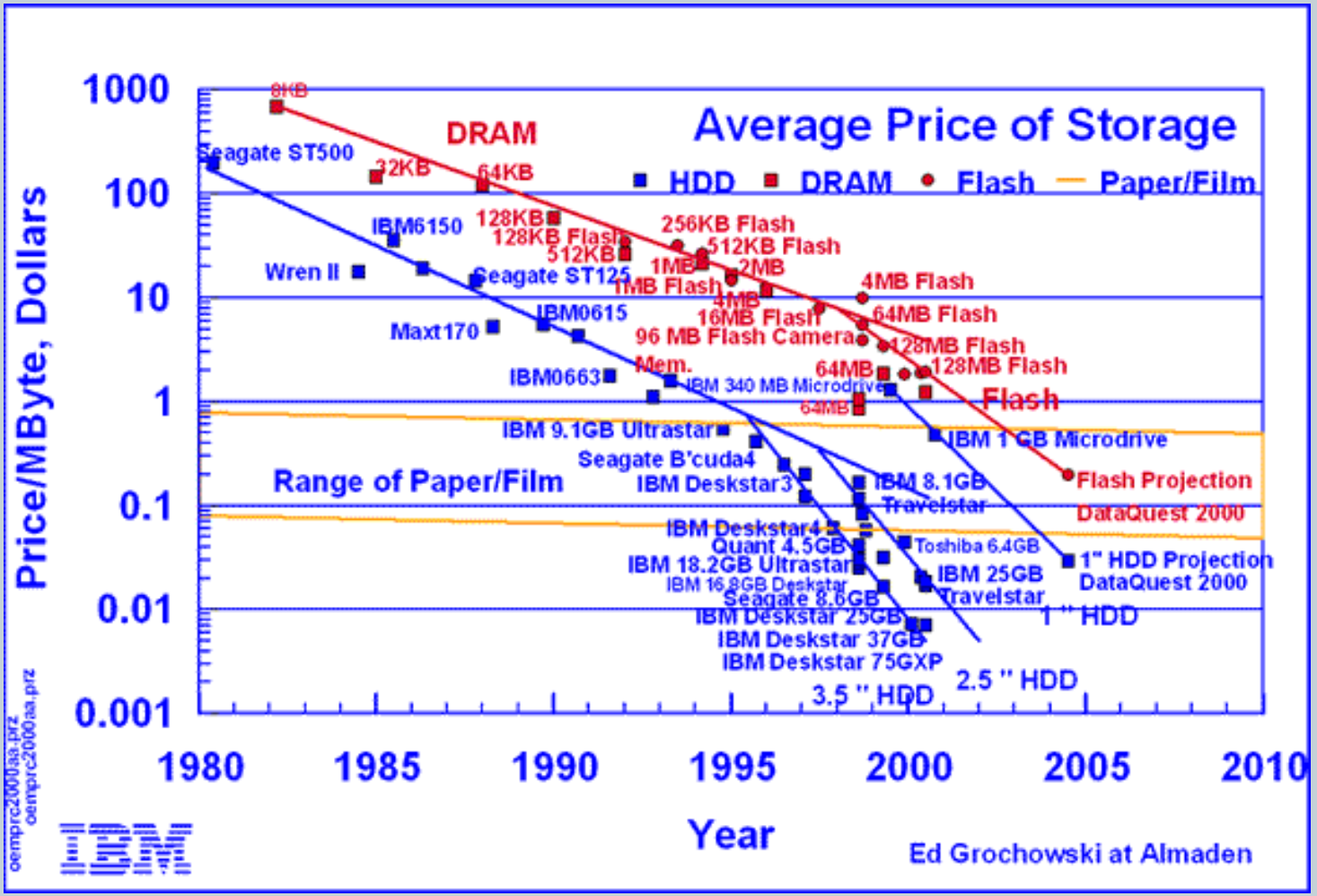
Technology has reduced transaction costs enabling new business models and opening new customers



Decreasing costs of computer data storage & processing






Average Price of Storage
HDD
DRAM
Flash
Paper/Film
Price/MByte, Dollars
1000
100
10
1
0.1
0.01
0.001
1980
1985
1990
1995
2000
2005
2010
Year
8KB
DRAM
32KB
64KB
128KB
128KB Flash
512KB
256KB Flash
512KB Flash
1MB
2MB
1MB Flash
4MB
16MB Flash
4MB Flash
64MB Flash
96 MB Flash Camera
128MB Flash
Mem.
64MB
128MB Flash
Flash
64MB
Flash Projection
DataQuest 2000
Seagate ST500
IBM6150
Wren II
Seagate ST125
IBM0615
Maxt170
IBM0663
IBM 340 MB Microdrive
IBM 9.1GB Ultrastar
IBM 1 GB Microdrive
Seagate B'cuda4
IBM Deskstar3
IBM 8.1GB Travelstar
Range of Paper/Film
IBM Deskstar4
Quant 4.5GB
Toshiba 6.4GB
IBM 18.2GB Ultrastar
IBM 16.8GB Deskstar
IBM 25GB Travelstar
1" HDD Projection DataQuest 2000
Seagate 8.6GB
IBM Deskstar 25GB
1" HDD
IBM Deskstar 37GB
IBM Deskstar 75GXP
2.5 " HDD
3.5 " HDD
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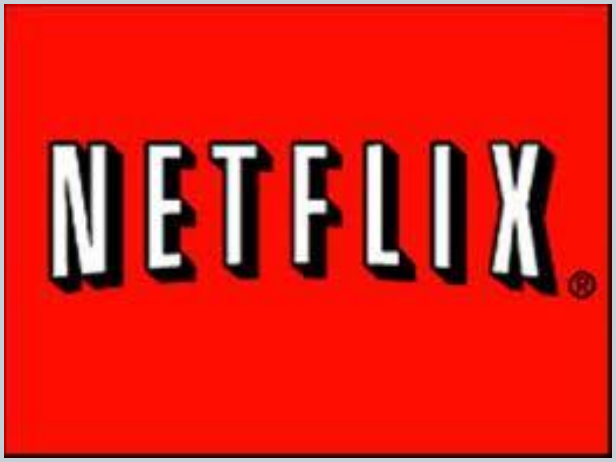
IBM
Ed Grochowski at Almaden

New disruptive businesses

Availability of internet creating new business models



What will be the drivers of high tech industry in the next 10 year?

More about Hi Tech Businesses …

High Tech products are difficult to develop and manage

- High R&D costs: micro-process chip
- Live with technical uncertainties: Windows 8
- Product standards undeveloped: HD vs Blu-Ray
- At risk of been copied or imitated: IBM PC, Groupon
- Short product life cycles, and rapid obsolescence: Cell phones, PC
- Speed is important, but early entry ≠ guaranteed success

High Tech markets are more difficult to navigate due to constant change

Confusing! Fast-moving! Lucrative! Volatile! Unpredictable!

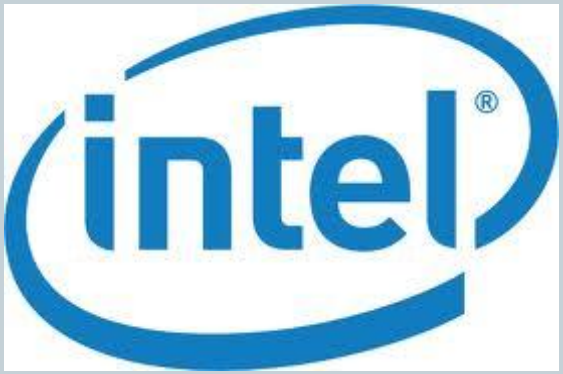
- Customer confusion and uncertainty
- Early products don't meet customers' expectations
- Prices dropping frequently
- Radical price-performance increases
- Rapidly changing competitive environment
- Rapidly building and collapsing markets

Most startups and new products fail

- At least 80% of venture capital funded start-ups fail
- 75% of new products launched by established companies fail

Most companies unable to sustain success

How do you sustain growth and market leadership?



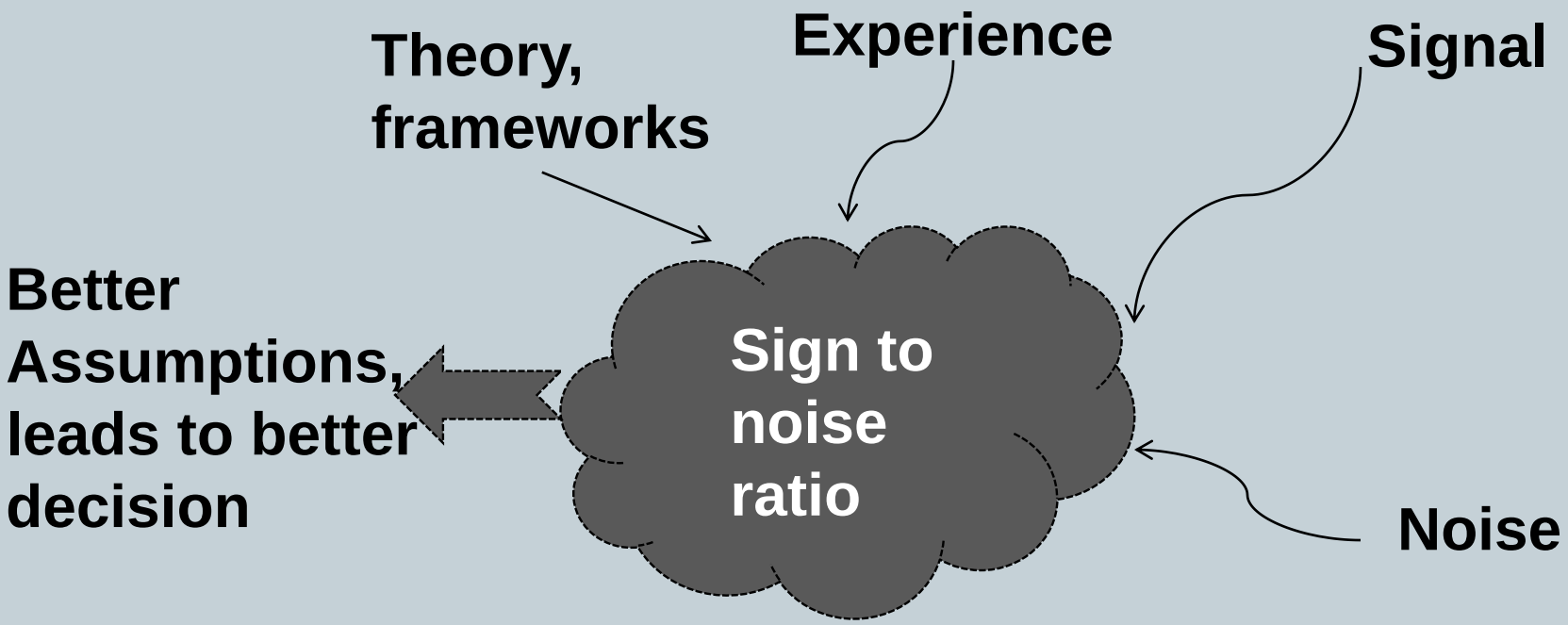
Three Categories of Reasons for Business Failures

- Generic management mistakes:
  - Bureaucracy, arrogance, tired executive, poor planning, short-term investment horizons, lack of customer focus, poor organizational structures, poor cost control, poor quality, poor risk management, ….
- Bad Luck!
- ***Strategic errors!***

  Caused by misunderstanding of market dynamics

Course Overview

Focus: Improve your understanding of market dynamics, so you can make better decisions



Business Theories and frameworks

- Selected business theories and frameworks developed in the last two decades
  - Provide you tools to analyze and understand …, and to make better decisions
  - Examples: Technology Adoption Life Cycle, Whole Product, Product Platforms and Product lines, Strategic Canvas and Value Curves, Strategic Dissonance, Technology Oversupply, Disruptive Innovation, Value Networks, Commoditization and De-commoditization, …

Cases focus on new innovative businesses & issues

1. E ink in 2005
2. Adobe Systems, Inc.
3. Dropbox: it just works”
4. Intel Corporation Product Transitions and Demand Generation
5. Reinventing the Automobile: General Motors’ AUTOnomy Project
6. Intel Centrino in 2007: A New “Platform” strategy for Growth
7. Hewlett-Packard: The Flight of the Kittyhawk
8. Facebook
9. Google in China
10. Apple Inc. in 2010
11. (TBD) Final case

How cases are selected?

- 1St selection criterion: Help you to understand the theory and frameworks covered in class
  - As examples or test cases
  - As supplements
- 2nd selection criterion: Expose you to emerging market

How cases should be studied?

- Put yourself in the shoes of the decision makers, at the time and the environment …
- Don't assume these folks were all stupid. They were not. Try to understand their constrains and the pressure put on them at the time …
- Do you have a different answer? Try to understand your thinking processes. If your decision is based on your intuition, you are not along. Most decision are based on intuition

But you need to know your assumptions, and try to validate them over and over again …

You are required to study all cases!

- 10 teams will be formed for case studies. Each team will be assigned a particular case, and they will report on their results in class.
- Each week (from week 2 to week 10) you are required to write a 2 pages double spaced report on the case assigned. When there are two cases assigned in one week, just choose the case you find it more interesting
- No report during the week your team is presenting
- Anthony and I will grade all the papers. Make it interesting for us!
- Focus on the questions asked!

Text Books

- Crossing The Chasm
  - Author: Geoffrey A. Moore
  - Publisher: Collins Business Essentials
- The Innovator's Dilemma
  - Author: Clayton M. Christensen
  - Publisher: Harvard Business School Press

Reference books (Cont.)

- The Innovator's Solution
  - Author: Clayton M. Christensen & Michael E. Raynor
  - Publisher: Harvard Business School Press

- Blue Ocean Strategy
  - Author: W. Chan Kim and Renée Mauborgne
  - Publisher: Harvard Business School Press

Four Major Building Blocks

1. Building high tech businesses
2. Managing high tech businesses
3. Profiting from high tech businesses
4. Globalization

Building High Tech Businesses (Weeks 2-3)

Theories and frameworks:

- Technology adoption curve & the chasm
- Beachhead market selection & bowling pin strategy
- Market segmentation
- Blue ocean strategy, long tail
- Whole product concept
- Hi Tech Hype Curve , Entrepreneurial crises

Cases:

E-Ink

Adobe

Dropbox

Managing High Tech Businesses (Week 4-6)

Theories and frameworks:

- Product platform and Product lines
- Core competence, R&D management, Technology S-curve
- Standard War, strategic dissonance
- Technology oversupply, Disruptive innovation, and Value

Cases:

- Intel product transition
- GM "AUTOnomy Project"
- Intel Centrino
- HP: the flight of the Kittyhawk

Profiting from Hi Tech Businesses (Week 7-8)

Theories and frameworks:

- Pricing Strategy
- Commoditization and De-commoditization
- How Wall Street determine company's value

Cases:

Facebook

Globalization – Week 9

Theories and Frameworks:

- Technology globalization
- New business model in emerging market

Cases:

- Google in China

Course Wrap-Up, Week 10

Course summary

Cases:

- Apple Inc. in 2010

Grading Criteria

Individual

Weekly Case Write Up	15%
Class participation	20%
Final Case report	20%

Group

Team technology report	30%
Case presentation	15%

Class participation about quality not quantity

- Attendance will account for half of the grade. If you are going to be absent please contact myself and Bo. Please try to minimize absences
- We will sample participation during all the classes and try to keep track of those who make insightful comments.
- 20% of final grade

Final Case Report

- Case: TBD
- Questions will be released in week 5
- Report:
  - Limited to 5 pages double spaced not including appendixes
  - Font 12
- Must answer all questions

- 20% of final grade

Team New Product Presentation
Week 7-8

- Select a new product concept
  - An improvement of an existing product
  - An integration (bundling) of existing products
  - Brand new product
- Focus: Commercialization of your new product concept, **not** technology or product itself
  - Value proposition, compelling reasons to buy, business model, whole product and potential strategic alliances
  - Initial target market, early markets
  - Competitions, product differentiations,
- 25 minutes presentation + 5 minutes Q&A
- 30% of grade

Team Case Presentations

- 10 teams – 5 students per team
- 20 minute presentation (<15 slides)
- 10 minute Q&A
- Skip the case intro & overview, focus on the questions asked
- Give Anthony and me hard copy before presentations

- 15% of grade

Team formation

Group formation process

- Form into 10 teams of 5 students
- Once your team is finalized come up and speak to Anthony about selecting a case.
- There will be a random drawing for the more popular cases and teams may be randomly slotted if necessary
- Should the teams with early presentation schedule be compensated and be graded at slightly relaxed criteria?