Project Loon
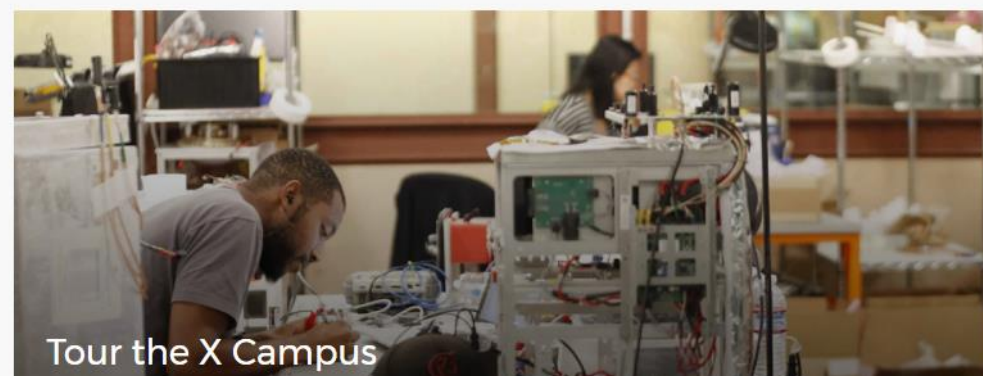## Balloon-Powered Internet for Everyone

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INFO5992 Understanding IT Innovations

Week 13: Structure Supporting Innovation

Exam Review and Exam Information

A/Prof Jinman Kim

Semester 1, 2017

THE UNIVERSITY OF SYDNEY

Copyright warning

UoS Outline

Week	Lecture Topics	Activity
1. 6 Mar	UoS Introduction; Definition of Innovation; Innovation System; Innovation in Australia	*N/A*
2. 13 Mar	Introduction to Technological / IT innovation	*Tute 1 – Massive Open Online Courses – Enabling technologies and Peer-review*
3. 20 Mar	Dynamics of Technological / IT Innovation; Source of Innovation; Adoption of Technology; Dominant Design	*Tute 2 – Design Dominance in the Smartphone market*
4. 27 Mar	Disruptive Innovation; Industry Value Chain; Value Network analysis	*Tute 3 – Innovative Tech Practice – Cognitive services* *Group Presentation Introduction – Topics Released*
5. 3 Apr	Distributed innovation I: Open / Closed innovation; Platform innovation; Web APIs; Crowdsourcing / crowdfunding	*Mid-semester Quiz* *Group Presentation – Topic Selection* *Individual Assignment Introduction*
6. 10 Apr	Distributed innovation II: User innovation; Free and Open source software; Open Data	*Peer-review Introduction* *Tute 4 – Innovative Tech Practice – Open source Geolocation and Maps*
Easter (Break)		
7. 24 Apr	Platform ecosystems	Group Presentations I – IT Innovation Case Studies *Peer-review of Group Presentations*
8. 1 May	Group Presentations II – IT Innovation Case Studies	*Peer-review of Group Presentations*
9. 8 May	Group Presentations III – IT Innovation Case Studies	*Peer-review of Group Presentations*
10. 15 May	Judging Innovation - Innovation in Industry sectors	Group Presentations IV – IT Innovation Case Studies *Peer-review of Group Presentations*
11. 22 May	Innovation ecosystem; Sydney's innovation ecosystem Organisational Culture; Structure supporting innovation **(Bill Simpson – Data61)**	*Tute 5 – Sharing Economy* *Individual Assignment Submission*
12. 29 May	Innovation by Start-up companies and Opportunities	*Tute 6 – Business Model Canvas*
13. 5 Jun	Structure supporting innovation UoS Review	*UoS comments / questions*

Agenda

– Short Lecture – Company Structure supporting Innovation

– Exam Review / Exam Info
– Presentation marks
– Report mark to be released before the final exam!
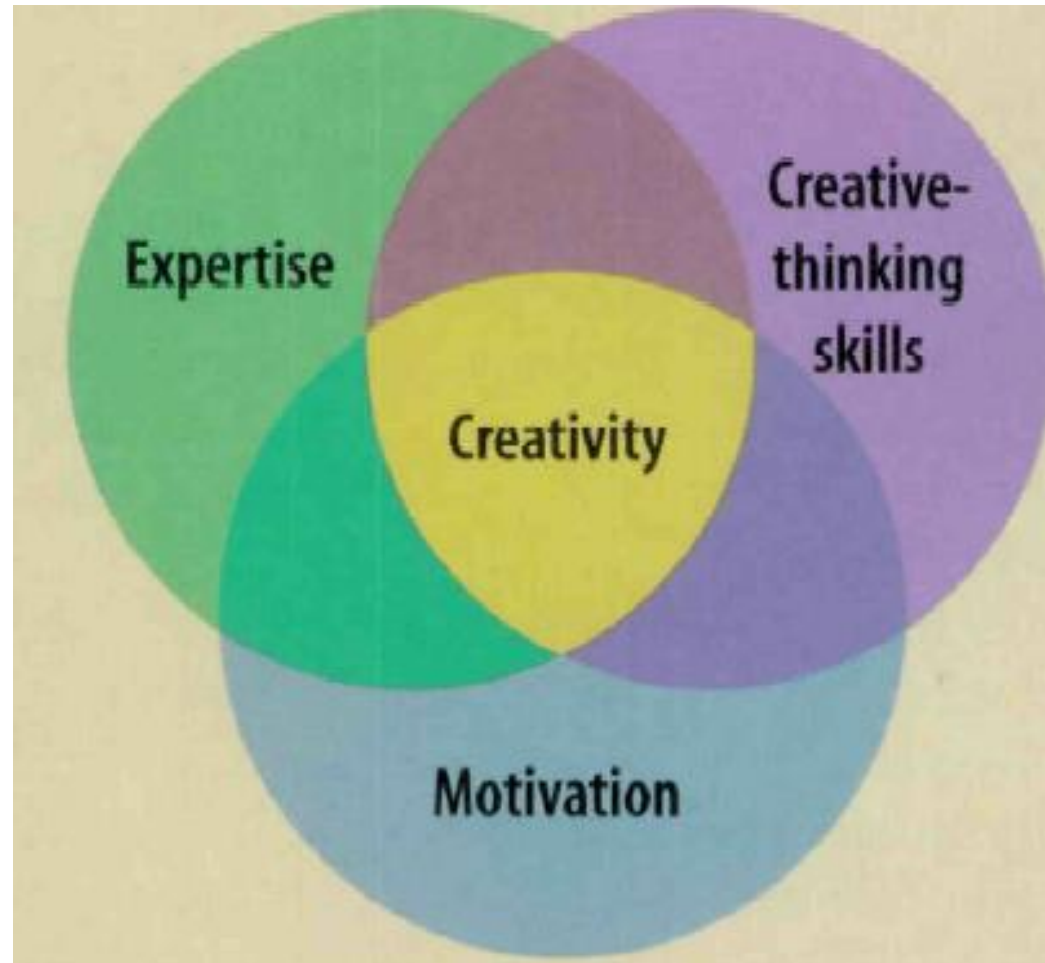
– QA

Structure supporting Innovation

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Creating a culture for creativity – Fostering creativity in the workplace

Teresa Amabile,
Harvard Business School

Source: Amabile*, How to Kill Creativity (1998)*

Recap: Fostering creativity, productivity and innovation

Teresa Amabile,
Harvard Business
School

fostering creativity in
the workplace
https://youtu.be/K7t
H07O4FoI?t=20

- – One of her studies:
  - – Found the factor that most led to engagement of workers was:
    - "Making progress in meaningful work"
    - More important than bonuses, raises, etc
    - More likely to lead to ideas/breakthroughs

Amabile, T., & Kramer, S. (2011). The progress principle. *Harvard Business Review Press, Boston, MA*.
http://www.nytimes.com/2011/09/04/opinion/sunday/do-happier-people-work-harder.html

The dynamics of "Inner Work Life"

– Emotions:

– Sharply-defined reactions and more general feelings

– Joy, disappointment, pride, etc

– Vary by pleasantness and intensity

– Perceptions:

– From immediate impressions to theories of what is happening

– E.g. of causes of actions in the work environment

– Motivations:

– Extrinsic motivations

– Intrinsic motivations (more important than extrinsic for creativity)

– Relationship or altruistic motivations

 Amabile, T., & Kramer, S. (2011). The progress principle. *Harvard Business Review Press, Boston, MA*.

How can a company have a Structure supporting invention and innovation?

Recap: Size and structural dimensions of companies

- Large companies might be disadvantaged for innovation because…
    - R&D efficiency may decrease due to loss of managerial control
    - Large companies can have more bureaucratic inertia
    - More commitments tie companies to current technologies
        - Learning effects (see Week 3); external commitments
- Small firms are often more flexible and entrepreneurial
    - Can change direction quickly based on changing circumstances or new observations

Source: Schilling (2013)

Size and structural dimensions of companies

– Many big companies have found ways of "feeling small"
  – Break overall company into several subunits
  – Can utilize different culture and controls in different units
  – E.g. "skunk works" teams for doing new product development
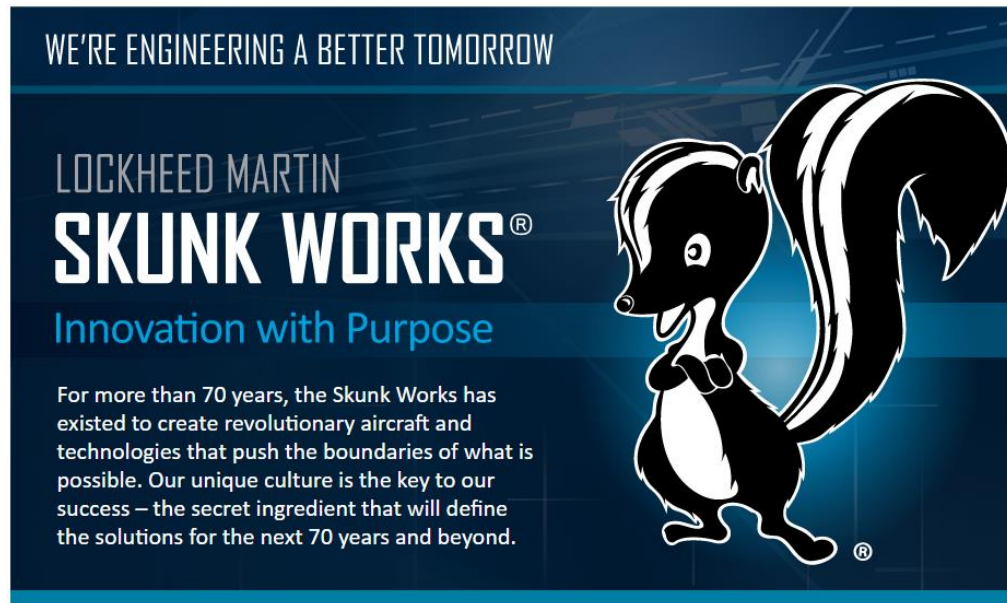
# Structural dimensions which influence innovation

- 1) Formalisation: The degree to which the company uses rules and procedures to structure the behavior of employees.

- 2) Standardisation: The degree to which company activities are performed in a uniform manner.

- 3) Centralisation:

    - Centralised authority: The degree to which decision-making authority is kept at top levels of the company
    - Centralised activities: The degree to which activities are performed at a central location
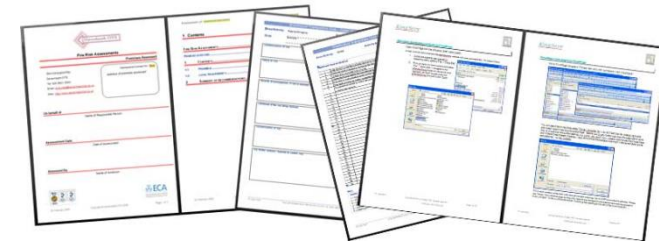
Source: Schilling (2013)

http://www.kingserv.org/design_examples.htm
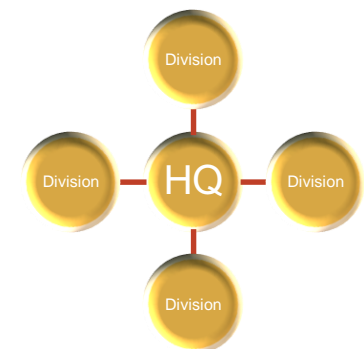
Mechanistic vs Organic Structures

- **Mechanistic Structures** have high formalisation and standardisation.
  - Good for operational efficiency, reliability.
  - Minimizes variation → may stifle creativity
- **Organic structures** have low formalisation and standardisation; described as "free flowing"
  - May encourage creativity and experimentation
  - May yield low consistency and reliability.

Combining the best of small and large companies

- Some divisions (e.g., R&D, new product lines) may be small and organic.
- Other divisions (e.g., manufacturing, mature product lines) may be larger and more mechanistic.
- Some organisations try to do both in different divisions:
  - Tushman and O'Reilly (1996) called this the "ambidextrous organisation"
- Can also alternate through different structures over time.
- Sometimes new product development can be quite independent of even the main R&D division (eg "skunk works")

One organisation – different cultures – Example: Apple

Photo: Apple

— 1980: Apple was producing the Apple II personal computer at reasonably high volumes for technical users

— Steve Jobs (CEO) wanted a new type of computer to be:

- Very intuitive to use
- Self-contained
- Usable by everyone, not just technical people

— Apple's Jeff Raskin had started developing a similar prototype

— The corporate structure wasn't appropriate for the new product:

- Apple's corporate environment had been structured for sound and efficient manufacturing
- Wanted new group to have different culture and more flexibility

— Jobs started new product development group specifically to develop Macintosh with renegade culture

https://www.quora.com/Apple-co-founder-Steve-Wozniak-once-said-in-an-interview-that-Steve-jobs-was-exaggerated-in-the-movie-Jobs-What-did-Steve-Jobs-actually-mean-to-Apple-and-what-products-could-his-name-take-credit-for
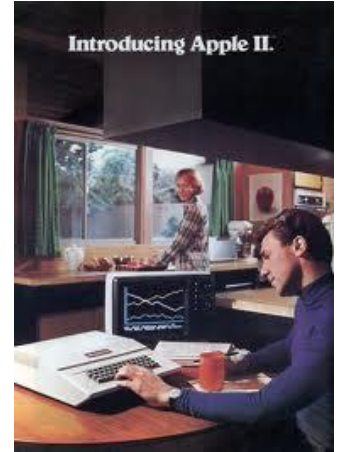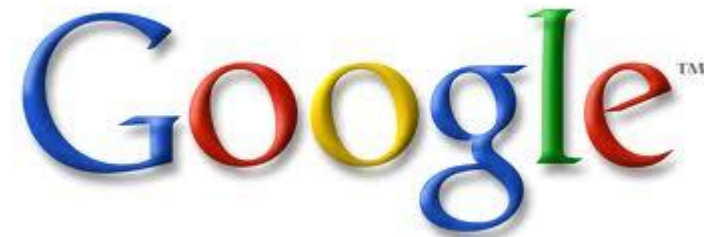
Keeping benefits of a small company in a large company – Example: Google

Sergey Brin and Larry Page
2 people

55,000 people (in Q1, 2015)
US$66b annual revenue (2014)

Keeping benefits of a small company in a large company – Example: Google

Eric Schmidt, Google CEO (until April 2011)

- "One of the things that we've tried very hard to avoid at Google is the sort of divisional structure and the business unit structure that prevents collaboration across units. It's difficult. So, I understand why people want to build business units, and have their presidents.

- But by doing that you cut down the informal ties that, in an open culture, drive so much collaboration. If people in the organization understand the values of the company, they should be able to self organize to work on the most interesting problems.

- And if they haven't, or are not able to do that, you haven't talked to them about what's important. You haven't built a shared value culture."

http://www.mckinseyquarterly.com/Googles_view_on_the_future_of_business_An_interview_with_CEO_Eric_Schmidt_2229

"20% time"

- "We encourage our employees, in addition to their regular projects, to spend 20% of their time working on what they think will most benefit Google. This empowers them to be more creative and innovative. Many of our significant advances have happened in this manner."

- Huge 20% products include the development Google News, Gmail, and even AdSense.

- Only about 10% of Googlers are using it, last time the company checked, but it doesn't really matter, as long as *the idea* of it exists, according to Google HR boss Laszlo Bock in his new book, "Work Rules!"

- "In some ways, the idea of 20 per cent time is more important than the reality of it," he writes. "It operates somewhat outside the lines of formal management oversight, and always will, because the most talented and creative people can't be forced to work."

http://www.businessinsider.com.au/google-20-percent-time-policy-2015-4?r=US&IR=T

Solve for X

– One of our most important principles is to run as fast as we can at all the hardest parts of a problem, and try to prove that something can't be done. We want to force ourselves to learn. We actively embrace failure: by making mistakes, we make progress. In this way, our ideas get stronger faster, or we discard them and move on to new ones.

https://www.solveforx.com/about

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Astro Teller:

The unexpected benefit of celebrating failure

TED2016 · 15:32 · **Filmed** Feb 2016

21 subtitle languages ?

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http://www.ted.com/talks/astro_teller_the_unexpected_benefit_of_celebrating_failure

Summary

- Culture for innovation
  - The importance of networked individuals for generating new ideas
  - The importance of "Making progress on meaningful work"
  - Effective management of people requires:
    - More focus on: stretch, self-discipline, support and trust
    - Less focus on: constraints, compliance, control and contract
- Structure for innovation
  - The structure of an organisation influences the ability to innovate
  - Some large companies find ways to have the advantages of small companies

INFO5992 Review

About this unit review

- List of topics covered in the unit at a very high level – you should understand all of these main topics!

- Don't assume that by reading this, you will pass the exam!
  - It is just a list of topics – refer to full lecture notes, readings, recommended readings, etc for the actual content
  - You can use this as a checklist – if you don't fully understand one of these topics, you will need to read notes/readings etc
  - Study among your friends!

- QA session

- Email to setup a time for group consultation

Week 1: IT Innovations – Introduction

Some questions the course will answer

What is technological innovation?

What different types of innovation are there?

Why do companies care about innovation?

Why do countries care about innovation?

How does innovation happen?

How do innovations spread?

How should established companies organise themselves to create innovations?

What makes some innovations successful and others not?

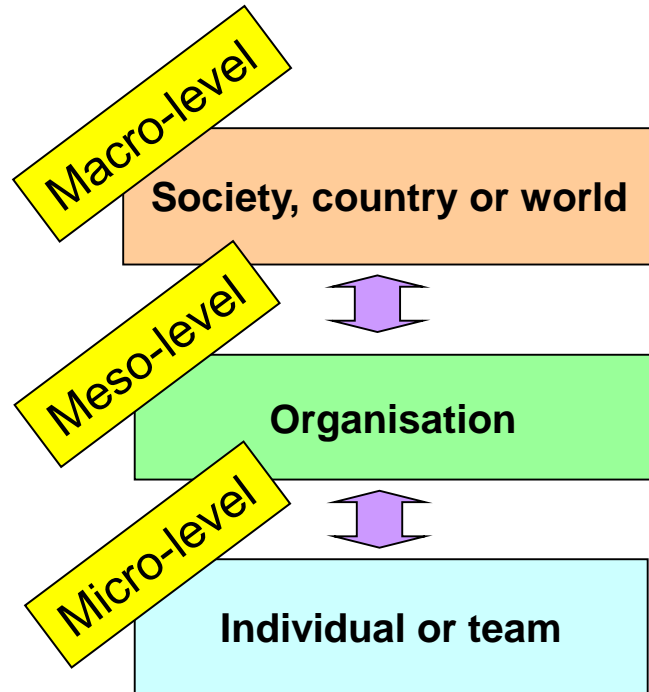How should my company know which innovations to adopt?

What jobs will still exist in the future?

How do I get a new idea for a startup company?

How do I get funding for my startup company?

And lots more!

Macro-, Meso- and Micro-level discussions

Macro-level

Society, country or world

Meso-level

Organisation

Micro-level

Individual or team

- How the **innovation system** works
- How technology cycles work
- Drawn mostly from economics and sociology

- How organisations can **adopt innovations**
- How organisations can **produce innovations**
- Drawn mostly from business studies, technology management and IT

- How individuals can **drive innovation**
- Drawn mostly from entrepreneurship and case studies

Relevance to IT careers

A. Enterprise IT

Understand IT innovations so you can analyse likely impact from new technologies and plan for their adoption

B. R&D of IT technologies

Understand IT innovations so you can lead the development of new technologies within an established organisation

C. IT start-up

Understand IT innovation so that you can create a software start-up company

A. Enterprise IT

B. R&D ⟷ **C. IT start-up**
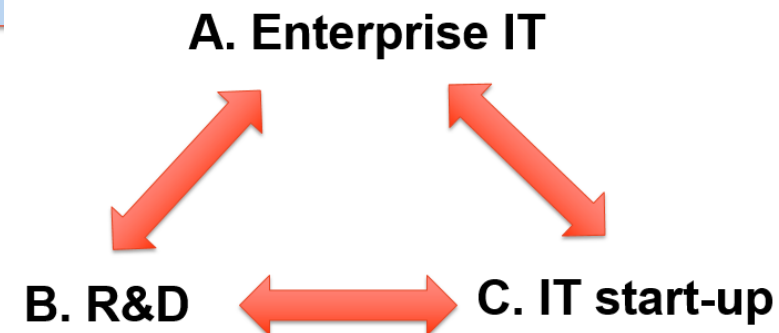
IT innovation ecosystem
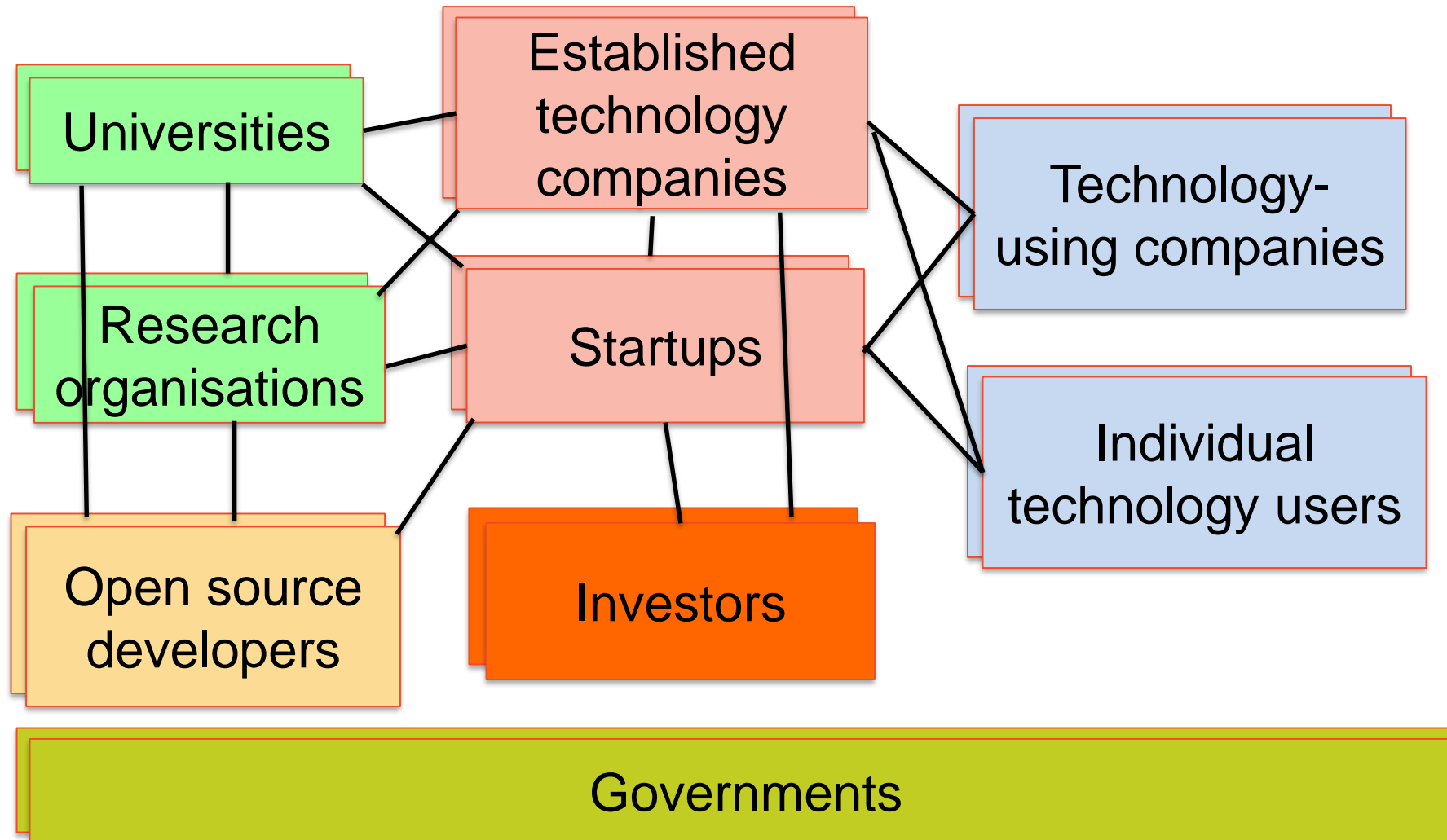
Introduction to technological innovation

- – Definition of innovation:
    - – Innovation involves idea + application of that idea ("ideas successfully applied")
    - – Innovation as creative destruction (Schumpeter)

Introduction to technological innovation

— The importance of innovation:

    — The importance of innovation to a country:

        • Innovation is a driver of productivity, growth, improvement in living conditions (health, education, reducing pollution etc.)

    — The importance of innovation to a company:

        • Innovative companies usually have greater productivity, revenue, growth and social contributions

— Innovation as "creative destruction"

— The importance of IT innovation:

    — IT as "general purpose technology"

    — IT as enabler of innovation in other fields (e.g. bio-informatics, logistics, automotive, …)

    — IT innovation as creative destruction

    — Why "software is eating the world"

Case Study: Importance of innovation to a Country

- Technological innovation:
  - Is often the most important competitive driver in many industries
  - Leads to improvements in productivity
  - Is strongly linked with improvements in Gross Domestic Product (GDP)
  - Is linked to improvements in standard of living including:
    - Job creation
    - Improved enjoyment of life
    - Health improvements
    - Education improvements
    - Addressing national or global issues including by:

Australian Innovation System Report 2016

WWW.INDUSTRY.GOV.AU/INNOVATIONREPORT

Innovation Cycle

New businesses bring new ideas into the market

Basic research and education

Identify opportunities or problems

Entrepreneurship and investment

Applied research, design and vocational training

Experimental development

Economic, social and environmental impact

Innovation Cycle

Foreign innovations enter the market

Business survival, growth and acquisition

Implementation and commercialisation

Less innovative, less productive businesses exit

Successful businesses offshore

Innovation disruption and/or imitation

Innovative goods, services, processes or methods

Source: Department of Industry, Innovation and Science (2016)

Week 2: Introduction to Technological Innovation

IT as enabling technology

- IT is a "General Purpose Technology" (GPT)
- Like electricity – it enables other technologies
- GPTs differ from other technologies and:
  - Are pervasive – spreading to most sectors
  - Continually improve in usefulness and lower in cost
  - Spawn innovation in other areas – making it easier to invent and produce new products or processes

Source: ITU, *Measuring ICT for Social and Economic Development*, 2006.
(based on Bresnahan and Trajtenberg, "General purpose technologies", 1995)

Environment and energy

Building and construction

Transport

Health

Education & training

Arts and recreation

Mining and resources

Agribusiness

E.g. Education & Training MOOC

Information and Communication Technology (ICT)
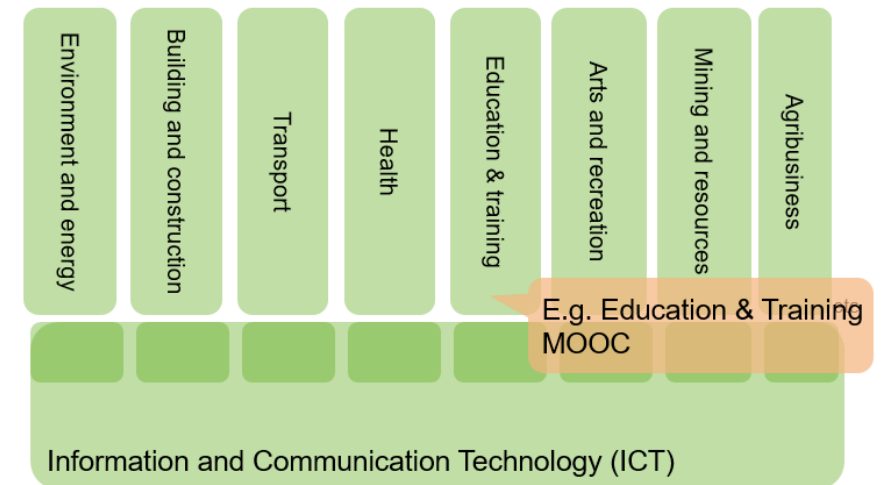
IT Innovation as Creative Destruction

- Examples:
  - Largest bookseller in world is a software company
    - (Amazon – while Borders went bankrupt)
  - Largest video service is a software company
    - (Netflix – while Blockbuster went bankrupt)
  - Dominant music companies are software companies
    - (Apple, Spotify, Pandora – traditional record companies exist to provide them with content)
  - Fastest growing game company is a software company
    - (Zynga who make Farmville)
  - Largest direct marketing company is a software company
    - (Google)

Types of Innovation

— Types of innovation according to different dimensions:
1. What type of thing is being innovated?
   Product/service innovation vs process innovation vs business model innovation
2. How different is it from what's already available?
   Radical vs incremental innovation
3. What impact will it have on the consumer?
   Life-changing vs incidental innovation
4. What impact will it have on the market or industry?
   Disruptive vs sustaining
5. What scope of the product/service/process does it affect?
   Architectural vs component innovation
6. What impact will the innovation have on the producers?
   Competence-enhancing vs competence-destroying innovation

Case Study and Tutorial1: MOOCS

- Identify the key enabling **IT technology innovations** used in MOOCS
- Peer-assessment for MOOCS is an area which needs further development **–** what are its challenges and emerging / existing solutions?
- What are the next major innovative technological breakthrough for MOOCS?
- Discuss the evolution of the education industry due to the introduction of MOOCS. You may apply 'Innovation System' concept into your discussion.

Week 3: Industry dynamics of Technological Innovation

Industry dynamics of innovation

- Diffusion and adoption of innovations:
  - A model for the diffusion of innovations (Rogers)
  - Categories of adopters (Rogers)
  - The "chasm" - between early adopters and the early majority (Moore)
  - The process of innovation adoption by individuals and organisations (Rogers)
  - Factors influencing speed of adoption (Rogers)
  - Technology adoption S-curves
  - Factors leading to lack of adoption

Household Penetration Rates for Various Technologies

Sources: U.S. Department of Commerce, Census Bureau, Consumer Electronics Association, National Cable and Telecommunications Association, Nielsen/NetRatings.

| Innovators 2.5 % | Early Adopters 13.5 % | Early Majority 34 % | Late Majority 34 % | Laggards 16 % |
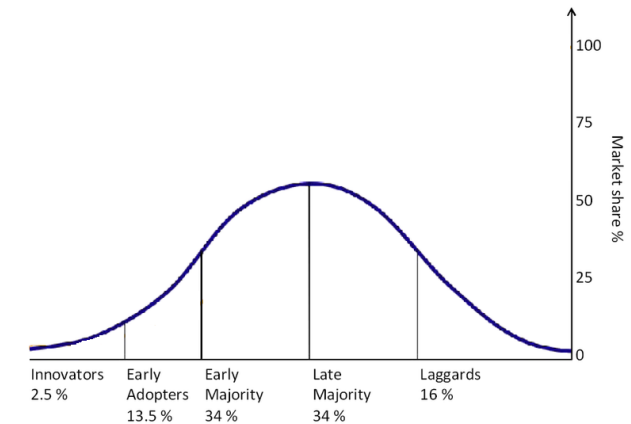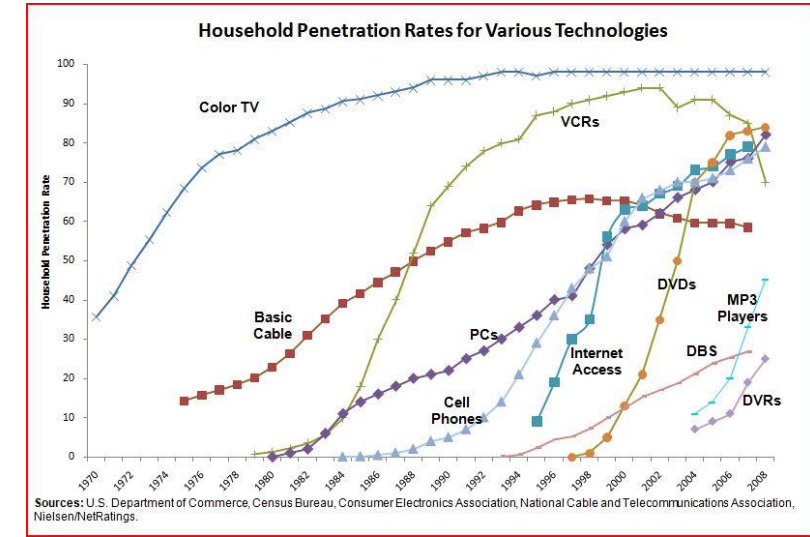
Product Category

- "A product category is all the products offering the same general functionality."

- A socially constructed partition of products that are perceived to be similar and in which firms choose to position their products
  - based roughly on an excerpt from the reading: "Perfect timing? Dominant category, dominant design, and the window of opportunity for firm entry"
  - http://onlinelibrary.wiley.com/doi/10.1002/smj.2225/full

Industry dynamics of innovation

- Design Dominance:
  - The concept of DD (Utterback & Abernathy)
  - The process by which DD happens (Utterback & Abernathy)
  - Phases of DD and technology cycles (Anderson & Tushman)
  - Standards for dominant designs
- Why dominant designs get selected in markets:
  - Learning effects
  - Network effects and its 4 types
  - Government regulations
- Frameworks for modelling design dominance
- First, Second, and Fast Second
  - waiting for the dominant design to begin to emerge and the moving to be part of it (that is, helping to create it)
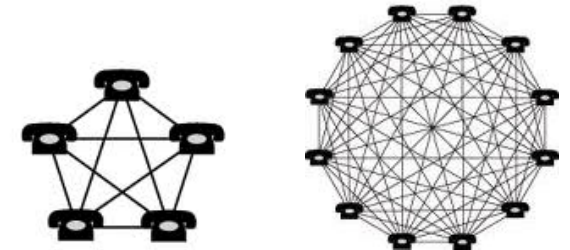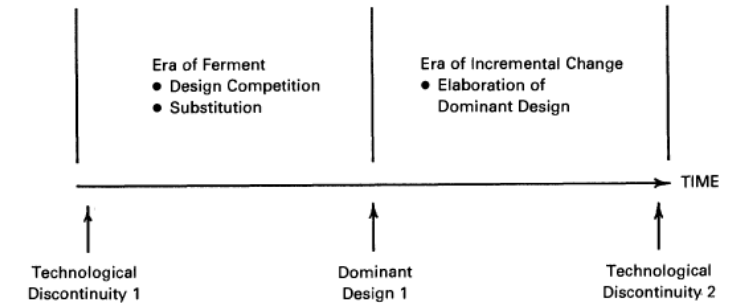
# Case Study and Tutorial2: Dominant Design in the Smartphone Market

- Android OS architecture is becoming the clear dominant design in the smartphone OS market. What are the main reasons that led to this design dominance?

- In the short article, Android's strategy for the VR is following similar principles to what made Android the dominant design. Do you think this strategy will become the dominant design in the VR space? You may think about this in the context of concepts learned in the class including 'architecture', 'standards', 'network effect' and 'self-reinforcing cycle'.

- In the short article on Windows 10, the author suggests "*Windows 10's Smartphone Failure Is Microsoft's Greatest Opportunity*". Do you agree with this comment? Can you answer in terms of the dominant design concepts above?

-

- In the long article, the conclusion made is that '*product differentiation still characterizes the competition among manufacturers and a dominant design has not yet emerged*'.
  - Do you agree with the assessment? What has changed since the paper was published in 2015?
  - If we continue to follow the concepts in the paper into the smartphone market of 2016, is there an emergence of a dominant design?
  - Does the article follow the design dominance technology cycle?

Week 4: Disruptive innovation

Industry dynamics of innovation

— Improvements in technological performance:

   — Technology performance S-curve
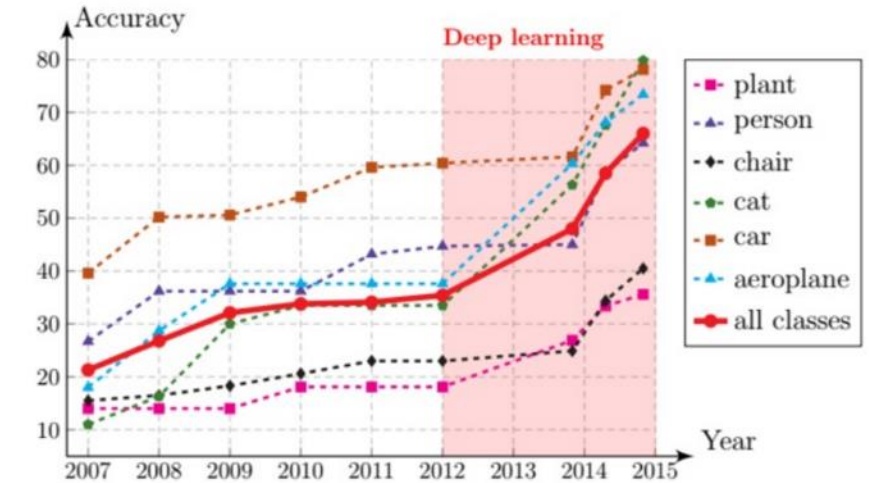
   — Relationships between technology adoption and technology performance improvement

— Modelling maturity and adoption of technolo

   — The Gartner "Hype-cycle"
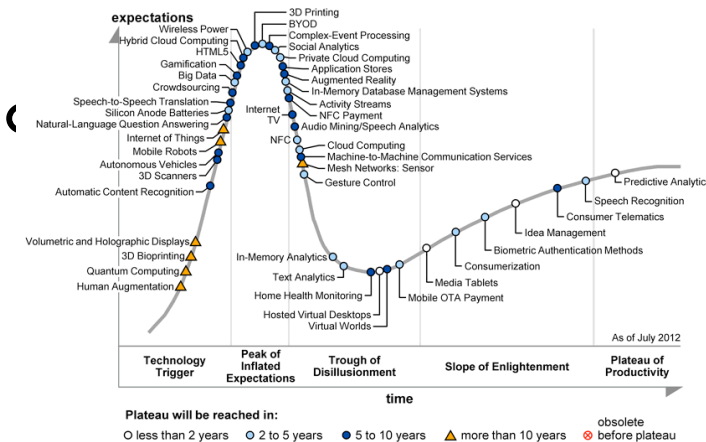
Disruptive innovation

- create new markets or change the **value network** in an existing market
- Industry value chains and value networks
  - What are they?
  - Analysing a value network
- Disrupting value networks
  - disintermediation, reintermediation, ignoring
- The relevance of disruptive innovation to established companies and to startups
- Typical results of the disruption of a market (eg changing the value network, types of companies, etc)
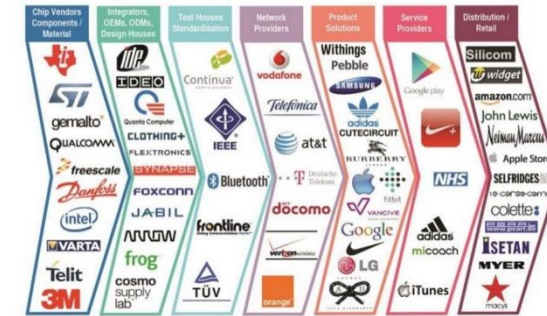
Use of Value Chains/Networks

– Analysing value chains/systems/networks is useful for:

– Understanding an industry (including relationships between companies)

– Understanding your company's position within the market

– Deciding where your company wants to be within that market

– Looking for opportunities for disruptive innovations
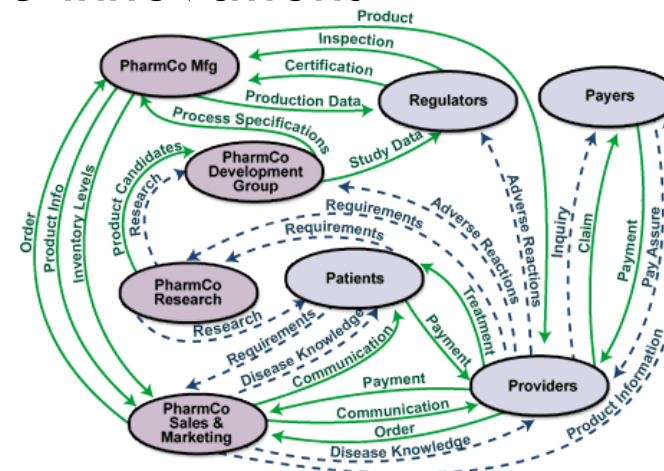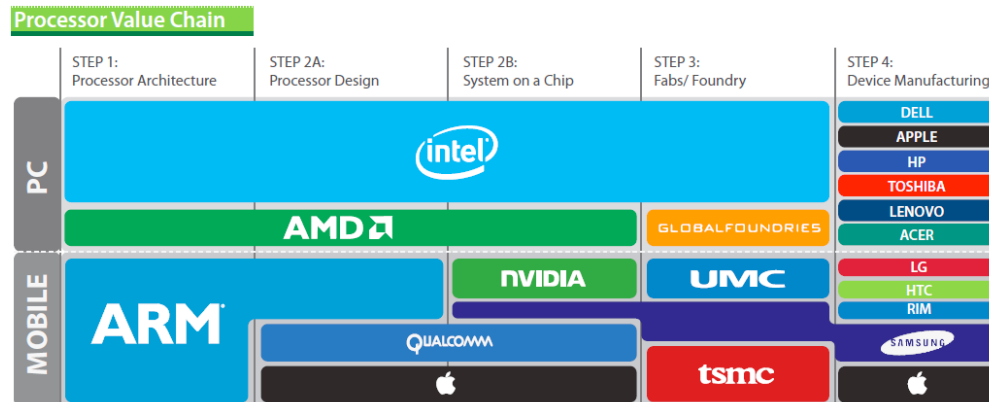
Source of figure: Verna Allee

Disruptive innovation

— Disruptive innovations create new markets or change the value systems within existing markets

— "The innovator's dilemma" (Christensen)

— Sustaining innovation vs disruptive innovation

— Low-end disruption and new-market disruption

— Other types of disruptive innovation

— Examples of disruptive innovation

The disruptive innovation model
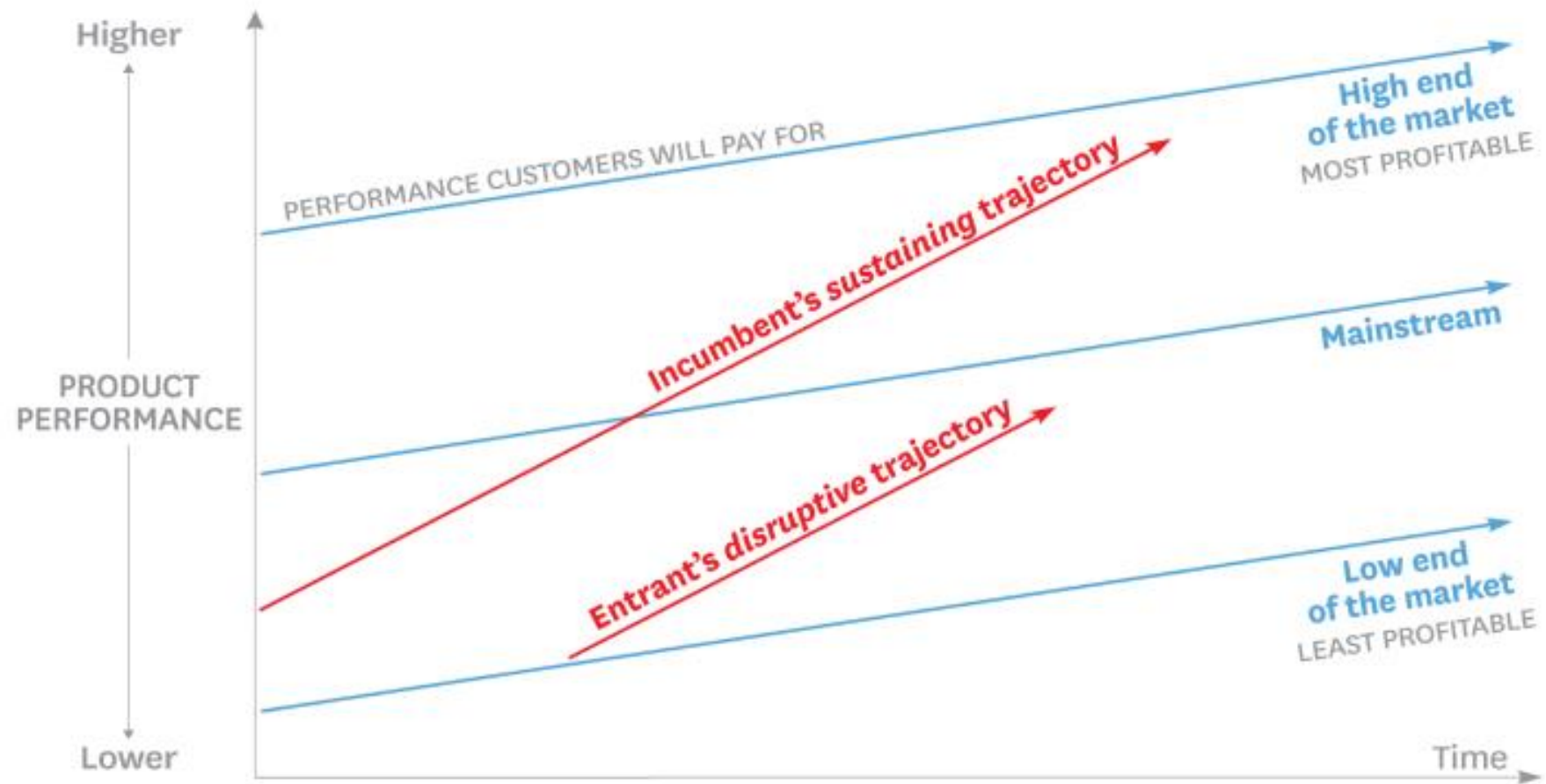
Higher

PERFORMANCE CUSTOMERS WILL PAY FOR

High end
of the market
MOST PROFITABLE

Incumbent's sustaining trajectory

PRODUCT
PERFORMANCE

Mainstream

Entrant's disruptive trajectory

Low end
of the market
LEAST PROFITABLE

Lower

Time

Disruptive innovation?

— Bitcoin bypasses traditional banks and clearinghouses with **blockchain** technology.

— Coursera and edX, among others, threaten business schools with **massive open online courses** (MOOCs).

— Tencent outcompetes in Internet services through microtransactions.
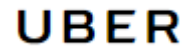
— Uber sidesteps the license system that protects taxicab franchises in cities around the world.

— AirBNB is also redefining the industry as it sidesteps regulatory system of the hotel industry and introduce social aspect of consumerism.

— Netflix destroyed the movie rental industry by providing new distribution business model to customers

Tutorial 3: Cognitive Services – A Disruptive Innovation?

— Pick one of the above services. Can you describe the underlying technology and how it is used to provide the service? Can you identify how existing companies that are using the technology? There are some example companies in https://www.microsoft.com/cognitive-services/en-us/applications Do you think the technology already is, or can lead to, a disruptive innovation?

—

— Pick another service. Can you think of a new business model using the service (technology)? Does it have the attributes to be a disruptive innovation? Answer this in terms of

  — Does it gain a foothold in a low-end market that has been ignored in favour of more profitable customers?

  — Does it create an entirely new market, turning non-customers into customers?

  — Does it begin with low-quality offerings, then eventually captures the mainstream market by improving quality?

—

— Pick another service. This time, consider the features and usability of the APIs. Microsoft is trying to produce an API that is easy to use to build your business. Do you think it will be easy to use the service and innovate with it for a new business? If you think the API of MS cognitive service is a Disruptive Innovation?

Week 5 and 6: Distributed innovation

Innovation systems and distributed innovation

– Innovation system models:

    – Parties involved, framework conditions, government policy

– Innovation eco-system
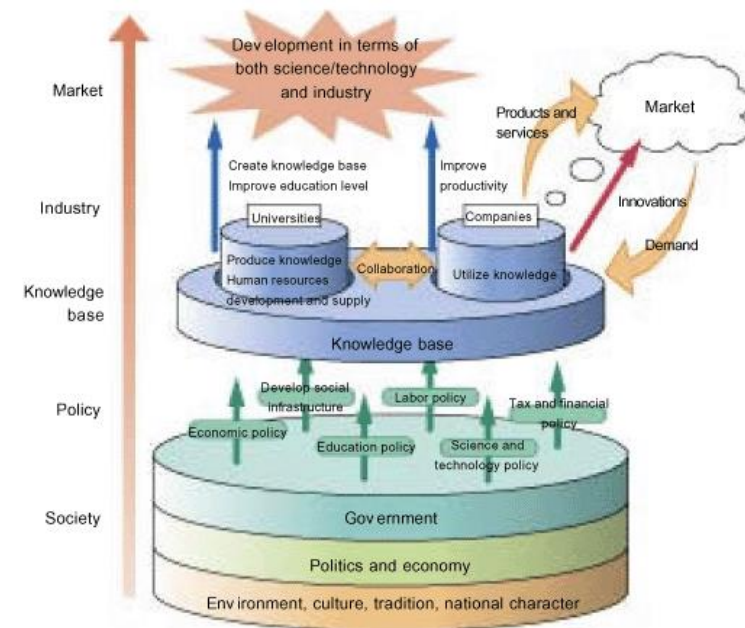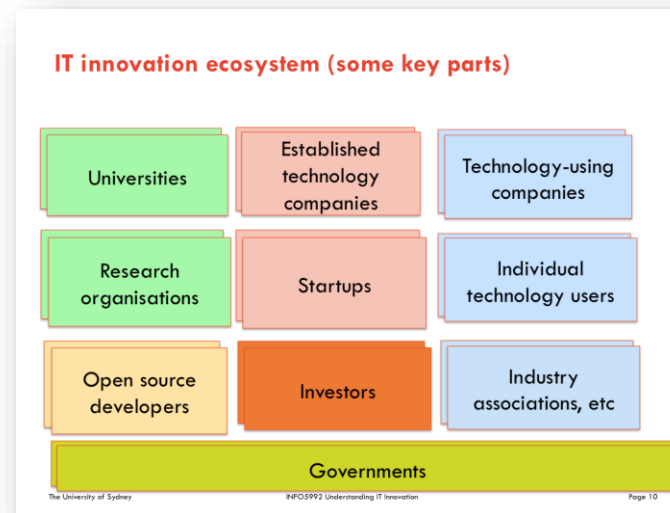
Innovation systems and distributed innovation

– Joy's Law – "Most of the bright people don't work for you -- no matter who you are. [So] you need a strategy that allows for innovation occurring elsewhere"

– Distributed innovation - "a system in which innovation emanates not only from the manufacturer of a product but from many sources including users and rivals"

– Open innovation:

  – What is open innovation?

  – Types of open innovation

  – Benefits of open innovation

  – Risks of open innovation

  – New approaches to open innovation

  – Balancing internal and external innovation
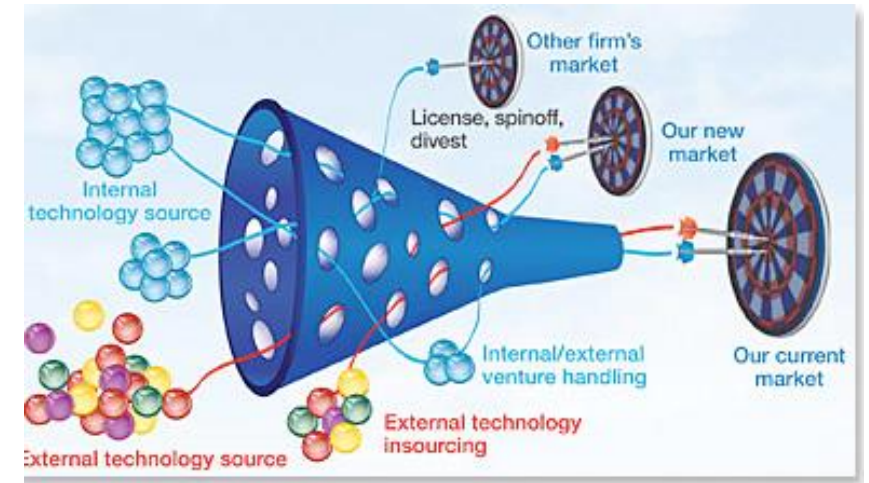
Definition of "Open Innovation"

— "the use of purposive inflows and outflows of knowledge to accelerate internal innovation and expand the markets for external use of innovation" (Chesbrough, 2006)

— Revised definition: "a distributed innovation process based on purposively managed knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organization's business model" (Chesbrough and Bogers, 2014)

Innovation systems and distributed innovation

— Approaches for involving others in innovation:
  — Product platforms
    • Benefits of product platforms to companies
  — Web APIs
    • The growing importance of Web APIs
  — Releasing data sets
  — Crowdsourcing innovation:
    • Why companies do it
    • Why individuals contribute
    • Types of crowdsourcing
  — Platform ecosystems
  — User innovation
  — Free and open source software
  — Accelerators, investment and others

Case Studies – lots of examples

- Kaggle
- Philips
- GE Open Innovation
- Samsung
- Cisco
- etc

User innovation and free/open source software

- Different modes of innovation: Who is doing the innovation?
    - Producer innovation vs user innovation vs open collaborative innovation
- User innovation
    - Why users innovate
    - The importance of user innovation in IT innovation
    - Examples of user innovation
- Lead users
    - Characteristics of lead users
    - Difference between lead users and typic
    - Why companies engage with lead users

Lead users

1986 journal article in *Management Science*
"Lead Users: A Source of Novel Product Concepts"

Lead users

Innovators 2.5 %	Early Adopters 13.5 %	Early Majority 34 %	Late Majority 34 %	Laggards 16 %

Market share %

100
75
50
25
0
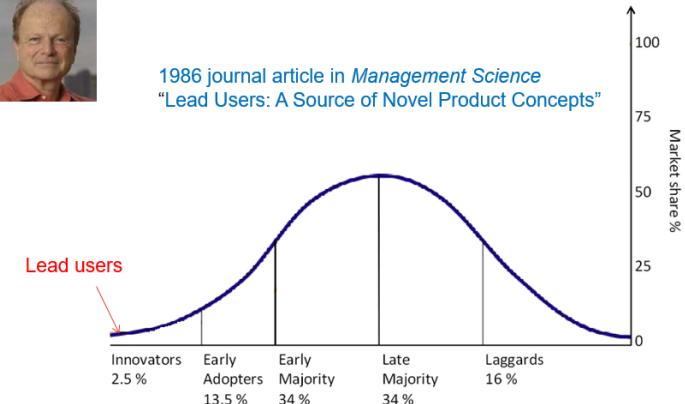
User innovation and free/open source software

– Importance of free and open source software in innovation:

   – In enterprise IT

   – In startups

– Free and open source licences

   – Permissive vs restrictive

– Open source business models

   – Types of business models

   – Example of successful business models using open source software

– Managing the use of free and open source software

   – Challenges, tools, etc.

When creating open source software:
How do you know what licence to use?

Permissive licences:
Changes need not be made available

Restrictive (copyleft) licences:
Changes must be made available

| Public domain | MIT | BSD | Apache Software License | GPLv2 | GPLv3 | AGPL | SleepyCat |

If:
• You want a lot of companies to adopt your software in their products/services, and
• You don't care if they make their changes available (eg as you just want the code to be used or you have deep enough knowledge & expertise that they will come back to you):
=> use a permissive licence (eg BSD, Apache)

If:
• You want to ensure that companies (using your software in their products) make their changes available (so you and others can get them):
=>use a restrictive licence (eg GPLv3)

Case Study and Tute 4

– What is the **Distributed Innovation concept(s)** employed by mapping API companies?

– Comparing the OpenStreetMap to others, they embrace 'user innovation' and 'crowdsourcing innovation' as their core differentiator.

– The Map API has created an extensive and powerful Value Network. In our case study today, we learned about several companies based upon the freely available OpenStreetMap. Can you add more examples to the Value Network (services, categories of services etc)

Week 7: Platform Ecosystem

Platform Economy Fundamentals

– **Platform businesses bring together producers and consumers in high-value exchanges.** Their chief assets are information and interactions, which together are also the source of the value they create and their competitive advantage.

– Importance of Network Effects, and their types

– Importance of 'self-reinforcing' cycle

– Modularity

– Product Platform

– Platform business

– Platform types e.g., Aggregation, Social, Mobilization, Learning

Main players in a platform ecosystem

The Players in a Platform Ecosystem

A platform provides the infrastructure and rules for a marketplace that brings together producers and consumers. The players in the ecosystem fill four main roles but may shift rapidly from one role to another. Understanding the relationships both within and outside the ecosystem is central to platform strategy.

PRODUCERS

CONSUMERS

Creators of the platform's offerings (for example, apps on android)

Value and data exchange and feedback

Buyers or users of the offerings

Interfaces for the platform (mobile devices are providers on Android)

PROVIDERS

OWNER

PLATFORM

Controller of platform IP and arbiter of who may participate and in what ways (Google owns Android)
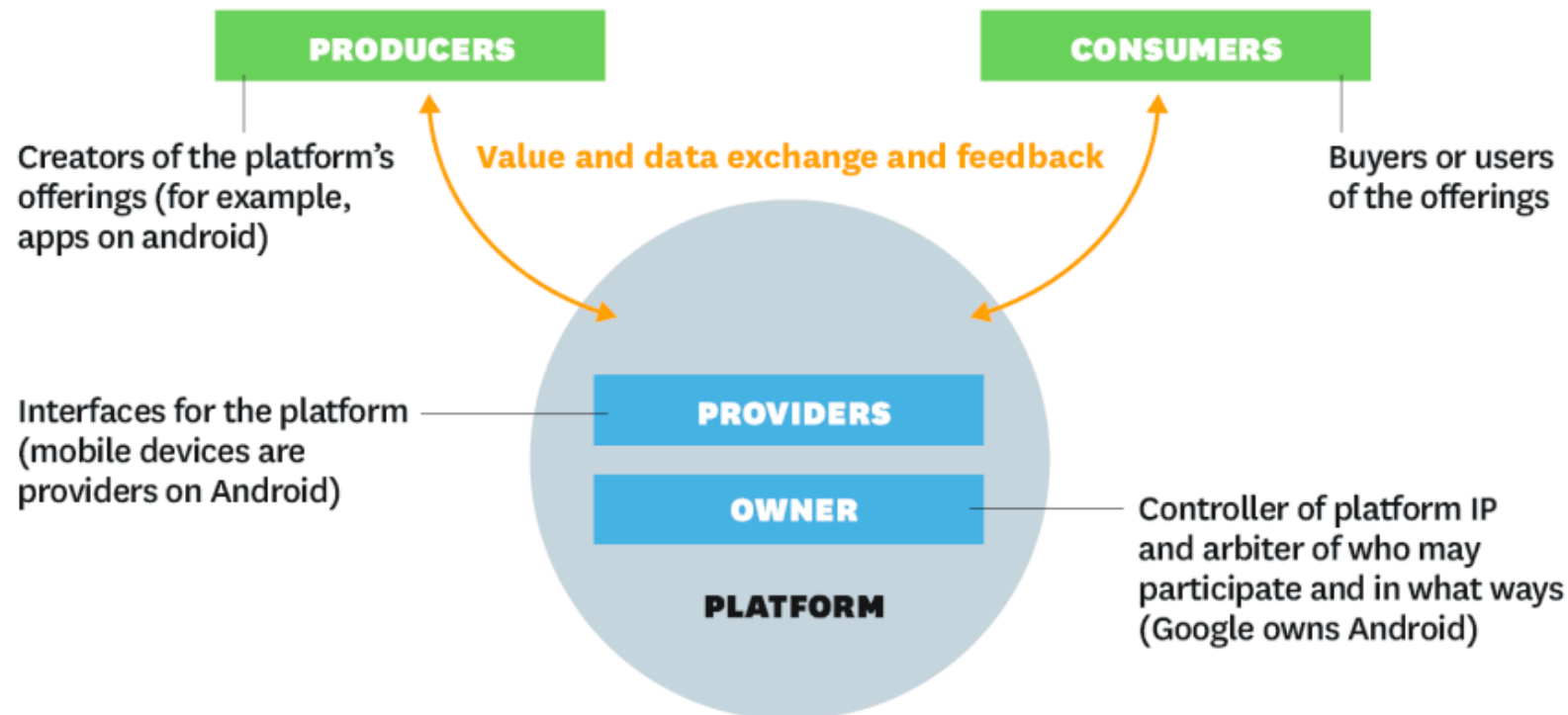
SOURCE MARSHALL W. VAN ALSTYNE, GEOFFREY G. PARKER, AND SANGEET PAUL CHOUDARY FROM "PIPELINES, PLATFORMS, AND THE NEW RULES OF STRATEGY," APRIL 2016

© HBR.ORG

Case Studies – Can you Map the examples to Platform economy type?

— Google

— Apple – e.g., iTunes

— Microsoft – e.g., OS, App store

— Amazon

— IBM – e.g., Watson

— eBay

— Samsung

— Oracle

— SAP

— …

— Producer, Consumer, Provider, Owner

— Aggregate, Social, Mobilise

— How about To Distributed innovation ?

— Product platforms, Web APIs, Crowdsourcing innovation / Crowdfunding Innovation, Releasing data sets "Open data", Free and Open Source Software, User innovation
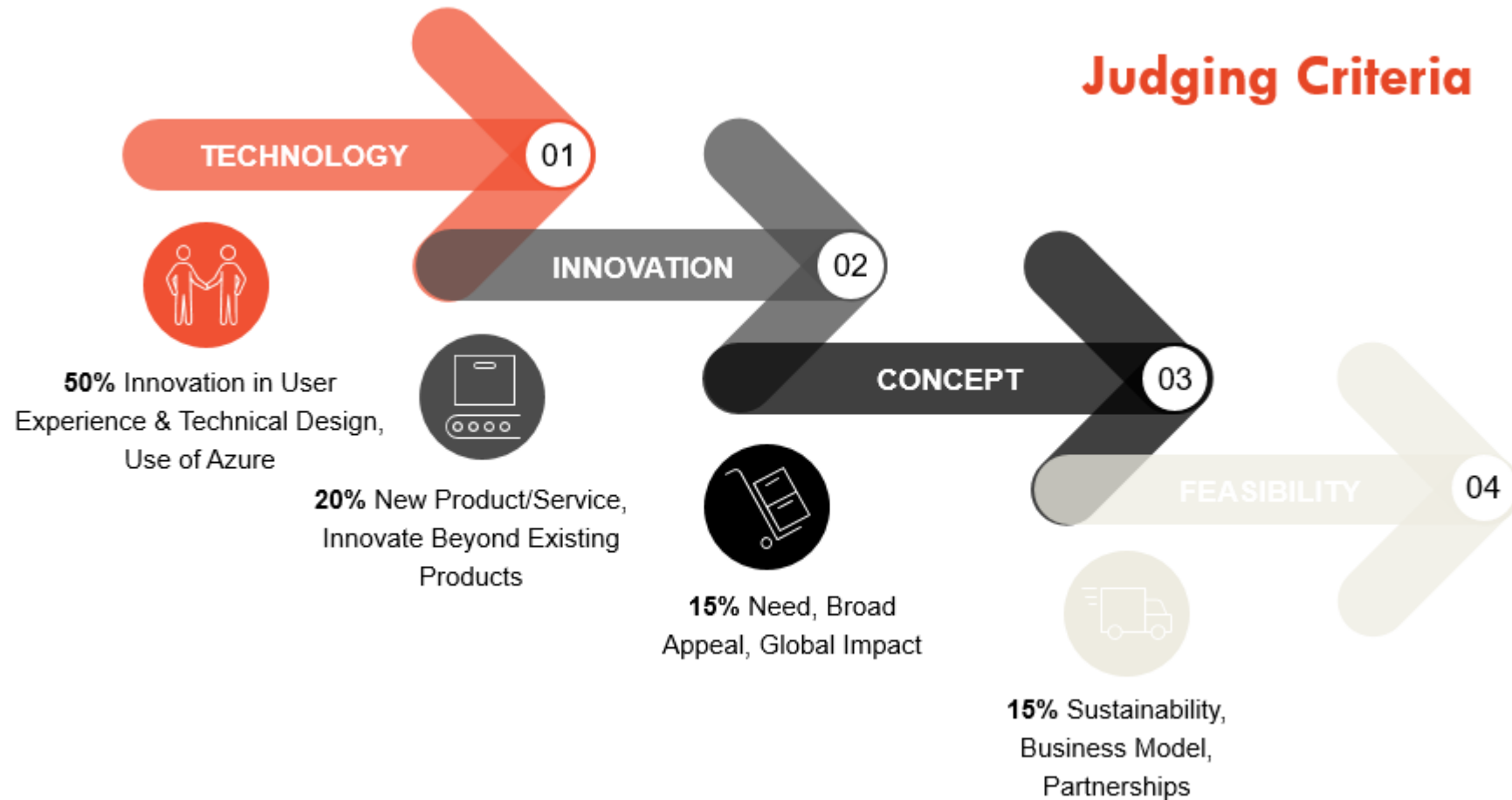
Week 7 to 10 : Student Presentations

Presentation Schedule and Peer Review

Group	Presentation Topic	Presentation Order	Presentation Week	Peer Assessment 1	Peer Assessment 2	Peer Assessment 3	Peer Assessment 4	Peer Assessment 5
Group 14		1	7	Group 22	Group 17	Group 3	Group 18	Group 13
Group 22	Augmented/Virtual/Mixed Reality	2	7	Group 14	Group 16	Group 10	Group 23	Group 12
Group 6	Commercial Drones/Autonomous Driving	3	7	Group 22	Group 5	Group 15	Group 11	Group 9
Group 17	Commercial Drones/Autonomous Driving	4	8	Group 6	Group 19	Group 8	Group 20	Group 4
Group 18	Virtual Reality (VR)	5	8	Group 14	Group 21	Group 7	Group 17	Group 3
Group 16	Smart Home	6	8	Group 22	Group 18	Group 13	Group 16	Group 10
Group 23	IoT Platforms	7	8	Group 6	Group 5	Group 12	Group 23	Group 15
Group 5	Sharing Economy	8	8	Group 14	Group 11	Group 9	Group 19	Group 8
Group 11	3D/4D Printing	9	8	Group 22	Group 20	Group 4	Group 21	Group 7
Group 19	Human	10	8	Group 6	Group 17	Group 3	Group 18	Group 13
Group 20	Multi-modal Interation: Gesture/Speech/Brain Control	11	8	Group 14	Group 16	Group 10	Group 23	Group 12
Group 21	Cognitive Services	12	8	Group 22	Group 5	Group 15	Group 11	Group 9
Group 3	3D/4D Printing	13	9	Group 6	Group 19	Group 8	Group 20	Group 4
Group 13	IoT Platforms	14	9	Group 14	Group 21	Group 7	Group 17	Group 3
Group 10	Virtual Assistant	15	9	Group 22	Group 18	Group 13	Group 16	Group 12
Group 12	Internet.org	16	9	Group 6	Group 5	Group 10	Group 23	Group 15
Group 15	Sharing Economy	17	9	Group 14	Group 11	Group 9	Group 19	Group 8
Group 9	Cognitive Services	18	9	Group 22	Group 20	Group 4	Group 21	Group 7
Group 8	Quantum Computing	19	9	Group 6	Group 17	Group 3	Group 18	Group 13
Group 4	Big Data	20	9	Group 14	Group 16	Group 10	Group 23	Group 12
Group 7	Personal Analytics	21	9	Group 22	Group 5	Group 15	Group 11	Group 9

Week 10 : Judging Innovations

Importance of the Selection Criteria

Judging Criteria

TECHNOLOGY 01

INNOVATION 02

CONCEPT 03

FEASIBILITY 04

50% Innovation in User Experience & Technical Design, Use of Azure

20% New Product/Service, Innovate Beyond Existing Products

15% Need, Broad Appeal, Global Impact

15% Sustainability, Business Model, Partnerships

The University of Sydney   https://blogs.msdn.microsoft.com/uk_faculty_connection/2016/11/30/ microsoft-imagine-cup-2017-starter-pack-get-your-teams-ready/   Page 17
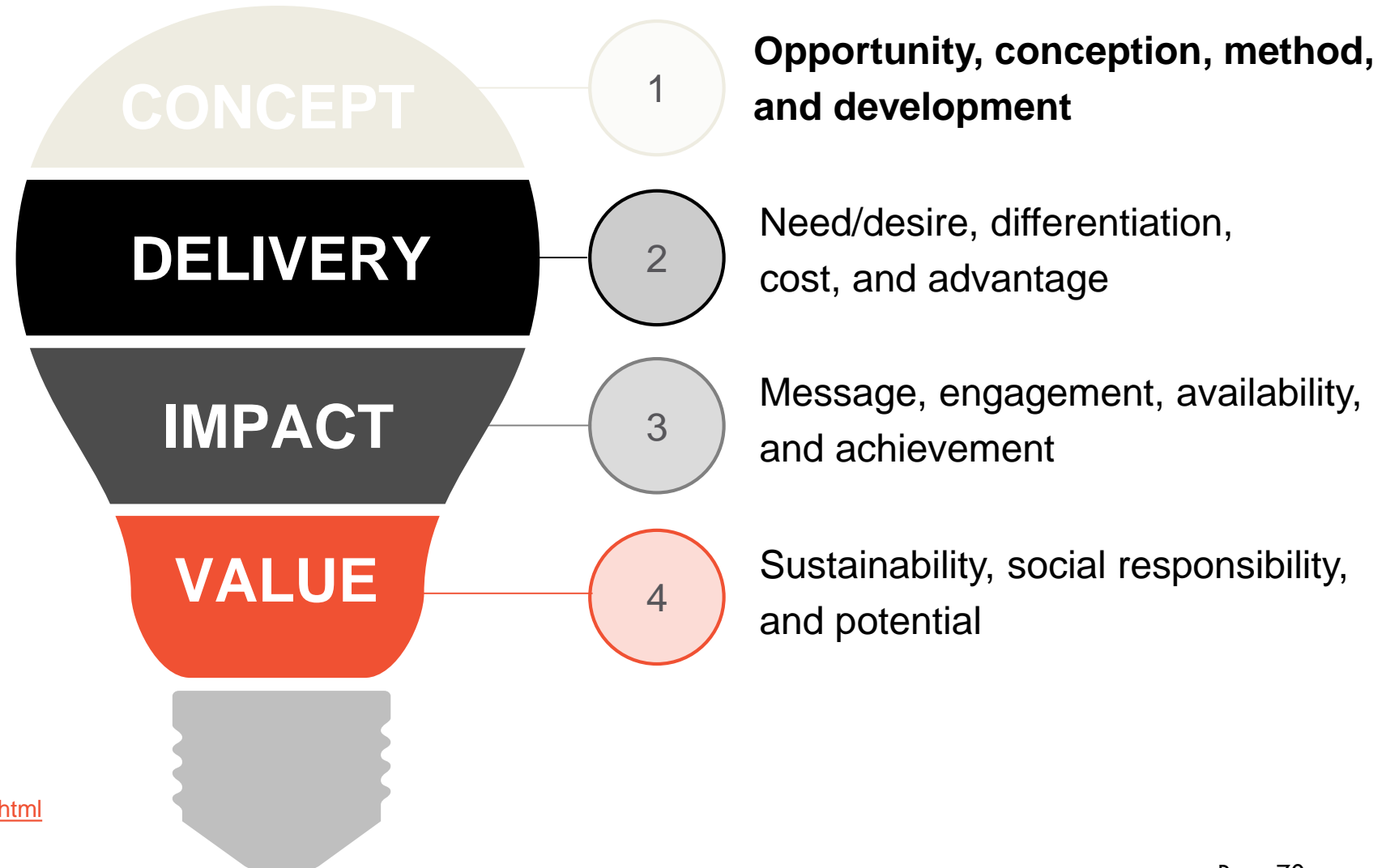
Judging IT Innovation

" Innovations that not only address a need and solve a problem but also seize an opportunity and create a new market or industry. "

" The immediate and longer term impact the innovation has on the environment and society as a whole is important. "
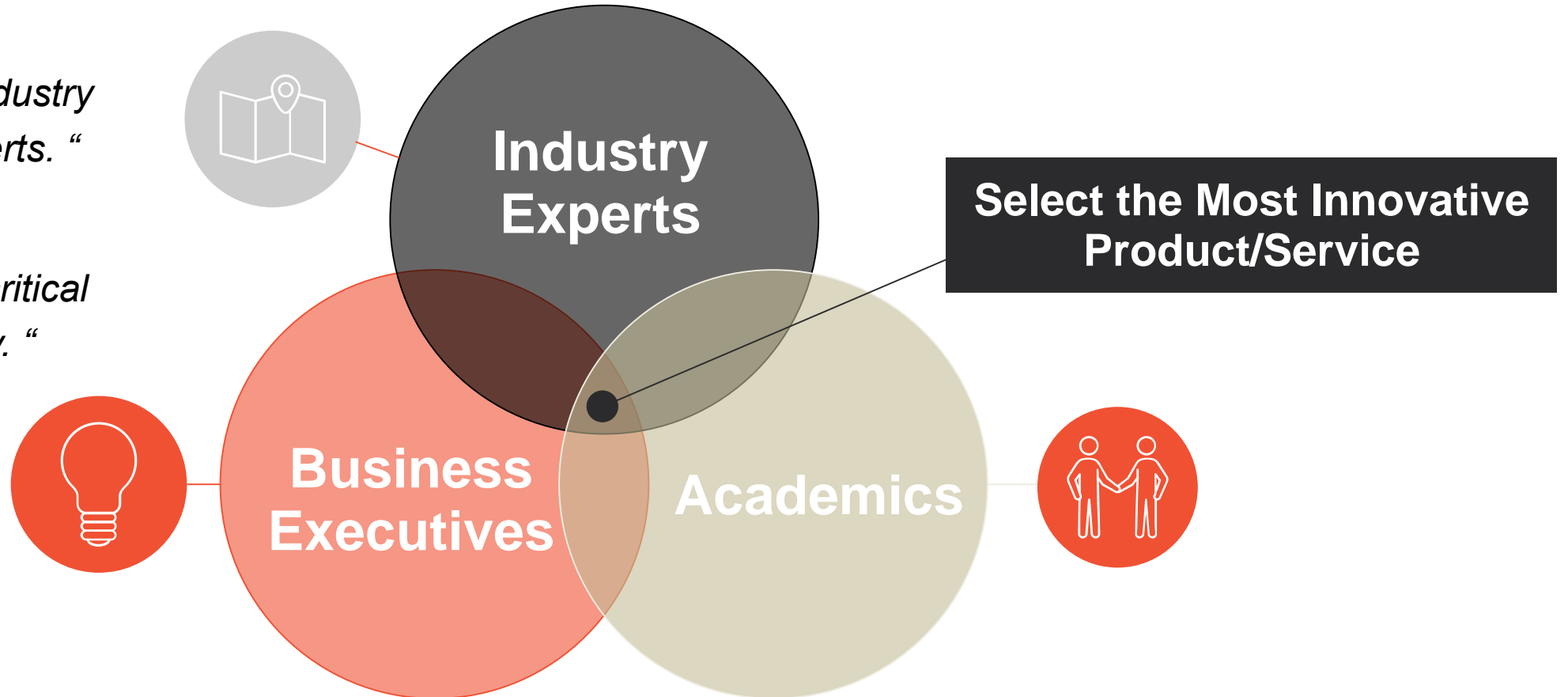
http://www.edisonawards.com/criteria.php
http://bigideas.berkeley.edu/toolkit-judging/
http://innovationinaction.umich.edu/competition/criteria.html

CONCEPT

DELIVERY

IMPACT

VALUE

1 — **Opportunity, conception, method, and development**

2 — Need/desire, differentiation, cost, and advantage

3 — Message, engagement, availability, and achievement

4 — Sustainability, social responsibility, and potential

Judging Panel

" *Diverse pool of industry and academic experts.* "

" *Judge training is critical to ensure uniformity.* "

Industry Experts

Select the Most Innovative Product/Service

Business Executives

Academics

http://www.ces.tech/Events-Programs/Innovation-Awards/Meet-the-Judges
http://bigideas.berkeley.edu/toolkit-judging/
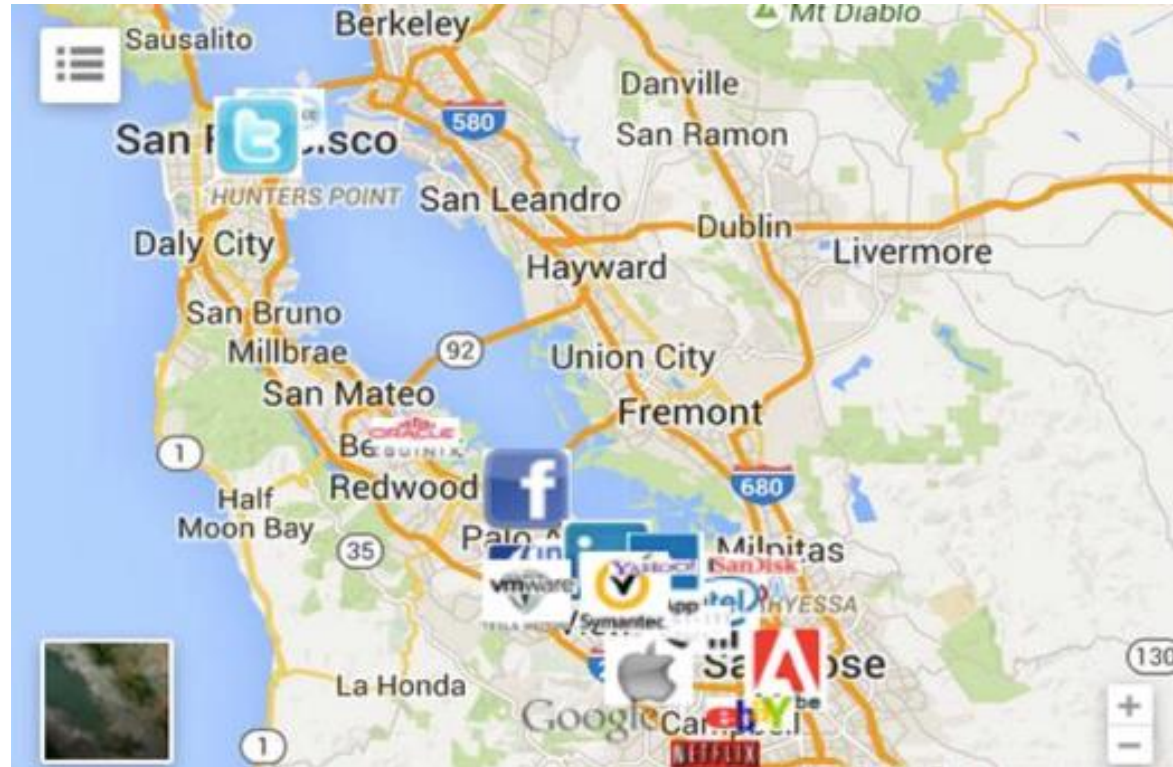http://www.edisonawards.com/criteria.php

Week 11: Innovation Ecosystem

Guest Lecture: Mr Bill Simpson-Young

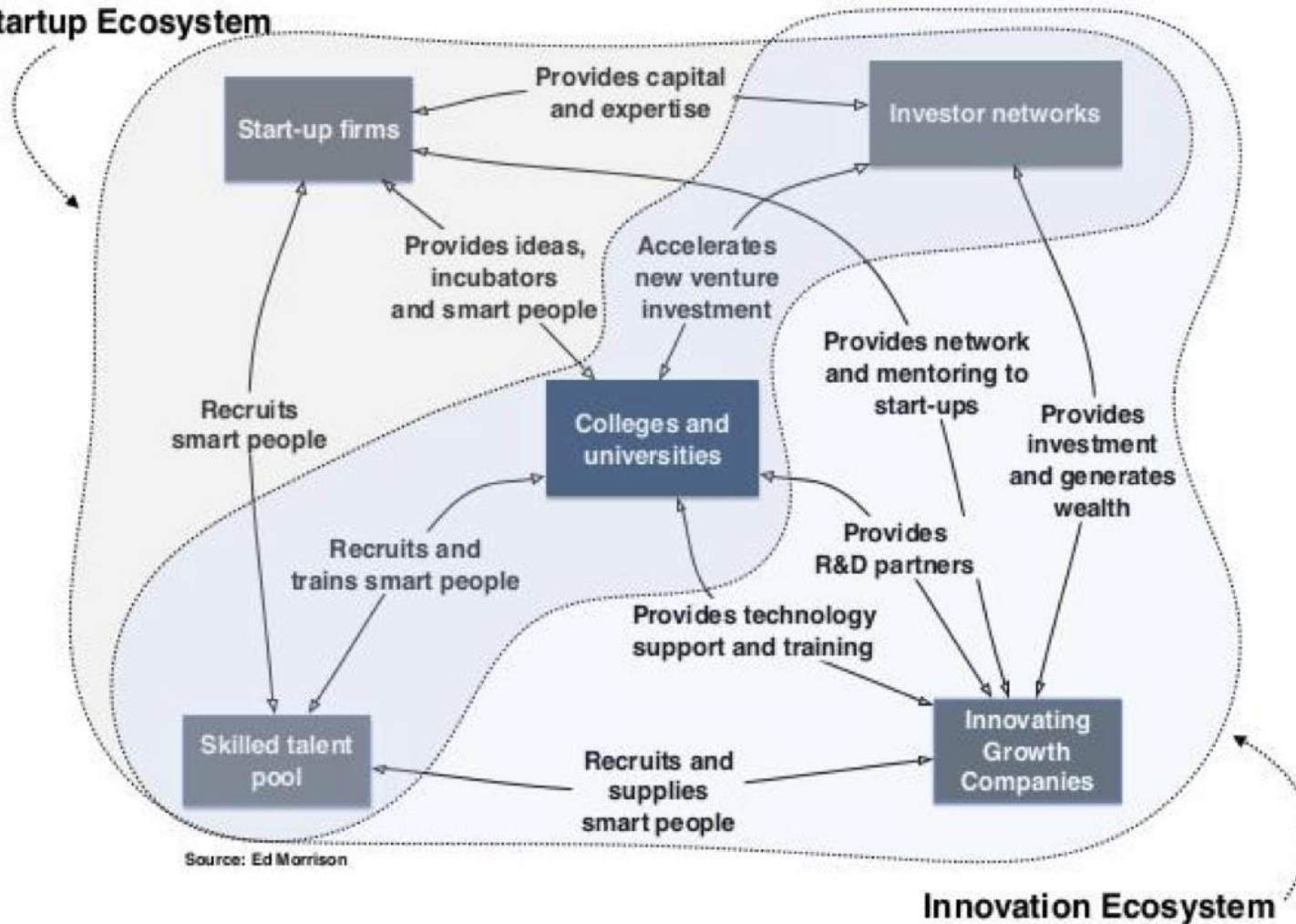# Innovation ecosystems

– Why Silicon Valley is so successful

– Sydney's innovation ecosystem

ICT Ecosystems – key elements

- Knowledge: Universities, research institutes and people, training

- Financial: Venture capital, angel funding, Govt grants,

- Legal: IP management, legal advice, copyright, registration etc.

- Advice: Team formation, mentorship, knowing where to go for the best advice

- Culture: Freedom to pursue new ideas; bringing together good ideas people, designers (product, service or UX), developers, thinkers, marketers, business managers
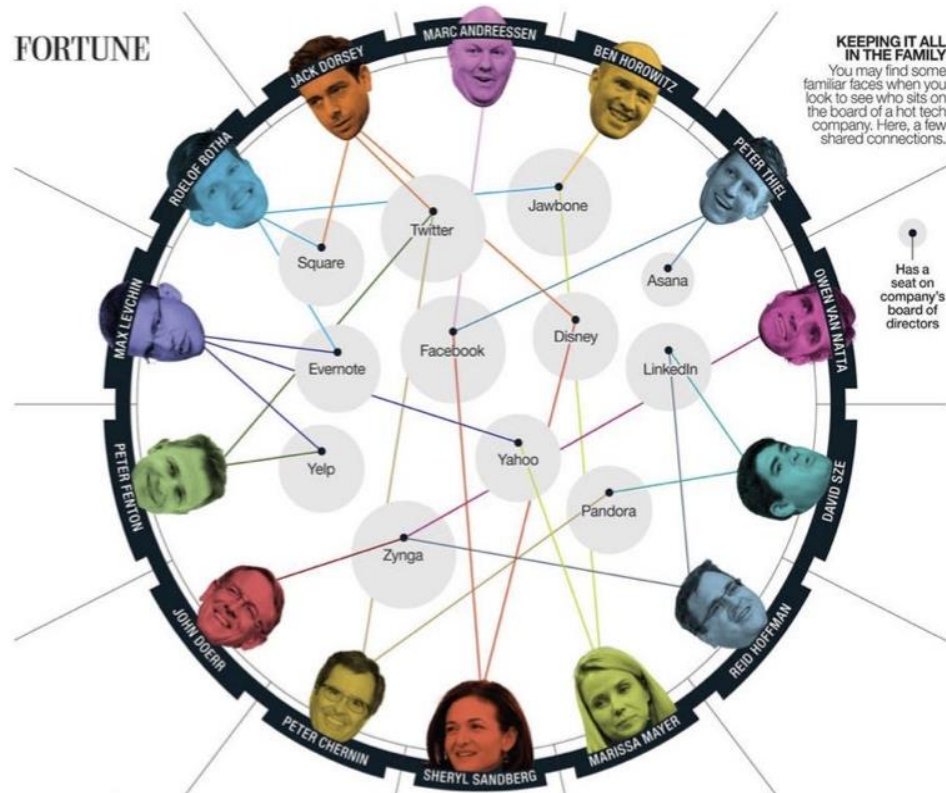
Universities Operate Within Ecosystems

Startup Ecosystem

Start-up firms

Provides capital and expertise

Investor networks

Provides ideas, incubators and smart people

Accelerates new venture investment

Provides network and mentoring to start-ups

Provides investment and generates wealth

Recruits smart people

Colleges and universities

Recruits and trains smart people

Provides R&D partners

Provides technology support and training

Skilled talent pool

Recruits and supplies smart people

Innovating Growth Companies

Source: Ed Morrison

Innovation Ecosystem

http://www.slideshare.net/edpro/strengthening-purdues-innovation-ecosystem

Social Capital

FORTUNE

KEEPING IT ALL IN THE FAMILY
You may find some familiar faces when you look to see who sits on the board of a hot tech company. Here, a few shared connections.

Has a seat on company's board of directors

"Some call it an ecosystem; others call it incestuous. In Silicon Valley every prominent player is just an adviser, an investor, a co-founder, an acquirer, or a director away from another. It's an industry worth trillions that operates like a small town."

http://fortune.com/2014/03/20/silicon-valleys-single-degree-of-separation/

Some of Sydney's innovation ecosystem

- Co-working spaces: eg Fishburners, BlueChilli, Stone & Chalk

- Accelerators: eg Incubate, Startmate, ON

- Tech business incubators: eg ATP Innovations

- Government programs: eg R&D Tax Incentives

- Universities

- Government-funded research organisations: eg CSIRO (including Data61)

- Established companies doing software/hardware development (Atlassian, Google, Canon, Optiver, Dolby, Freelancer, Canva, etc)

- Hacker spaces, etc

Case Study and Tutorial 5: Sharing Economy

01 Sharing Economy is a socio-economic system built around the sharing of human and physical resources.

02 It includes the shared creation, production, distribution, trade and consumption of goods and services by different people and organisations.

03 To get here we needed companies like eBay, Paypal, Amazon, and Facebook

04 While these companies are here to stay, new rules surrounding how they operate are already changing the way they operate.

86% agree it makes life more affordable

83% agree it makes life more convenient and efficient

76% agree it's better for the environment

89% agree it is based upon trust between providers and users

63% agree it is more fun than engaging with traditional companies

78% agree it builds a stronger community

Case Study and Tutorial 5: Sharing Economy

- What are the IT technologies that are enabling sharing economy platforms?

- Would you consider companies adopting 'sharing economy' platform to be following the concepts of disruptive innovation?

- It is no coincidence that top IT companies are formed in SF – could you suggest few reasons from what we learned in the class today?

- There are several weaknesses identified for sharing economy companies. What are they? In particular, why is it suggested that many 'web startups are easy to launch but many will not survive once their funding runs out' [1]?

- Does sharing economy concept adopt open innovation? Can you identify open innovation approaches to engaging external users in the innovation?
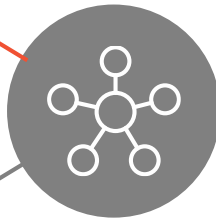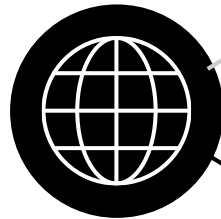
BENEFITS OF SHARING ECONOMY
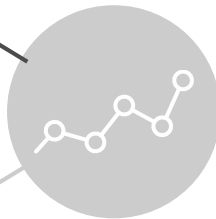
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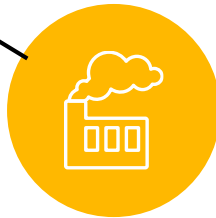
78% agree it builds a stronger community

Week 12: Innovation by startup companies

Week 12:

Innovation by start-up companies

— The importance of the entrepreneur
— Definitions of startups (e.g. from Steve Blank, Eric Reis)
— How to get startup ideas (Paul Graham)
— Why traditional product processes are not suitable for startups
— New approaches for startups:
    — The Customer Development process
    — The Lean Startup approach
    — The Business Model Canvas
    — The Value Proposition Canvas
    — The Lean Canvas
— Lean startup doesn't suit everything:
    — Big visions for short-term monopoly
    — (Peter Thiel)
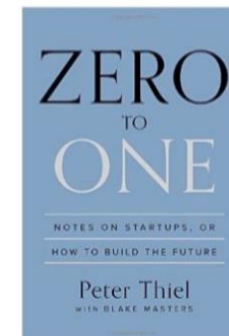
Some differences between established companies and startups

	Established companies	Startup companies
Markets for products	Known	Mostly unknown (hypothesis only)
Customers	Known	Mostly unknown (hypothesis only)
Products	Known	Mostly unknown (hypothesis only)
Future product features	Learn from customers	Learn from potential customers and test hypotheses
Business model	Company executes the current business model	Company searches for the best business model
Product	Full specifications as needed by market	Minimum feature set (for speed to market and flexibility for change)
Product development	Smooth execution using proven methods	Pivots (until find market, customers, products, business model)
Structure	Relatively stable	Fluid

Based on work of Steve Blank
eg http://www.slideshare.net/sblank/why-product-managers-need-sneakers?from=ss_embed

The startup – 3 key principles

– Business Model Canvas
  "Sketch Out Your Hypotheses."

– Agile software development
  "Quick, Responsive Development."

– Customer Development
  "get out of the building"

  – including hypothesis-driven experiments with customers, pivoting etc
    Steve Blank, Why the Lean Start-Up Changes Everything, Harvard Business
    Review, 2013, https://hbr.org/2013/05/why-the-lean-start-up-changes-everything

Week 13: Culture and structure for innovation (part from week 11)

Culture, structure and management for innovation

- Fostering a culture for ideas generation:
  - Innovation by networked individuals (and implications for organisational culture)

  - "Inner work life" and Intrinsic motivation
  - "Making progress on meaningful work"
 - "The smell of the place"

Culture, structure and management for innovation

- Size and structural dimensions of firms affecting innovation:
  - Formalisation
  - Standardisation
  - Centralisation
  - Differences between large companies, small businesses and scalable start-ups
- Approaches to organising firms for innovation:
  - Decentralised vs centralised R&D
  - Mechanistic vs organic structures

http://www.kingserv.org/design_examples.htm
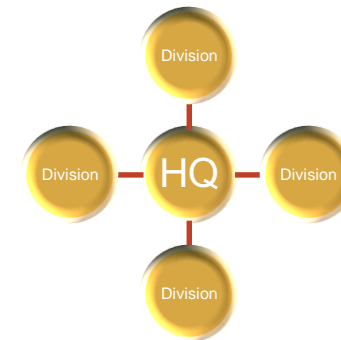
Unit of Study Survey

Exam Information

INFO5992 Exam time and place

- Date:

- Time:

- Location:

- Duration: **10 mins reading time + 2 hour exam**

- (check your official timetable info for date/time/place to be sure – it's your responsibility to be in the right place at the right time)

INFO5992 Exam details

- The following material will be provided:
  - Examination booklet
- Answers must be written in the examination booklet
- Answers must be handwritten. Please write legibly. Marks cannot be given if the text cannot be read.
- English is not a problem, but I can only award marks if I can **read** and **Understand**
- **Short and Concise answers**
- No electronic devices. The use of calculators, phones, laptops, smart watches, tablets etc is NOT permitted.
- The use of books or notes is NOT permitted.

INFO5992 Exam questions

– Total marks: 60 (the exam is worth 60% of the final mark of the INFO5992 UoS)

– A time guide for each question will be provided (for guidance only).

　– As there are a total of 60 marks in 120 minutes, the time guide for a question will be twice the number of marks for the question.

– There will be 9 questions, all with sub-parts.

– No multiple choice questions.

– The answers to all questions will be either short answers or medium-length answers (as in the Quiz).

INFO5992 Exam questions

- Do not write too much!
  - As a reference, a Q worth 2 marks is to be answered in 4 minutes; it should be answered in 2-3 lines.
  - In the reading time, plan ahead and think about how much you should write per Q
- It is OK to use bullet points and/or diagrams in your answers. Questions may ask for you to draw a diagram.
- Answer questions with depth to show your understanding – don't state the concepts – Qs will ask if you understand the concept and not memorised it
- Refer to the comments / feedback from your Quiz.

What to study

- All lecture material:
  - You will not be expected to memorise historical details of specific case studies from lectures. However, you may choose to use such case studies in answering questions if you want.
  - Guest Lecture content is examinable
- Reading materials and additional references (within the lecture slides):
  - Some questions will require you to give examples and to demonstrate your understanding of the unit material. You can use knowledge gained and examples given in other readings such as readings you used for your individual essay, group presentation and general reading.
- Tutorial:
  - Summary of the tutorial are examinable and you should study them; references / reading materials in the tutorial material should be studied
- Student presentation:
  - You will not be expected to know the details of the group presentations (though you may choose to use case studies in answering questions).

Sample question

- (This is an example of the type of question that will be in the exam. It is NOT an actual question from the exam.)

- ============

- Question 1   [Total of 8 marks] [Time guide: approx. 16 minutes]

- 1.1. [3 marks] Give three reasons why using an agile project management approach may be more successful than using a waterfall approach when developing an innovative software product or service.

- 1.2. …

- ============

Sample question

- (This is an example of the type of question that will be in the exam. It is NOT an actual question from the exam.)

- ============

- Question 1   [Total of 8 marks] [Time guide: approx. 16 minutes]

- 1.1. [3 marks] Explain the concept of 'Network Effects' and its importance to Platform Economy

- 1.2. …

- 1.3. …

- ============

QA

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