

# UoS Semester Outline

Week		Learning Outcomes	Lectures
<b>Module 2: Innovation Framework</b>			
Week 01	L01, LO2, LO3	Unit of Study Introduction, Administrivia, Definition of IT Innovation, Importance of Innovation to a Country, General Purpose Technologies, Overview of Emerging Technologies	
Week 02	LO4, LO5	Innovation Frameworks I: Dynamics of IT Innovation, Dominant Design	
Week 03	LO6	Innovation Frameworks II: Disruptive Innovation, Innovator's Dilemma, Value Chain & Value Network	
<b>Module 2: Development of Key Intellectual Property in the Modern Age</b>			
Week 04		Introduction to Open Innovation and Closed Innovation Distributed Innovation I: Product Platforms, Web APIs	
Week 05	LO7	Distributed Innovation II: Crowdsourcing, Free and Open- Source Software, Open Data	
Week 06		Distributed Innovation III: Platform Ecosystems, User Innovation	
<b>Module 3: Commercialisation Process and Business Strategies for Emerging Technologies</b>			
Week 07		Commercialisation I: Startup vs Traditional Companies, Lean Startup Methodology and Agile Development	
Week 08	LO8	Commercialisation II: Customer Development Process, Value Proposition Canvas	
<b>Mid semester break</b>			
Week 09	LO8, LO9	Commercialisation III: Innovation Management, Business Model Canvas Commercialisation IV: Capital & Fundraising for IT Innovation	
Week 10	LO11, LO12	Organisational Cultures and Structures Supporting Innovation, Judging IT Innovation	
<b>Module 4: Innovation At-Scale</b>			
Week 11	LO10	Innovation Ecosystem: Silicon Valley and Australia	
Week 12	N/A	Guest Lecture	
Week 13	N/A	Course Review   Innovation Pitch Presentation	
Final Exam			

# 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 (e.g.,) a software start-up company

## Innovation vs. Invention



Joseph  
Schumpeter,  
Economist and  
political scientist  
(1883 – 1950)

- *Innovation involves (1) a new idea that is (2) applied commercially*
  - Schumpeter (1930s).
- ***"Invention is the first occurrence of an idea for a new product or process, while innovation is the first attempt to carry it out into practice."***
- *Jan Fagerberg, Oxford Handbook of Innovation, 2004*

# Definition of innovation

- Innovation is the implementation of a new or significantly improved product (good or service), process, new marketing method or a new organisational method in business practices, workplace organisation or external relations.
- Organisation for Economic Co-operation and Development (OECD) - to **promote policies** that will improve the economic and social well-being of people around the world
- OECD (2005) Oslo Manual: Guidelines for collecting and interpreting innovation data, 3rd edition, OECD and European Commission



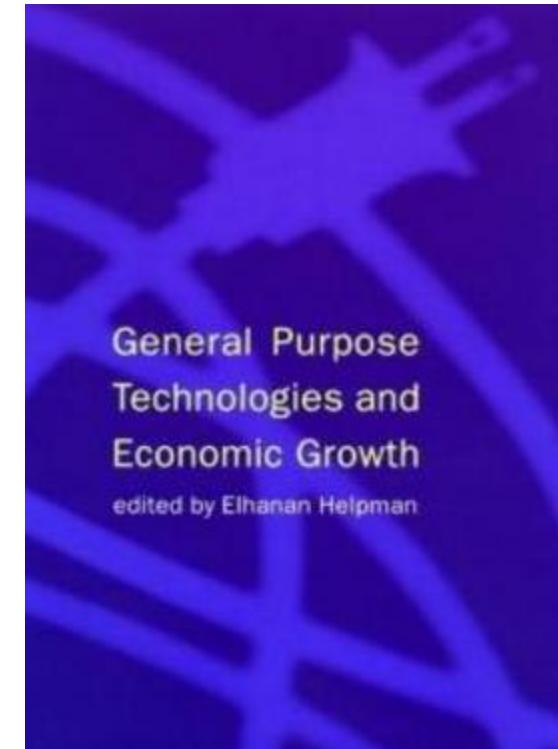
# Impact of High-Growth Firms

The Australian Innovation System Report explores the impact of innovation on business, industry and national performance.

**High-growth firms:** A relatively small proportion of firms in the economy are responsible for a significant share of growth in employment and revenue (**9% of all firm but contributed 46% of employment growth**).

# General Purpose Technology

- GPT is a term coined to describe a new method of producing and inventing that is important enough to have a protracted aggregate impact. Electricity and information technology (IT) probably are the two most important GPTs so far.
- A GPT has the potential to affect the entire economic system and can lead to far-reaching changes in such social factors as working hours and constraints on family life. Examples of GPTs are the steam engine, electricity, and the computer.



B. Jovanovic, General purpose technologies, New York University and Nber, Peter I. Rousseau, Vanderbilt University and NBER  
<http://www.nber.org/papers/w11093.pdf> (Feb'25)

General Purpose Technologies and Economic Growth, edited by Elhanan Helpman Cambridge, Mass. : MIT Press, c1998.

# IT as an enabling technology

- IT is a “General Purpose Technology” (GPT)
- Like electricity – it **enables** other technologies
- GPTs differ from other technologies and:
  1. Are **pervasive** – spreading to most sectors
  2. Continually improve in **usefulness and lower in cost**
  3. 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)

## A 4<sup>th</sup> measure for GPT

- GPTs are those technologies that **impact** economic growth, and transform both household life and the ways in which firms conduct business.
4. **Is the GPT fundamentally disruptive and foundational?** Electricity displaced the technologies of lighting, mechanization and processing that came before it. It is also foundational to many of the GPTs we consider absolutely necessary nowadays (**telephony** and the **Internet** are two GPTs that **wouldn't exist without electrification**).

# Example of emerging GPTs

## Likelihood of becoming GPT Over 2-5 Year Timeframe

	Artificial Intelligence	Blockchain & Cryptocurrencies	Intelligent & Connected Devices	Quantum Computing	Clean/Sustainable Energy	AR/VR
Definition	Theory and devt of computer systems able to perform tasks that normally require human intelligence	List/ledger of records, called blocks, which are linked and secured using cryptography	Equipment/machines that have their own computing capability and are connected to other devices/the internet	Computation systems that make direct use of quantum-mechanical phenomena to perform operations on data	Energy obtained from renewable resources, naturally replenished on a human timescale	Superimposition of computer-generated imagery on a user's view of the real world, providing a composite view
Pervasive?	✓	—	✓	✗	✓	—
Improve Over Time?	✓	—	✓	✓	✓	✓
Spawn Innovation?	✓	✓	✓	✓	✓	✓
Fundamentally disruptive?	✓	✓	—	—	—	—

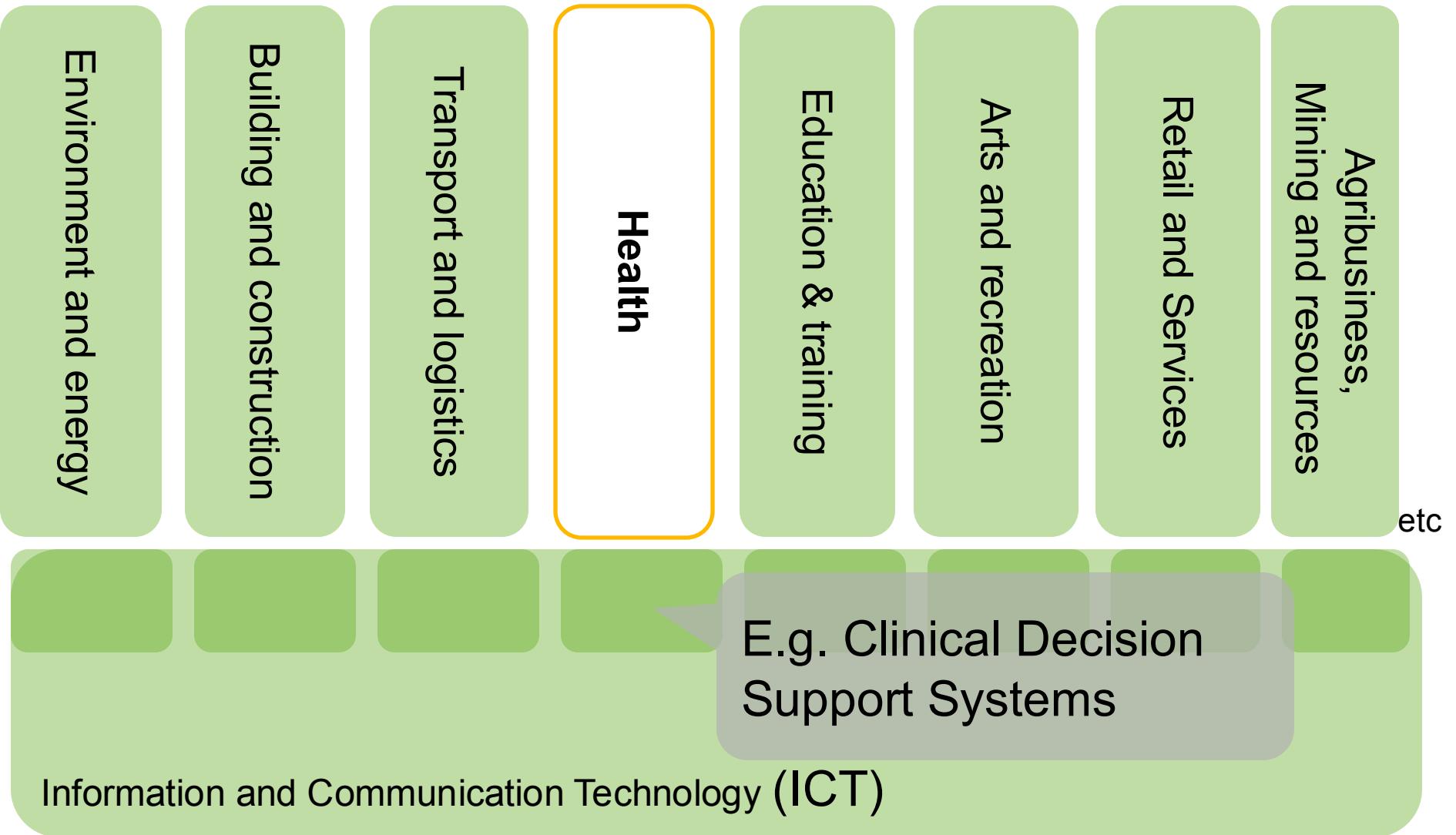
✓ Yes    ✗ No    — Unsure

<https://hackernoon.com/ai-blockchain-ar-vr-etc-which-one-is-a-general-purpose-technology-9b5510ca25e3> (Feb'25)

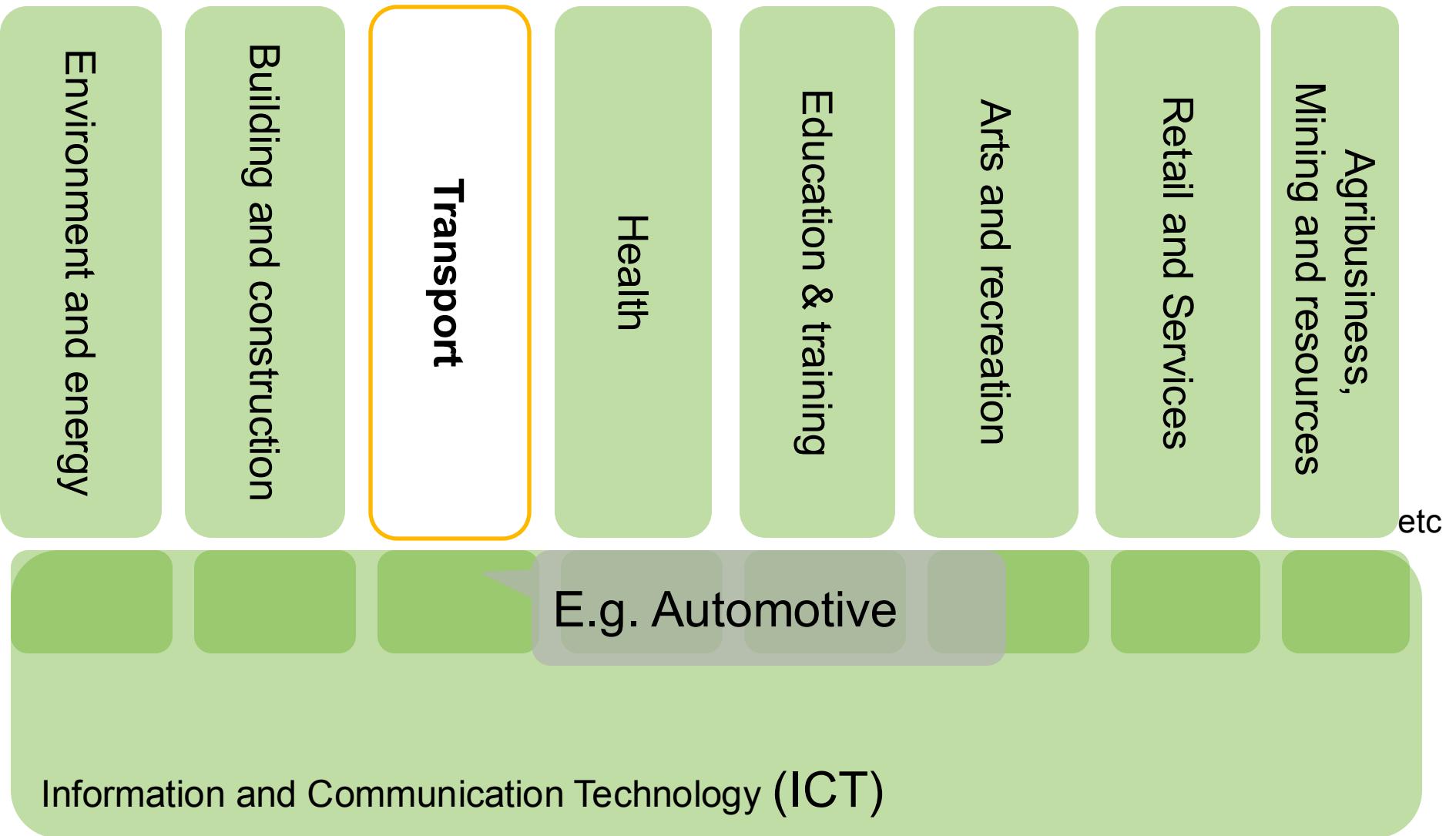
# Some hot areas of current ICT Innovation



# Industry-specific ICT innovation

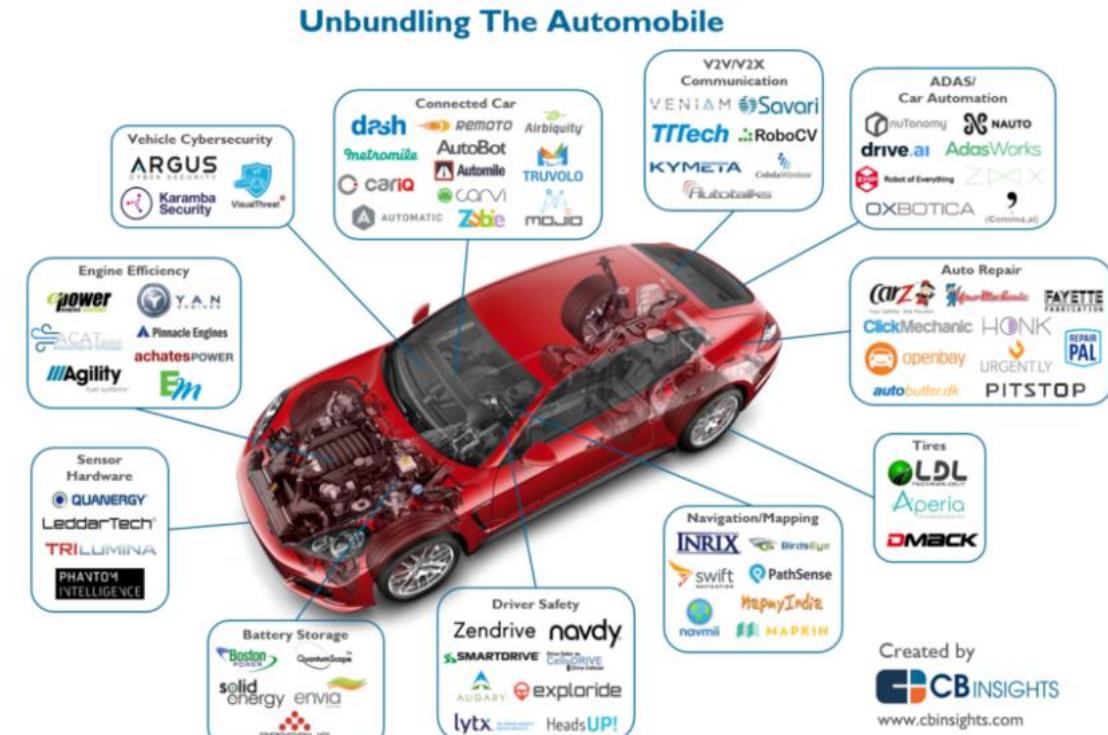


# Industry-specific ICT innovation



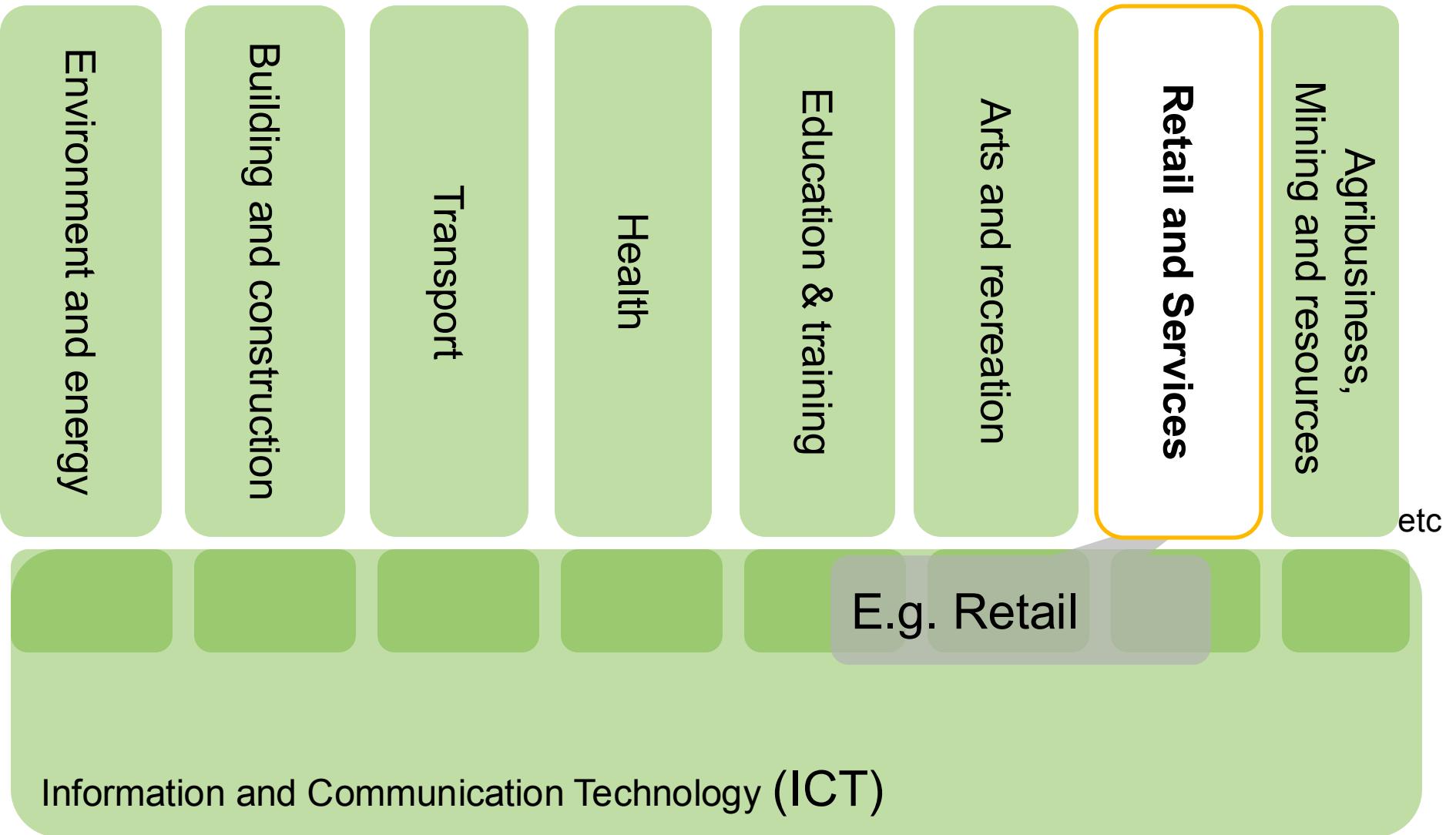
# Example – Software in cars

- What does software do in a car?
  - For cars, software development is not just simple implementation
  - E.g., for the hybrid transmission system in GM's Yukon, 70% of the time was spent on software development
  - For modern cars, 80% of innovations come from software/computer systems
  - For self-driving cars, this will be even higher due to greater number of sensors, greater need for data analytics, more AI, etc.



<https://medium.com/@josephstockholm/auto-tech-startups-in-stockholm-101febca5661> (Feb'25)

# Industry-specific ICT innovation

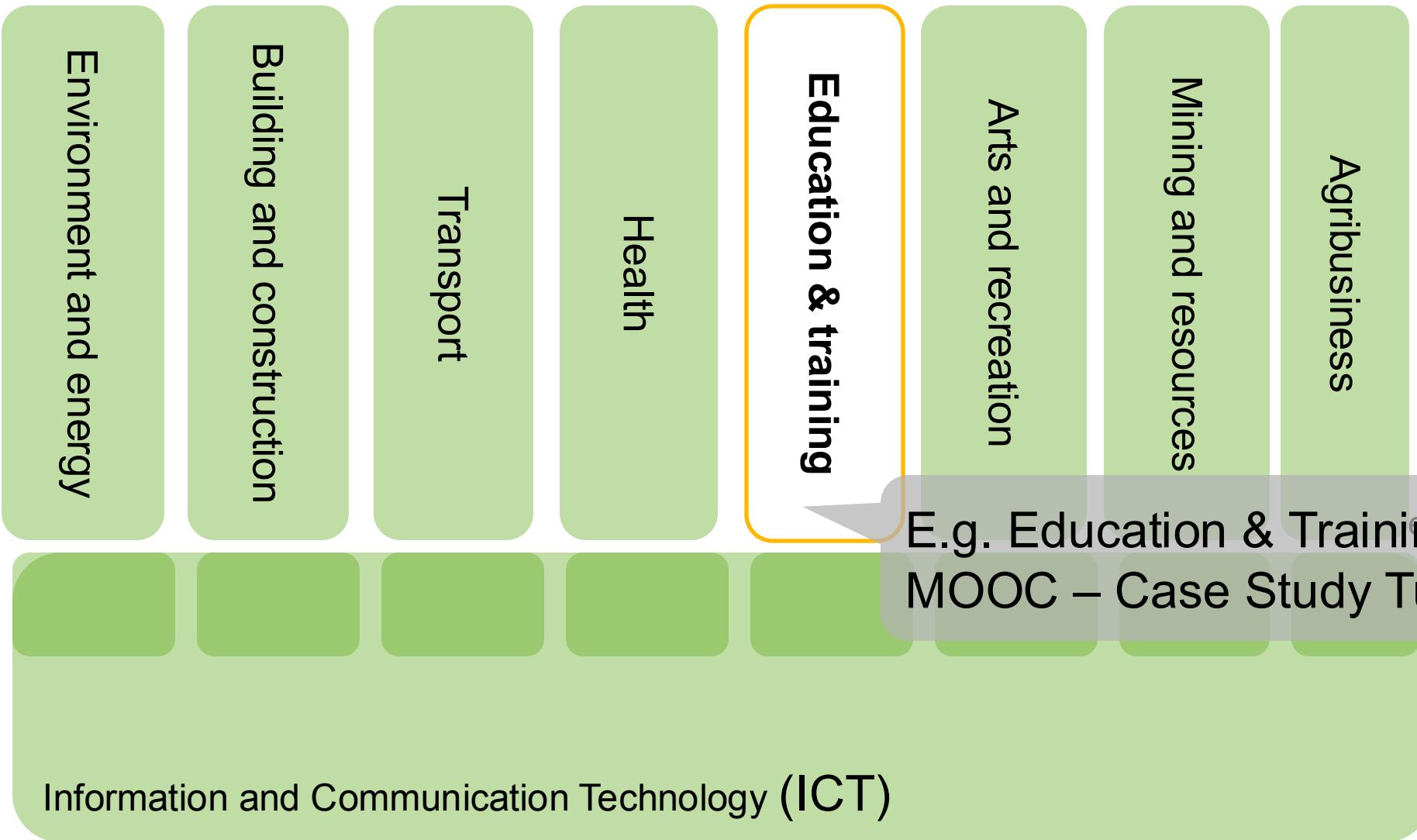


# Amazon Go



<https://www.amazon.com/b?ie=UTF8&node=16008589011> (Feb'25)

# Industry-specific ICT innovation



## Micro credentials

- A microcredential is any one of a number of new certifications that covers more than a single course but is less than a full degree.
- The edX platform was the first to launch a microcredential, the XSeries, in 2013. Udacity and Coursera followed in 2014 with the Nanodegree and the Specialization, respectively.
- Every MOOC platform now offers at least one type of microcredential, and some platforms offer as many as three different types.
- “More workers and employers will find value in credentials that are smaller than degrees, especially as they begin to coalesce around models with recognizable features, structures, and meaning.”

<https://www.class-central.com/report/moocs-microcredentials-analysis-2018/> (Feb'25)

## MicroMasters - a three-way arrangement between educator, student and employer

- “MicroMasters” certificate programs on edX, to which 1.7 million students have registered in a year.
- MicroMasters certificates (MMs) are online, examined and graded, credit-eligible graduate-level courses that involve about a quarter of the coursework of a traditional Masters degree. At edX they cost about \$1,000.
- But, as important as expanding educational access is, what’s at stake here is even more radical and future-disruptive. **Because, it’s apparent most students won’t pursue the full degree. They’ll walk with the MM.**
- Each MicroMasters is sponsored by at least one industry partner, currently a list of 40 which includes GE, MicroSoft, IBM, Hootsuite, Fidelity, Bloomberg, Boeing, WalMart, PWC, Booz-Allen Hamilton, and Ford.

<https://www.forbes.com/sites/adamgordon/2018/02/13/voice-of-employers-rings-out-as-moocs-go-from-education-to-qualification/#e7fdd1f564b6> (Feb'25)

# Assessment Tools for MOOCs

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- Peer Assessment
  - students are organized anonymously into small groups to grade each other's submissions. The groups are double-blind and random
- Automated Essay Grading
  - Machine learning at edX
  - Given a rubric and 15 graded assignments, the system learns when the marks are given and when not
- Proctoring MOOC Exams
  - testing centers for on-site proctoring
  - require that students hold up a picture ID on camera prior to beginning the exam; someone then remotely watches the student
  - checking the speed and style of typing against previous samples from the same student

[Short article] Linda L. Briggs, “Assessment Tools for MOOCs, Campus Technology”, 2013

<https://campustechnology.com/Articles/2013/09/05/Assessment-Tools-for-MOOCs.aspx> (Feb'25)

# The Innovation-Development Process

## Stages in the Innovation-Development Process:

(not always all used and not necessarily in this order)

1. Recognising a problem or need
2. Basic and applied research:
  - Scientific investigation (applied=addressing practical problem)
3. Development:
  - Putting a new idea into a form to meet the needs of users
4. Commercialisation:
  - Production, manufacture, packaging, marketing, distribution
5. Diffusion and adoption:
  - Spreading innovation through members of a social system
6. Consequences

Source: Rogers (2003)

# Diffusion of innovation

A product innovation, process innovation, business model innovation etc.

By word-of-mouth, TV, trade journals, Internet, Social Media, etc.

“Diffusion is the process in which (1) **an innovation** is (2) **communicated through certain channels** (3) **over time** among (4) **the members** of a (5) **social system.**”

This is the “rate of adoption” of an innovation.

There are different types of people – some tend to adopt innovations early after initial availability, others later.

A social system has external influencers (e.g. media, govt.) and internal influencers (e.g. opinion leaders)

## “Tech Influencer”

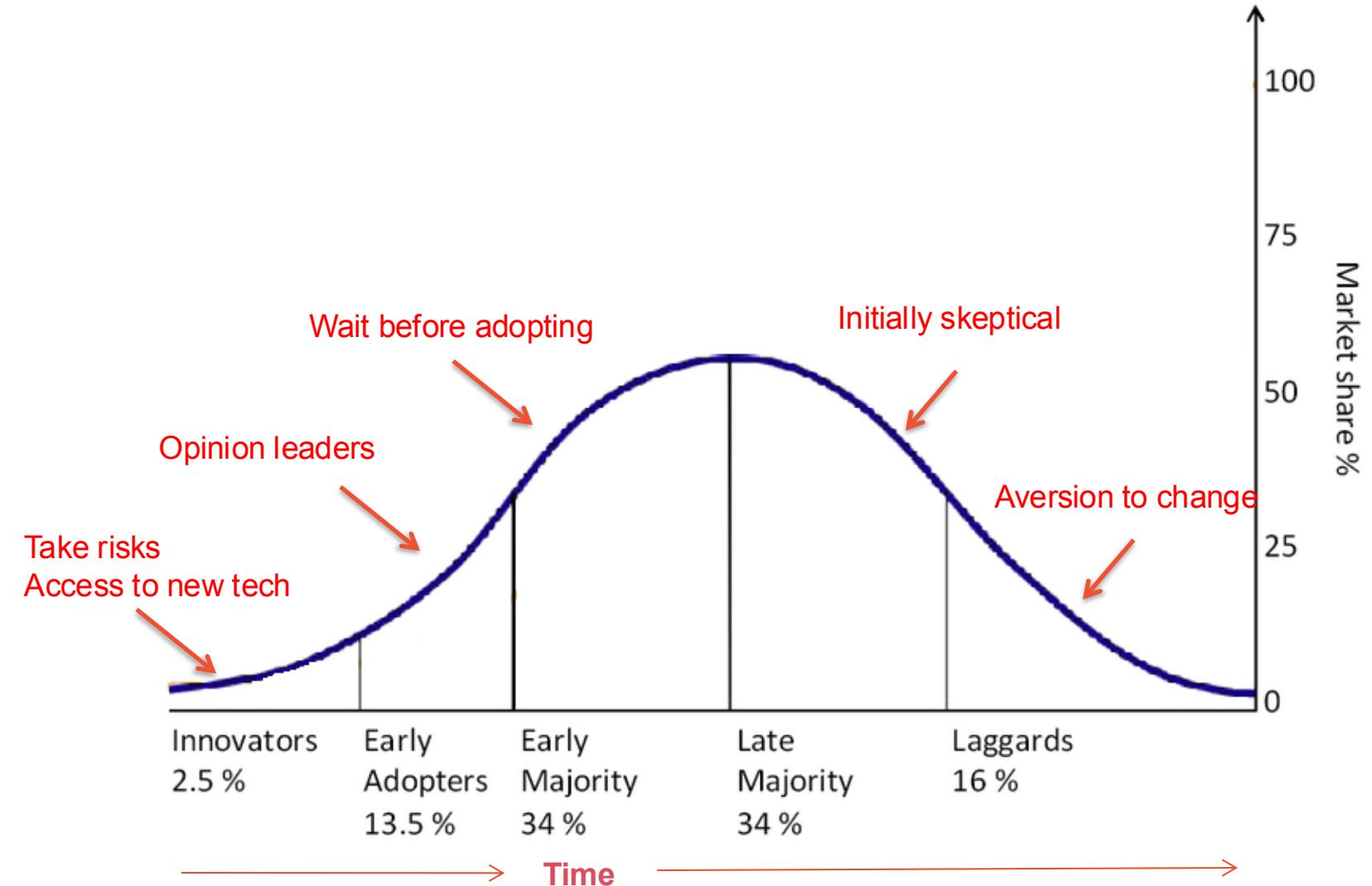
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A **technology influencer** is someone who has a significant impact on the technology industry and its trends through their work, expertise, or social media presence. These individuals can be bloggers, social media personalities, industry leaders, or even celebrities with a passion for technology.

**It's a Career!**

# Technology Adoption Lifecycle Model



## **“The Chasm”**

- From “Crossing the Chasm” book by Geoffrey Moore
- Discusses how hard it is for companies making high-tech products to get from **early adoption to mainstream** and provides approaches to help
- If the chasm can be crossed, then there is a greater opportunity for dominance in the market



Geoffrey Moore,  
High tech consultant

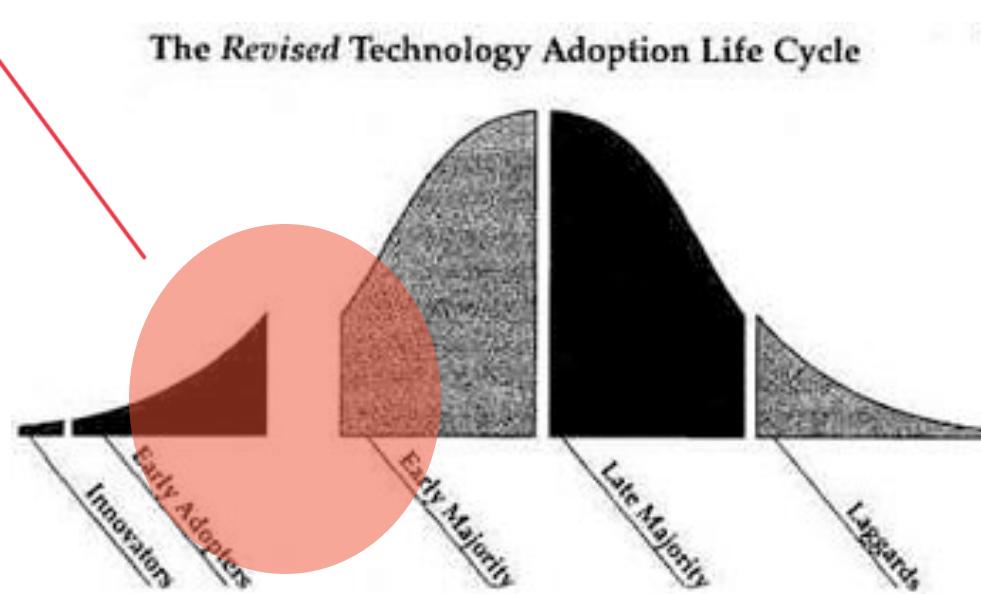


Figure from “Crossing the Chasm”

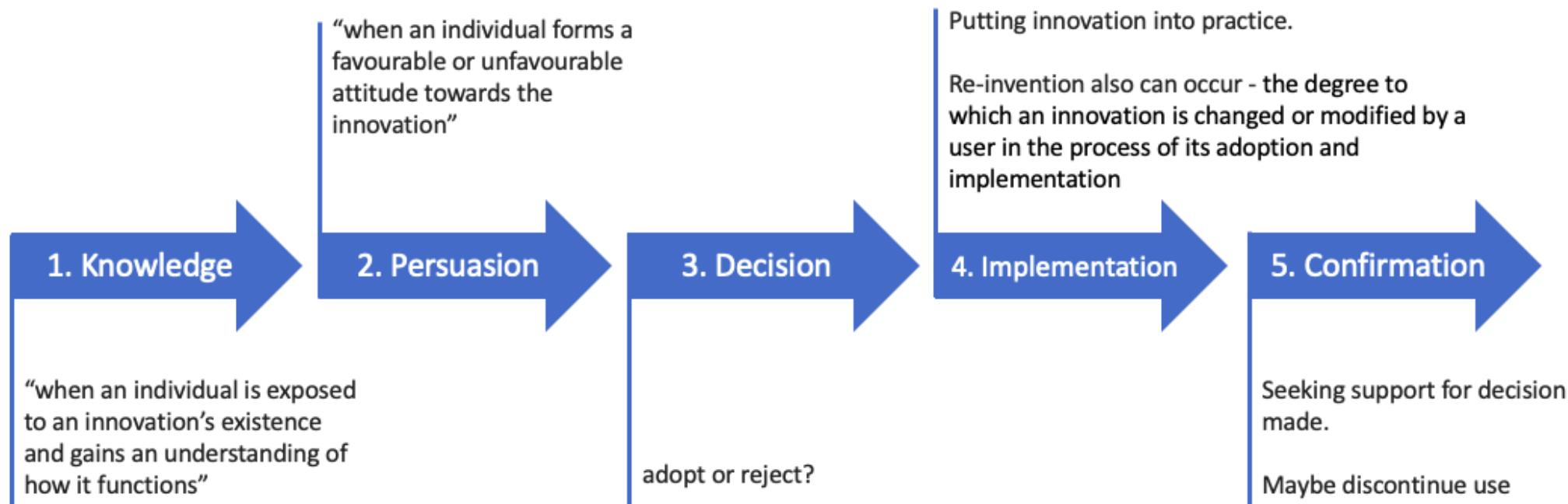
## Cumulative adoption curve

- Another way of representing the same information (cumulatively)
- This is known as a “technology adoption S-curve”



# The process of innovation adoption: Adoption by Individuals or Organisations

- From Rogers:
  - The adoption of an innovation by an individual:





# Rate of adoption of an innovation

- Perceived **attributes** of innovations that determine the **rate of adoption**:
  - **Relative advantage** – the extent to which it is viewed as better than the idea it supersedes.
  - **Compatibility** – the extent to which it is perceived as consistent with the existing values, past experiences, and needs of potential adopters.
  - **Simplicity** (vs Complexity) – the extent to which it is perceived as simple to understand and use.
  - **Trial-ability** – the degree to which it may be experimented on a limited basis (low cost, “free trial offer”).
  - **Observeability** – the extent to which results of an innovation are visible to others who imitate. (Rogers. 2003 p.12-16)
- The rate of adoption is also affected by:
  - Extent of Change Agents’ Promotion Efforts (e.g. marketing)
  - Other factors

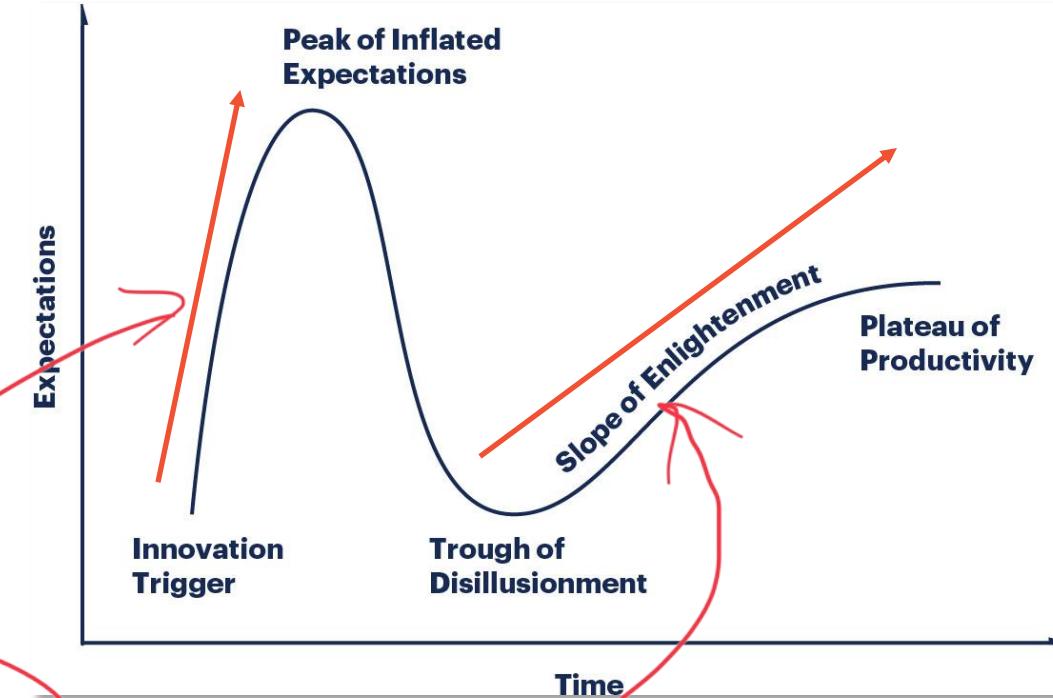
Source: Rogers (2003)

# Five phases of a technology's life cycle

#	Phase	Description
1	Innovation Trigger	Innovation Trigger: A potential technology breakthrough kick things off. Early <b>proof-of-concept</b> stories and <b>media interest</b> trigger significant publicity. <u>Often no usable products exist and <b>commercial viability is unproven</b>.</u>
2	Peak of Inflated Expectations	Early <u>publicity</u> produces a number of <b>success stories</b> – often accompanied by scores of failures. Some companies take actions; many do not.
3	Trough of Disillusionment	<u>Interest wanes</u> as <u>experiments and implementations fail to deliver</u> . Producers of the technology shake out or fail. <u>Investments continue</u> only if the surviving providers improve their products to the satisfaction of early adopters.
4	Slope of Enlightenment	More instances of how <u>the technology</u> can benefit the enterprise start to crystallize and become <b>more widely understood</b> . Second- and third-generation products appear from technology providers. More <b>enterprises fund pilots</b> ; <u>conservative companies remain cautious</u> .
5	Plateau of Productivity	<b>Mainstream adoption</b> starts to take off. Criteria for assessing provider viability are more clearly defined. The technology's broad market applicability and relevance are clearly paying off.

# Interpreting Technology Hype

- Most innovations will progress through a pattern of **overenthusiasm and disillusionment**, followed by **eventual productivity**.
- The vertical shape shows how **expectations** surge and contract over **time** as an innovation progresses, based on the market's assessment of its future expected value.
- Two stages of upward direction (increasing expectations)
  - Driven by market hype; high expectations met with low maturity
  - Driven by an increase in the maturity of the innovation; it leads to real value and fulfilled expectations



# Definition: Product Category

- “A **product category** is all the products offering the same general functionality.”
  - <http://kwhs.wharton.upenn.edu/glossary/>
- 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>

## Factors that lead to a “dominant category”:

- What is the dominant category of a product?
  - The product segment or version that captures:
    - The largest market share or
    - Significantly shapes consumer expectations
- Technological factors
- Firms attempt to claim advantageous market positions
- Stakeholders (e.g., customers, producers, critics, and regulators) making sense of emerging category
  - Suarez et al (2015)

## Some factors leading to dominance of the IBM PC architecture

- The IBM PC architecture became the dominant design even though the IBM PCs and compatibles were not the most advanced personal computer
- Some factors in its initial rise to dominance:
  - Open architecture with (mostly) specified interfaces
  - Easily available components
  - Many different vendors with compatible system so a lot of competition on price
  - Software compatibility across a large range of vendors

## Examples of dominant designs in IT

- IBM PC Architecture
- WIMP (window, icon, menu, pointing device)
- Internet protocol stack (TCP/IP, etc)
- The core web standards (HTML, HTTP, URL)
- LAMP (Linux, Apache, MySQL and Perl/PHP/Python)
- Relational Database Management Systems
- Apple iPhone application architecture
- The Android architecture
- Smart speaker API architecture



- **Note: Dominant Designs are not specific products, they are architectures.**

## The phases of Design Dominance

- Utterback and Abernathy talked about **two phases** in reaching design dominance:
  - The **fluid phase**:
    - Uncertainty about the technology and its market
    - Firms experiment with different product designs
  - The **specific phase** (i.e. innovations are specific to the dominant design):
    - There is a stable architecture (dominant design) for the technology
    - Firms focus on incremental innovations to improve components
    - Firms focus on process innovations to produce them efficiently and effectively

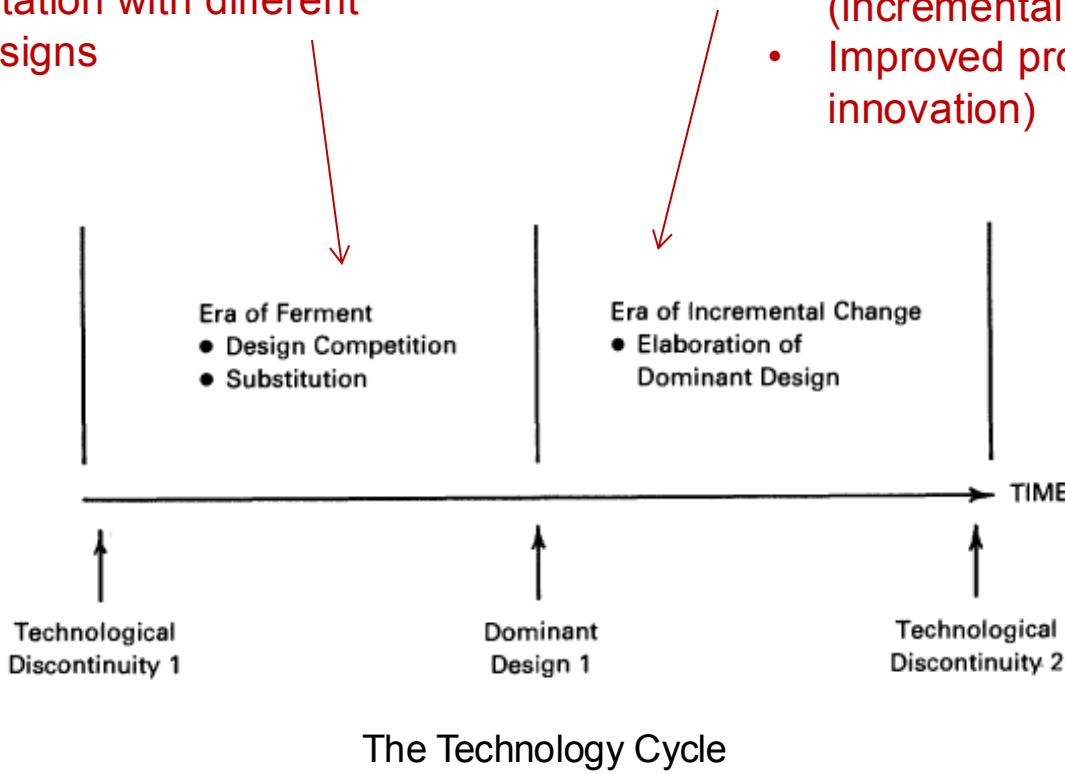
# Design Dominance and Technology Cycles

Companies focus on:

- Custom solutions
- Experimentation with different product designs

Companies focus on:

- Increased market penetration
- Improved product functionality (incremental product innovation):
- Improved production efficiency (process innovation)

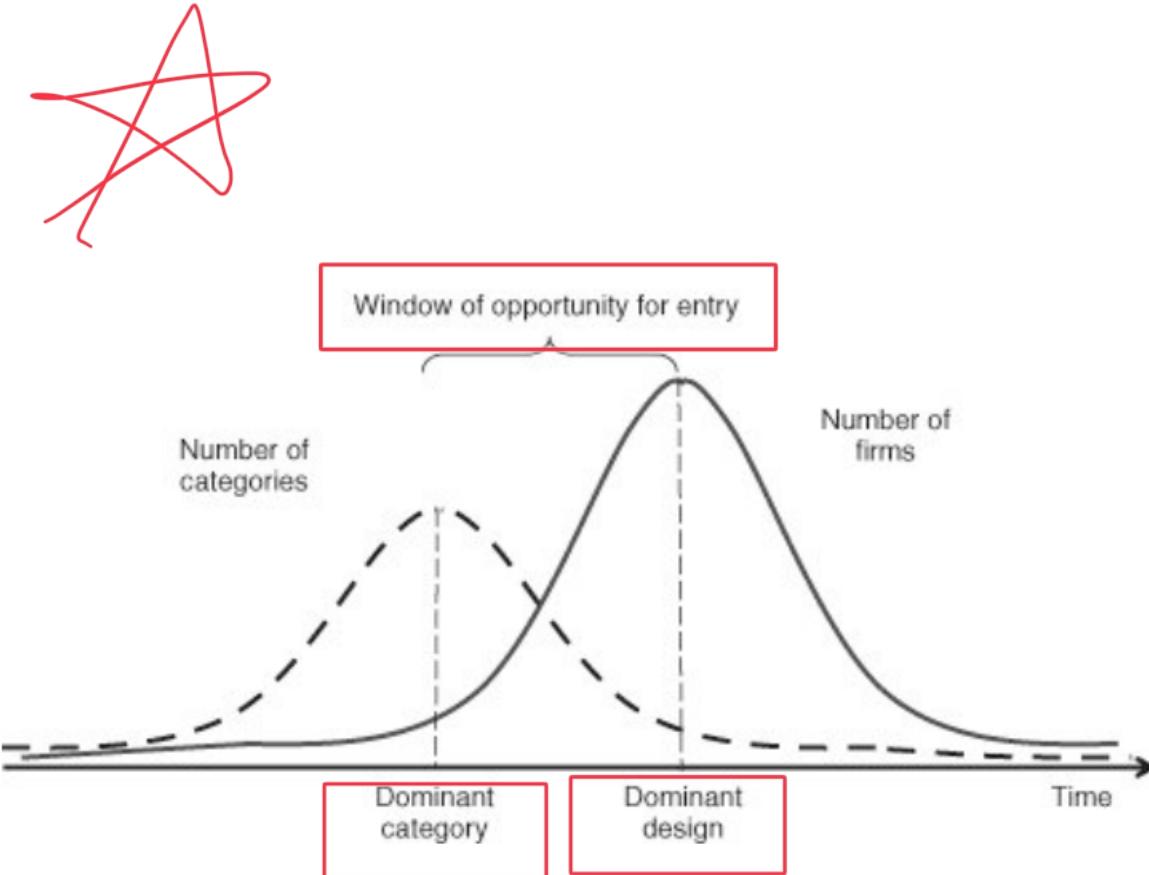


Source: Anderson and Tushman (1990)

# Design Dominance and Technology Cycles

- During the “era of incremental change”, firms typically focus on:
  - Increased market penetration
    - Segment the market offering different models at different price points
  - Improved product/component functionality (incremental product innovation):
    - New features and increased performance (faster, more scalable, etc.)
  - Improved production efficiency (process innovation):
    - Lower production prices through simplification of components or process innovation
- This continues until the next technological discontinuity.

# Dominant design and windows of opportunity?



Figure

Caption

Figure 1: Theoretical framework: dominant category and dominant design during the industry life cycle. During the industry life cycle, the number of categories will increase before the number of firms increases. The emergence of the dominant category occurs as the number of categories begins to decrease. This point in time marks the opening of the window of opportunity for entry, whereas the emergence of the dominant design marks the closing of the window of opportunity

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## Standards for dominant designs

- Sometimes **standards are used to encourage or maintain a dominant design in an industry**
- Standards may be defined by:
  - a formal standards organisation (“*de jure*”); or
  - wide public acceptance or market forces (“*de facto*”)
- Standards may be for controlling:
  - { **Quality** (products/services have required characteristics); or
  - { **Compatibility** (products/services can be used with other products/services)
    - Compatibility standards can be:
      - Sponsored (a party or parties hold a proprietary interest in a particular technology and in the adoption of it by others); or
      - Non-sponsored

# De jure and De facto standards

De jure standards		De facto standards	
Standards authority	Example standards	Company	Example Standards
W3C ( <u>World-wide Web Consortium</u> )	HTML, URL, CSS, XML	Microsoft	Word Doc formats; PowerPoint formats
ISO ( <u>International Organisation for Standardisation</u> )	MPEG, CD data format, Office Open XML, computer languages	Adobe	PDF (later became de jure standard), Flash
ANSI (American National Standards Institute)	C	IBM	PC architecture
IETF	TCP, IP, HTTP, JSON	Community (with guidelines set by Sun)	Java
Industry consortia	USB, BluRay	Community (with guidelines set by Google)	OpenSocial

## Why Dominant Designs Are Selected

- **Market forces: Increasing returns to adoption**
  - For many technologies (especially in IT), the more a technology is adopted, the more valuable it becomes to the industry because of:
    - **Learning effects:**
      - The industry gains knowledge in all aspects of technology
    - **Network effects:**
      - The benefits of using technology increase with the number of users.
- **Government regulations**
  - Sometimes, the government sees the importance of technology for a nation and regulates a specific dominant design (e.g. for TV, mobiles)

# Why Dominant Designs Are Selected:

## 1) Learning Effects

- Learning effects include:

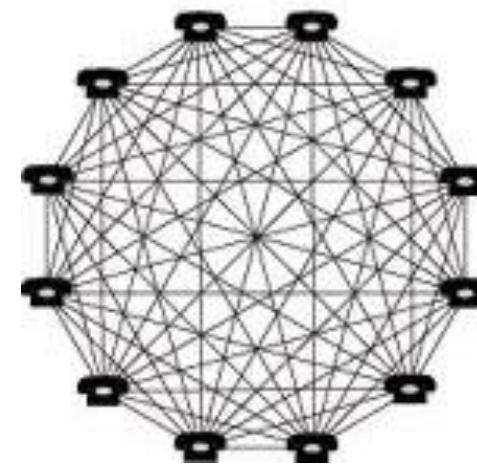
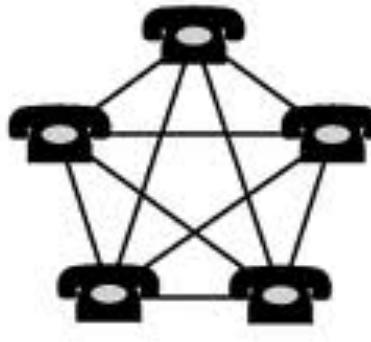
- When a design is dominant, there is greater use of the technology
- Greater use leads to greater knowledge accumulation about that technology
- Greater knowledge enables a fast rate of improvement of the technology
- Company structures and culture are based around the technology

# Why Dominant Designs Are Selected:

## 2) Network effects

### – Network effects

- For technologies with network effects, the benefit from using a technology increases with the number of other users
  - e.g. railways, telephone, Facebook, Skype



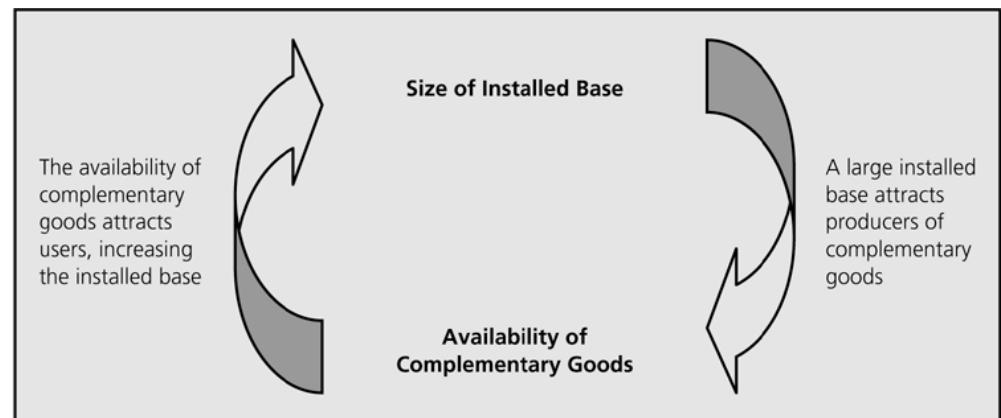
# Types of network effects

- Direct network effects:
  - Increase in usage leads to direct increase in value
  - E.g. Email, Telephone, Twitter
- Indirect network effects:
  - Increase in usage leads to increase in value of complementary goods leading to increase in value of the original technology
  - E.g. PC Architecture gained value from value of compatible software
- Two-sided network effects:
  - Increase in usage by one set of users increases value to another set
  - E.g. marketplaces (such as eBay, Airbnb), reader/writer software
- Local network effects:
  - Increase in use of local networks (within a larger network) leads to increase in value
  - E.g. Instant Messaging, Facebook

# Why Dominant Designs Are Selected: The self-reinforcing cycle

- A technology with a large installed base attracts developers of complementary products;
- A technology with a wide range of complementary products attracts users;
- An increase in the number of users is an increased installed base.
- This leads to a self-reinforcing cycle:

**FIGURE 4.2**  
The Self-Reinforcing Cycle of Installed Base and Availability of Complementary Goods



Source: Schilling (2008)

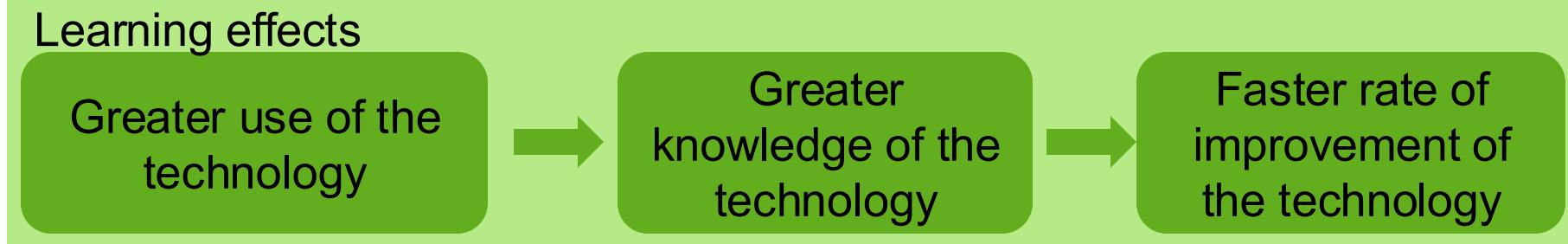
# Why Dominant Designs Are Selected:

## 3) Government regulation

- Government Regulation
  - There are often strong consumer or economy benefits of having a single dominant design
  - Rather than wait for market forces, sometimes government organisations step in and impose a standard
  - Examples:
    - Digital TV in Australia (using the DVB-T standard)
      - compare with the standard for an HD media format which was not imposed by government but was left to market forces to sort out (Blu-ray vs HD DVD)
    - GSM (General Standard for Mobile communications) for telecommunications:
      - This was established in the EU early for all mobile communications whereas in US, there was a long battle between different technologies (which has left many problems).

# Summary: Why Dominant Designs Get Selected

## – Market Forces



### Network effects

Direct

Eg Telephone

Indirect

Eg PC Architecture

Two-sided

Eg eBay

Local

Eg Instant Messaging

### Govt regulations

Common design seen as important for country

Govt regulates

Eg Digital TV

# First, Second, and Fast Second



- **First mover** – getting into market quickly and hoping that your product becomes the dominant design
- **Second mover** – waiting for the dominant design to be completely established and accepted in the market and then producing ‘me-too’ product under that standard
  - Competing on low cost and low price and trying to be better than the competition (little innovation)
- **Fast second** – waiting for the dominant design to begin to emerge and then move in to be a part of it (that is, helping to create it)
  - Established firms with technology to protect. Not in their best interest for new technology to become established, but once it seems likely, try to become leaders in the new market.
  - Timing – has to be ready to move as any first mover.... Continue to run its core business and waiting to see whom the first mover will be

## More examples of Fast Second

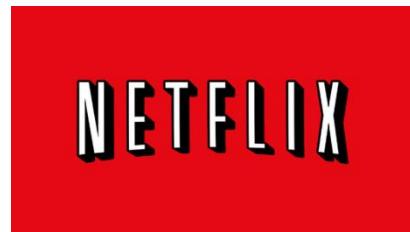
- Lyft, as an example, have exploited Uber's success well with a design immediately accessible to Uber users. But this can only take you so far—in 2021, for example, Uber's revenue was \$10 billion and Lyft's revenue was \$3.2 in US and Canada.
- TikTok entered the social media market – with ‘shorts’ and smart use of ‘audio’ after established players like Facebook, Instagram, Youtube and Twitter. However, it quickly caught on with users and became one of the fastest-growing social media platforms in the world, prompting the incumbent to offer similar features e.g., Youtube Shorts



# What is Disruption?

A **process** whereby a smaller company with fewer resources is able to successfully challenge established incumbent businesses.

- Not a product or service at one fixed point
- Evolution of that product or service over time



# Industry Examples of Low-End Disruptions

- **Chromebooks in Education:**
  - Chromebooks, initially positioned as low-cost laptops with a focus on web-based applications, disrupted the education technology sector
  - Provided a more affordable alternative to traditional laptops and desktops, enabling schools to access digital learning resources at a lower cost
- **Mobile Wallets for Financial Services:**
  - Mobile wallets like PayPal, Cash App, and Venmo started as simple digital payment solutions for peer-to-peer transactions
  - Disrupted traditional banking and payment systems by offering a convenient and low-cost way for individuals to send and receive money digitally

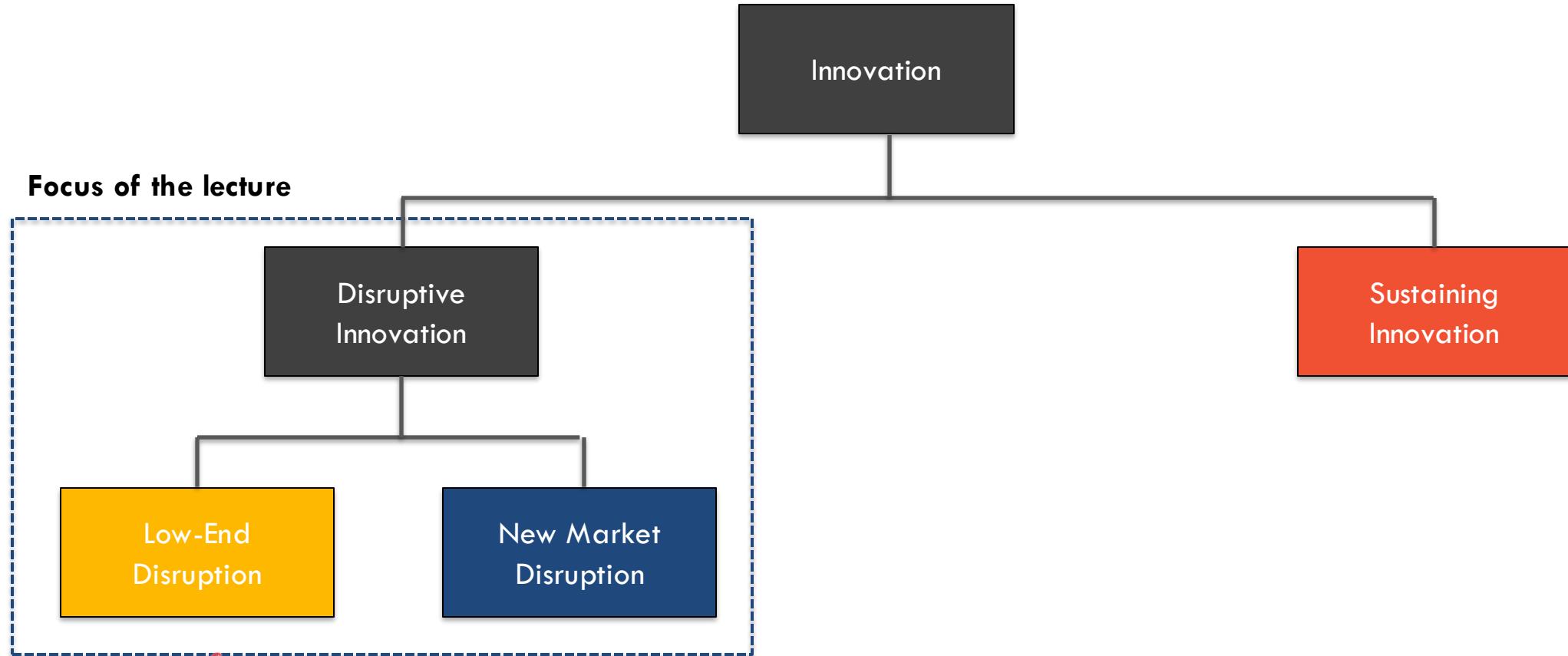
# Industry Examples of New-Market Disruptions

- **No-Code Development Platforms (e.g., Bubble, Webflow):**
  - These platforms empower non-programmers to build web applications and digital products without needing to write code
  - Creating a new market segment for entrepreneurs and small business owners who previously could not enter software development
- **Remote Work Collaboration Tools (e.g., Zoom, Slack):**
  - Work and collaborate remotely and connect with people
  - The rapid shift to remote work, accelerated by the COVID-19 pandemic, led these platforms to serve a newly emergent market of workers and organisations that had previously relied on in-person interactions

# Disruptive Innovation

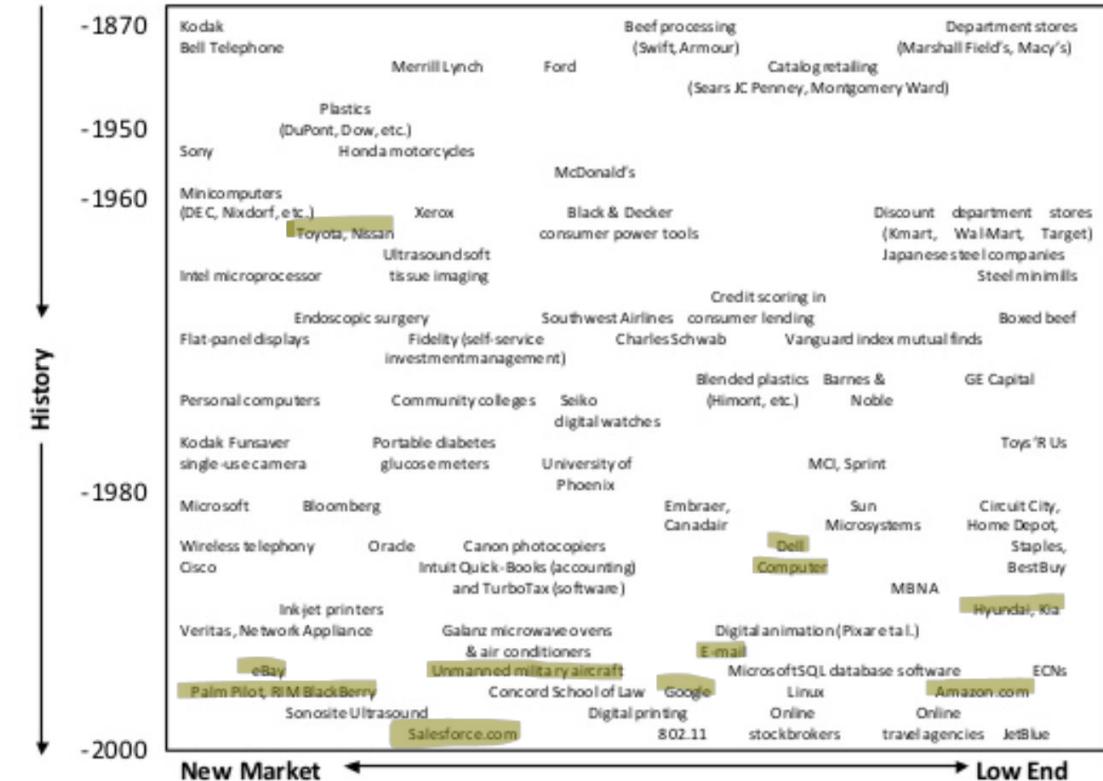
- According to Christensen, innovations can be either **disruptive** or **sustaining**
- “**Disruptive innovations**” – Target markets **overlooked by incumbents**
  - i.e. Target overserved or unserved markets
- “**Sustaining innovations**” – Move upmarket
  - i.e. **incremental advances or major breakthroughs**, but they all enable firms to sell more products to their most profitable customers

# Structure of the Framework



# Types of disruptive innovation

- Christensen distinguishes between:
  - “low-end disruption” – there are customers who do not need the full functionality or performance of products already on the market so cheaper alternatives can take over.
  - “new-market disruption” – there are customers who have needs that were not being addressed by existing products
- Christensen, C.M. and Raynor, M.E. 2003, 48



# Case Studies – Low end disruption ?



CLOUD MACHINE  
LEARNING ENGINE



Yes

Yes & No  
(Taxi vs limousines)

No

No

Yes & No  
(Cheaper alternative to iPad;  
replacing books)

# New Market Disruption

Occurs when **an innovation fits a new market** that is not being served by existing incumbents in the industry

- Conversion of non-consumers into consumers
- Initially caters to the new market
- As it improves quality, it is able to induce consumers to defect from the existing market into the new market that it created

# Case Studies – new market disruption ?



CLOUD MACHINE  
LEARNING ENGINE



No

No

Yes

Yes

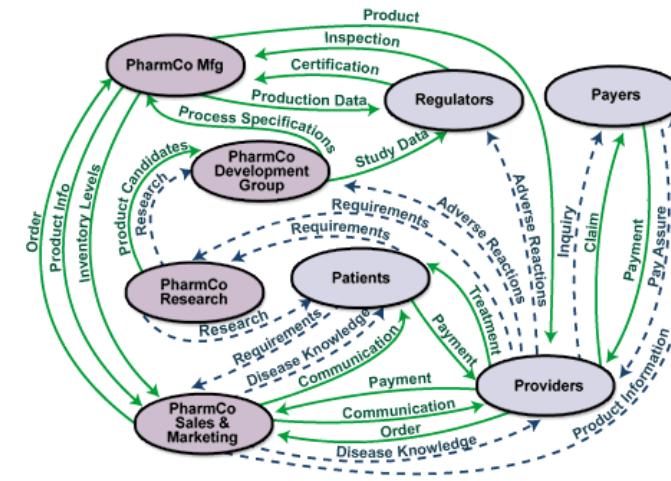
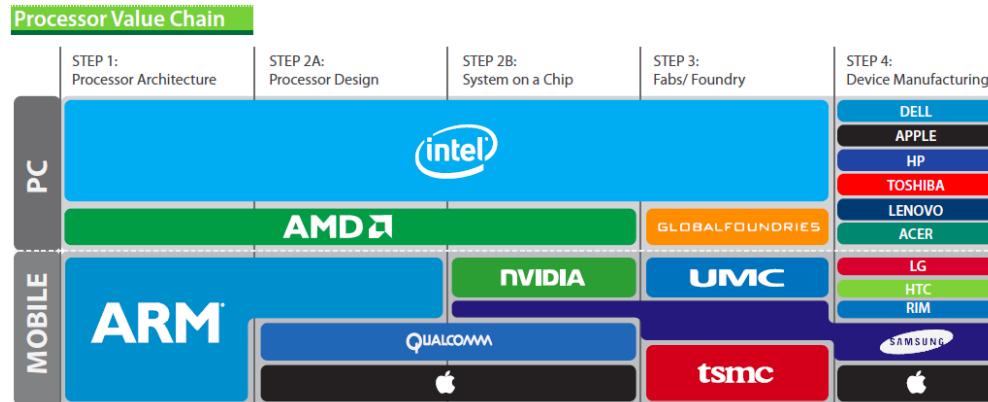
No

## Porter's “Value Chain”

- Typically describe how value is added within different business units of a company
- **Products pass through stages and value is added at each stage**
- More suited to manufacturing physical goods than IT
- Has been extended to show how **value flows** through an **industry**
- **In this course, we will only be talking about value chains within industries – industry value chain – not internally within companies**

# Use of Value Chains/Networks

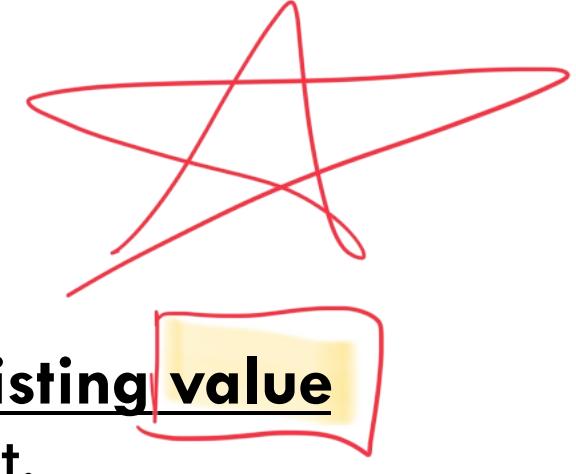
- Analysing value chains/systems/networks is useful for:
  - Understanding an industry (including relationships between companies)
  - Understanding your company's position within the market
  - Deciding where your company wants to be within that market
  - Looking for opportunities for disruptive innovations



# Disruptive innovators and value networks

- Recap: “**value network**” – Similar concept to “industry value chain” but usually **more focused on the whole system** rather than for a specific product/service type
- “When would-be disruptors enter into existing value networks, **they must adapt their business models** to conform to the value network and therefore fail that disruption because they **become co-opted.**”
- (Clayton Christensen, “The Innovator’s Dilemma”, 1997)

# Summary of “Disruptive Innovation”



## Low-End Disruption

Come at the bottom of the market and take hold within an existing value network before moving upmarket and attacking the incumbent.

## New Market Disruption

Take hold in a completely new value network and appeal to customers who have previously gone without the product.

## “The Innovator’s Dilemma”

- Christensen identified the “innovator’s dilemma”...
- Effective established companies study the needs of their customers
- The companies innovate to meet these customer needs
- The companies sell new products/versions to their customers
- The most important existing customers are the high-end ones who spend the most so the focus is on them
- The dilemma is that a company needs to move upmarket to capture customer segments with higher profitability (i.e. sustaining innovation). However, in doing so, they are more likely to get disrupted (i.e. low-end or new market disruption).
- Examples:
  - Kodak and digital camera
  - Blockbuster and online movie streaming

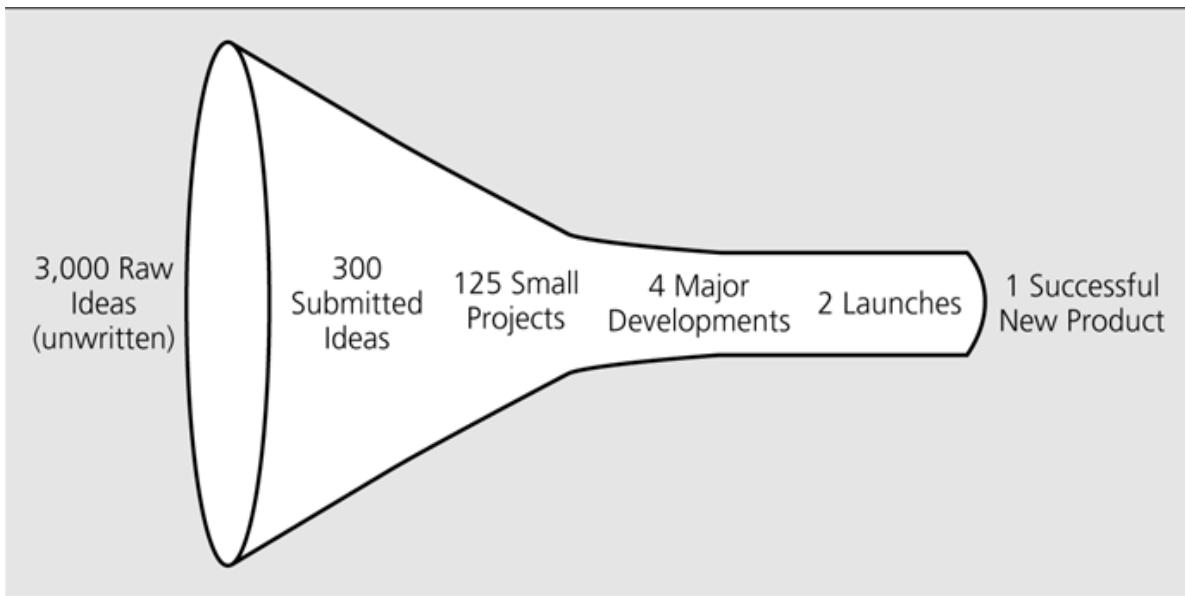
# Ambidexterity Strategy



- Strategy to resolve the Innovator's Dilemma
- **Ambidexterity:** The ability of a firm to simultaneously explore and exploit, enabling the firm to adapt over time
- Like the left hand and right hand of an organization:
  - The organization concentrate on serving clients well on one hand (“exploit”)
  - The organization concentrate on innovation with the other hand (“explore”)
- Discussed more in later Lectures

# Evolution of innovation by companies: Traditional model

- This is a simplistic model assuming:
  - Simple one-way flow – left to right (it's not usually this simple)
  - All activities inside a single company (no in-flows, no out-flows)



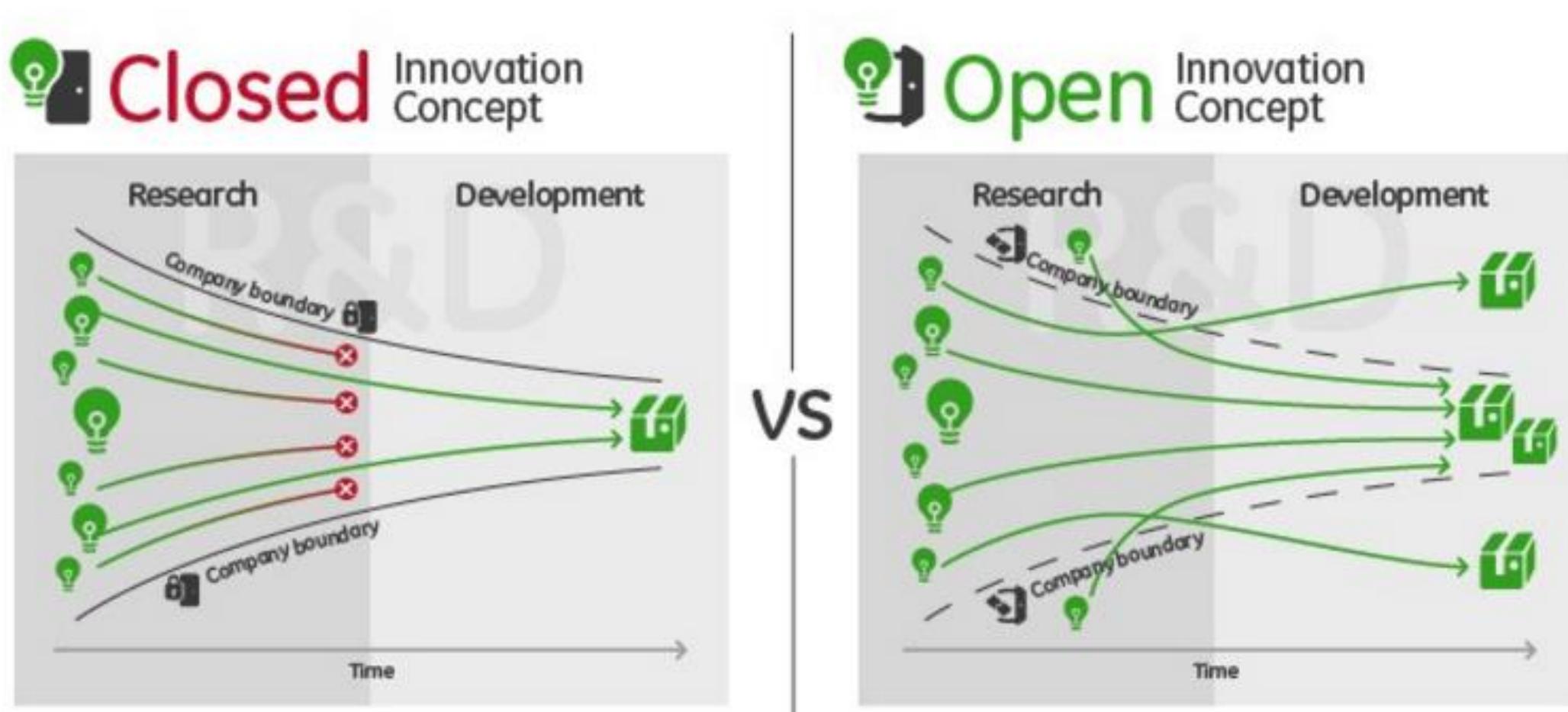
Source – Schilling, 2013

# Evolution of innovation by companies:

## Some trends in the late 20<sup>th</sup> century

- More mobility of workers between companies
- More outsourcing of work
- Globalisation (more working across countries)
- Better information and communication technologies (e.g., email, web)
- Availability of venture capital funding allowing small companies to grow quickly (even without revenue)
- Easier to create and build new technology companies
- So more opportunities for collaborative innovation

# The classic innovation funnel: “Closed innovation”



# Types of open innovation

## 1. Outside-in process:

- “Enriching the company’s own knowledge base through the integration of suppliers, customers, and external knowledge sourcing”. E.g., Microsoft acquired GitHub

## 2. Inside-out process:

- “Earning profits by bringing ideas to market, selling IP, and multiplying technology by transferring ideas to the outside environment.”, E.g., Qualcomm's Licensing Model

## 3. Coupled process:

- “co-creation with (mainly) complementary partners through alliances, cooperation, and joint ventures during which give and take are crucial for success.”. E.g., BMW, Intel, and Mobileye Collaboration

Source: Enkel, Gassmann and Chesbrough (2009)

## Some benefits of open innovation

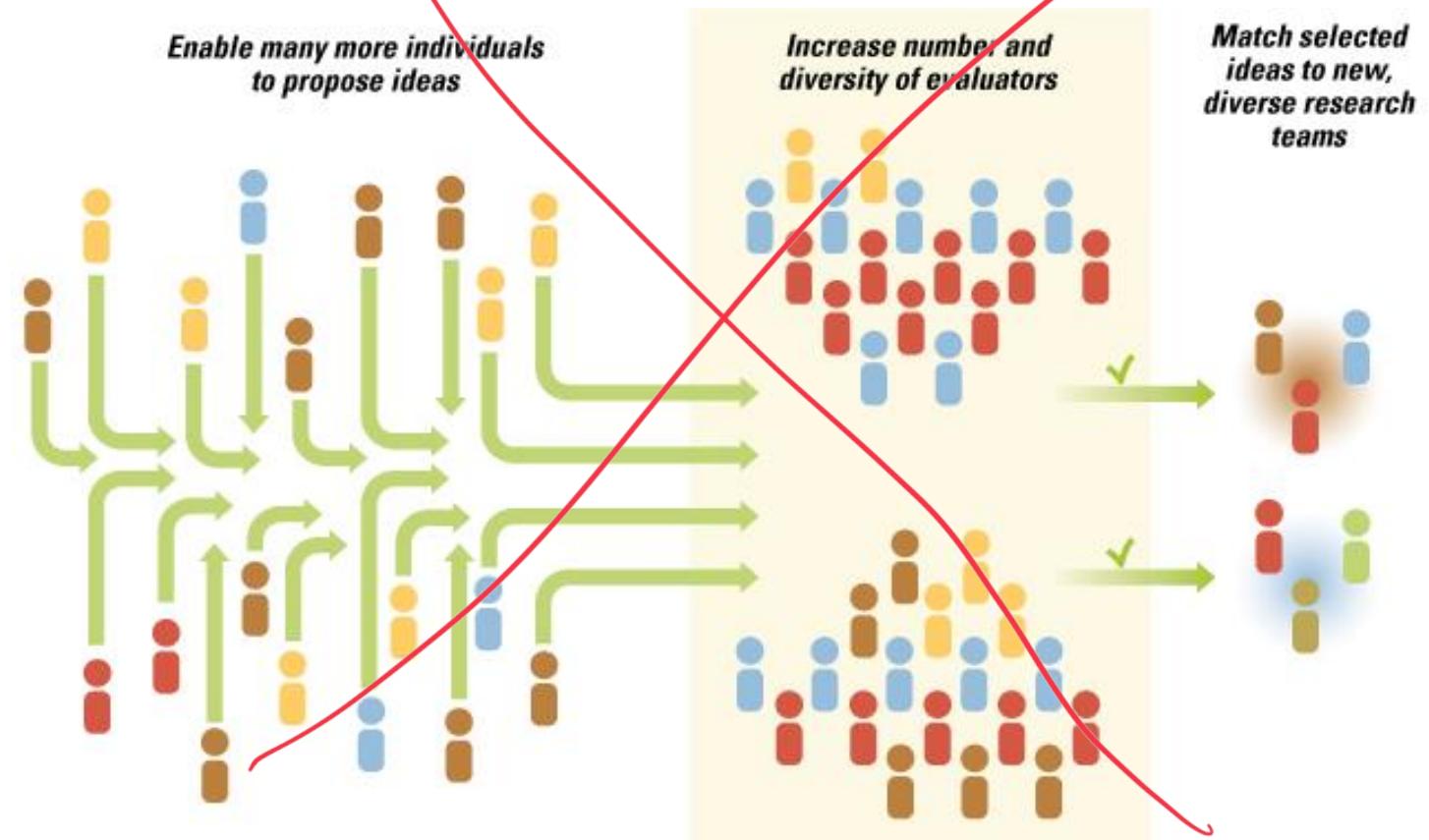
-  Larger base of ideas to draw from for innovation
  - “Not all of the smart people work for us” (Bill Joy from Sun Microsystems)
-  Existing third-party technology can be used, reducing risk and cost of development
-  Identification of new business opportunities with collaborators
-  Share risks and pool resources with other companies
-  Can be lower cost than large R&D departments

# Risks of open innovation (compared to closed innovation)

-  Lack of control
  - Will usually not have as tight control of external resources as internal ones
-  Higher complexity of managing innovation
  - Need to manage external relationship, intellectual property, confidentiality etc
-  Higher coordination costs
  - May cost to coordinate external resources
-  Possible loss of own capability over time
  - If are not using and building a capability but relying on others
-  Possible loss of competitive advantage compared to others
  - If allow others to build skills in area important to your business, they can sell their expertise to your competitors (contracts can help address the risk)

# Distributed innovation

- “a system in which innovation emanates not only from the manufacturer of a product but from many sources including users and rivals”
- Eric von Hippel (1988) paraphrased by Carliss Baldwin (2012)



<http://sloanreview.mit.edu/article/experiments-in-open-innovation-at-harvard-medical-school/> (Mar'25)

## Enabling distributed innovation: **Modularity**

- In software engineering, modularity refers to how much a software/Web application may be divided into smaller modules. Software modularity indicates that the number of application modules can serve a specified business domain.

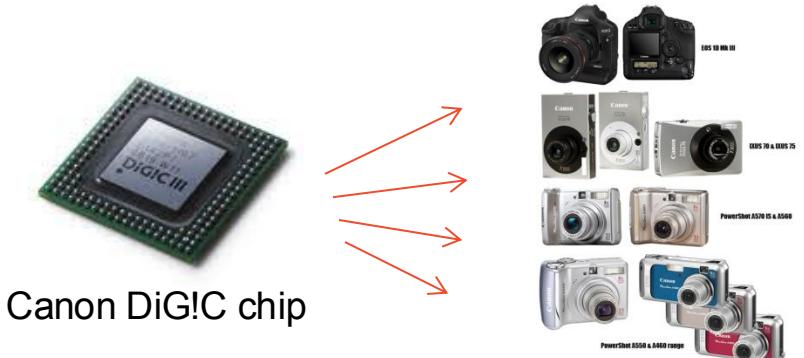
<https://www.techopedia.com/definition/24772/modularity>

# Enabling distributed innovation: **Modularity**

- Products may be modular at:
  - **User level** e.g. Firefox add-ons, Microsoft Office plug-ins, Smartphone Apps
  - **Producer (company) level** e.g. Software products based on a company's platforms
  - **Industry level** e.g. Each component of a PC made by different company

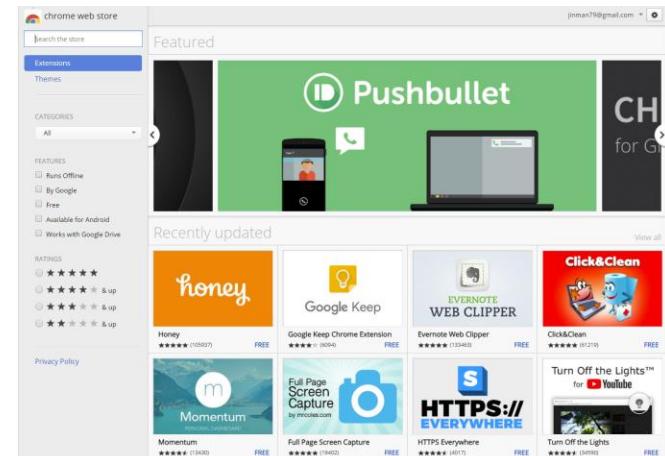
# Product Platforms

- Concept became popular in the 90s – used for reusable components/design frameworks
- Foundation of components around which a company builds related products
- Also known as “product family engineering”
- Platforms make it possible for companies to:
  - Have a rich line-up of different products with the same core functions
    - At different price-points
    - For different customer types
  - To do so efficiently through re-use of a common platform



Canon DiG!C chip

<http://www.reghardware.com/>

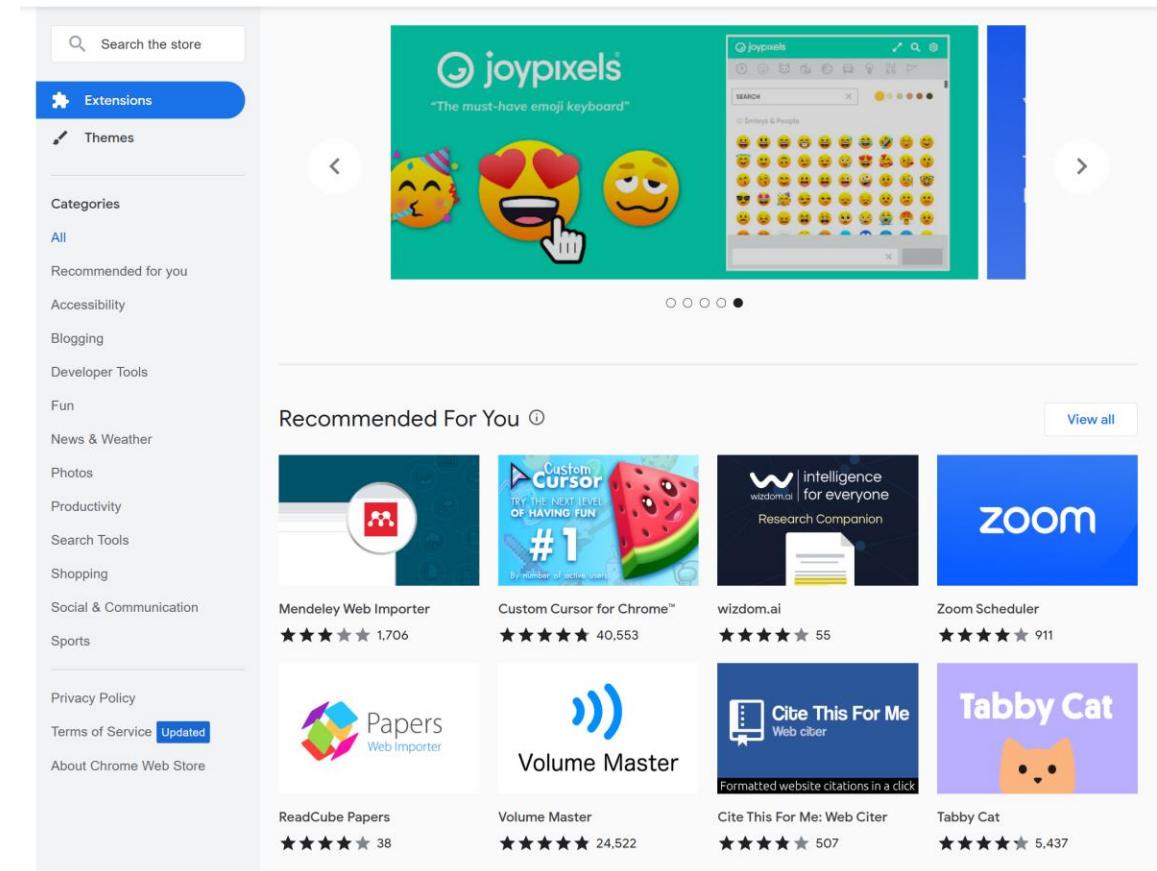


## Some ways in which companies provide IT product platforms

- Make source code available:
  - Allows external innovators to modify the software for their own needs
  - E.g., Core Java platform
- Provide toolkit (software and documentation):
  - Allows external innovators to write software based on the toolkit
  - E.g., SAP XML Toolkit for Java
- Provide plug-in/add-on support in software:
  - Allows external innovators to customise software without access to source code
  - E.g., Google Extensions
- Provide a complete product platform for external innovation
  - Allows external innovators to write rich and varied applications on the platform
  - E.g., Android and iPhone app architectures
- Provide live data/functionality via an application programming interface (API)
  - Allows external innovators to build new services using the data
  - E.g., Facebook API

# Example of a Product Platforms – Google Extensions

- Extensions are small software programs that **customise the browsing experience**. They enable users to tailor Chrome functionality and behavior to individual needs or preferences.
- They are built on web technologies such as HTML, JavaScript, and CSS.



[Chrome Web Store - Extensions \(google.com\) \(Mar'25\)](https://chrome.google.com/webstore/category/extensions)

# Product Platforms: Benefits

- For external product platform:
  - Can be made available externally, leading to new businesses, and new business models
- For internal product platform:
  - Reuse technology component in multiple products leading to:
    -  Faster development time so gets to market sooner
    -  Lower effective cost (as spread over multiple products)
    -  Higher adaptability and ‘evolve-ability’
    -  Innovative aspects of the platform can benefit a range of products
    -  Application development on platform can focus on innovative value-add

# Web APIs

- Interfaces for web-based services to interact (usually RESTful APIs)
- Enable modularity on the web
- Used e.g.:
  - Maps
  - Payment
  - Messaging
- Becoming the underlying infrastructure for a lot of automation

Image: developer.google.com

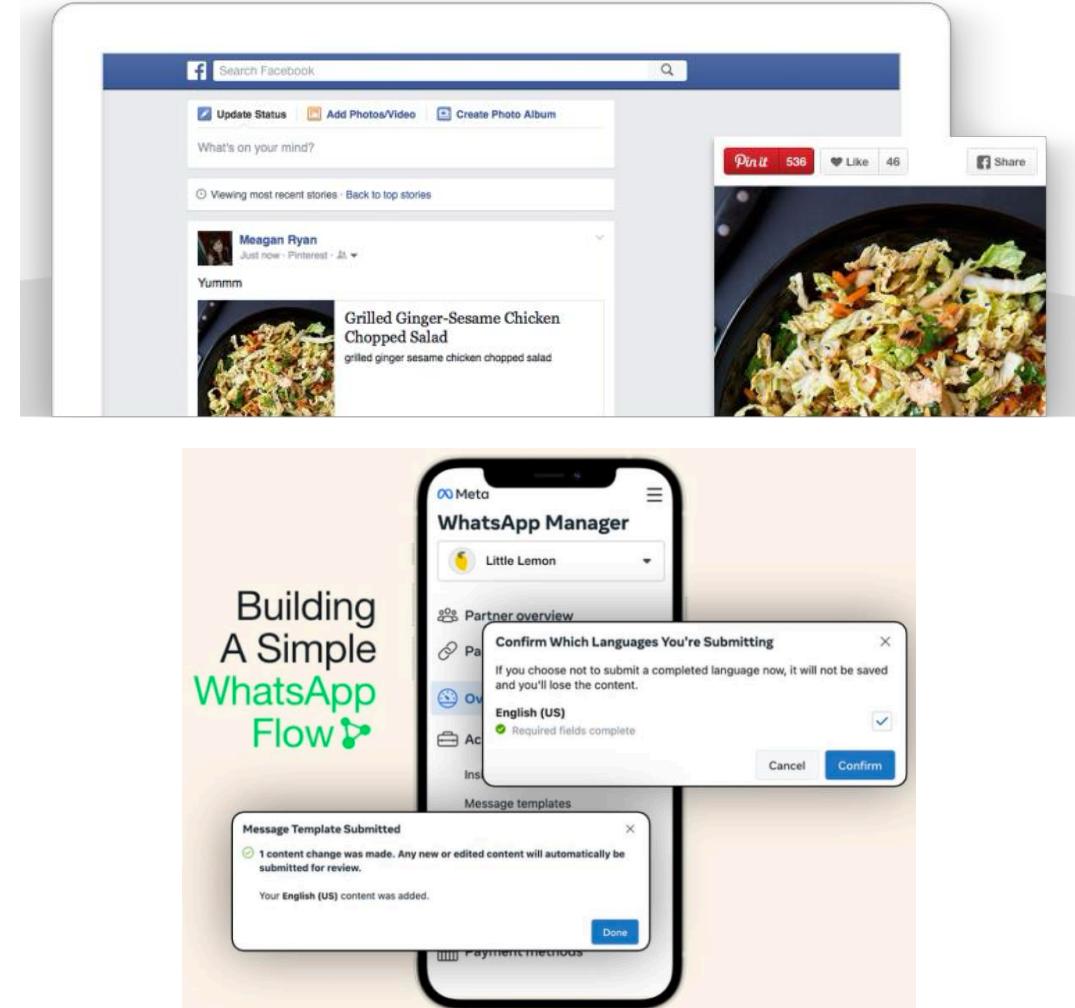


Image: facebook.com/developer

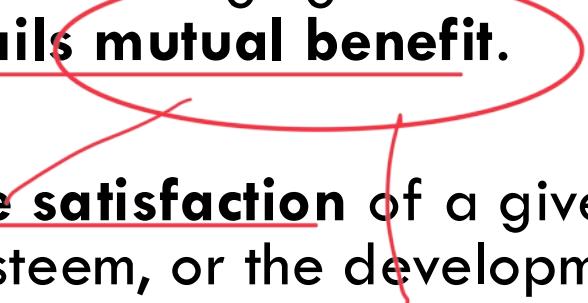
# API Business models

- Models can be: Free /Developer Pay / Developer Gets Payed / Indirect
- **API as a product:** This category implies that the API has a specific money-making goal or serves as a significant or single source of income for the company. By definition, APIs in this category must provide value that is easy to monetize, and is highly competitive or unique
- **API enhancing existing product:** A majority of monetized APIs fall into this category. With the main money-making responsibility assigned to another part of the business, API providers have a greater set of business model options, ranging from direct pay-to-play to indirect, commission-based compensation
- **API promoting existing product:** Designed to solidify the market position, APIs in this category are often offered for free, and work to attract interest and traffic to the API provider.

<https://www.epam.com/insights> (Mar'25)

[A Quick Guide to Business Models for APIs](#) (Mar'25)

## Crowdsourcing: Newer definition

- Crowdsourcing is a type of participative online activity in which an individual, an institution, a non-profit organization, or company proposes to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task.
- The undertaking of the task, of variable complexity and modularity, and in which the crowd should participate bringing their work, money, knowledge and/or experience, always entails mutual benefit.
- The user will receive the satisfaction of a given type of need, be it economic, social recognition, self-esteem, or the development of individual skills, while the crowd-source organization will obtain and utilize to their advantage what the user has brought to the venture, whose form will depend on the type of activity undertaken.

Estellés-Arolas, E., & González-Ladrón-de-Guevara, F. (2012). Towards an integrated crowdsourcing definition. *Journal of Information science*, 38(2), 189-200.

# Crowdsourcing: The typical crowdsourcing process

## The Crowdsourcing Process *In Eight Steps*



Image by Daren C. Brabham | [www.darenbrabham.com](http://www.darenbrabham.com)

# Crowdfunding

- ~~Crowdsourcing is the sourcing of anything from a crowd~~
- **Crowdfunding is the sourcing of funds from a crowd - a specific type of crowdsourcing.**

Platform	Total Raised	Supporters	Platform Fee	Payment Fee	Important to Know
 GoFundMe	\$25B	50M	0%	2.9% + \$0.30	<ul style="list-style-type: none"><li>✓ Can quickly set up withdrawals and deposits take an average of 2-5 business days</li><li>✓ Coaching and account support throughout the fundraising and donation process</li><li>✓ Easy to use fundraising tools make setup fast (e.g., mobile app and superior add beneficiary feature)</li><li>✓ The GoFundMe Giving Guarantee – in the very rare case that something isn't right with a fundraiser, donors may be eligible for a 100% refund of their donation</li></ul>
 Indiegogo	\$1.5B	10M	5%	3.0% + \$0.30	<ul style="list-style-type: none"><li>✓ Offers "flexible funding"</li><li>✓ Specializes in technology and hardware product launches</li><li>✓ Regular email support hours; marketing and campaign strategy support</li></ul>
 Kickstarter	\$3B	15M	5%	3.0% + \$0.20	<ul style="list-style-type: none"><li>✓ Specializes in creative projects with robust reward level feature</li><li>✗ 14-day wait to withdraw and deposits take 5-7 business days</li><li>✗ Limited email support hours</li><li>✗ Requires Kickstarter approval to launch a fundraiser</li></ul>
 Fundly	\$330M	NA	4.9%	2.9% + \$0.30	<ul style="list-style-type: none"><li>✓ Can withdraw immediately and deposits take 2-5 business days</li><li>✗ No donor guarantee policy for fraud protection</li><li>✗ Limited email support hours</li></ul>
 JustGiving	NA	22M	<b>Nonprofits:</b> 0-5% <b>Personal:</b> 0%	<b>Nonprofits:</b> 2.9% <b>Personal:</b> 0% 2.9% + \$0.30	<ul style="list-style-type: none"><li>✓ Supports UK gift aid</li><li>✗ 14-day wait to withdraw and deposits take 6-10 business days</li><li>✗ No fraud protection offered</li><li>✗ Limited email support hours</li></ul>

<http://www.crowdfunding.com/>

# Why do people engage with crowdsourcing?

Many reasons including:

- “the desire to earn money;
- to develop one’s creative skills;
- to network with other creative professionals;
- to build a portfolio for future employment;
- to challenge oneself to solve a tough problem;
- to socialize and make friends;
- to pass the time when bored;
- to contribute to a large project of common interest;
- to share with others; and
- to have fun.”

Brabham, D. C. (2012). Crowdsourcing: A model for leveraging online communities. In *The participatory cultures handbook* (pp. 120-129). Routledge.

# Types of Crowdsourcing (Brabham, 2011)

Type	How it Works	Kinds of Problems	Examples
Knowledge Discovery and Management	Organization tasks crowd with <u>finding and collecting information into a common location and format</u>	Ideal for <u>information gathering</u> , organization, and reporting problems, such as the creation of collective resources	Peer-to-Patent <i>peertopatent.org</i>  SeeClickFix <i>seeclickfix.com</i>
Broadcast Search	Organization tasks crowd with <u>solving empirical problems</u>	Ideal for ideation problems with <u>empirically provable solutions</u> , such as scientific problems	InnoCentive <i>innocentive.com</i>  Goldcorp Challenge <i>Defunct</i>
Peer-Vetted Creative Production	Organization tasks crowd with <u>creating and selecting creative ideas</u>	Ideal for ideation problems where solutions are matters of <u>taste or market support</u> , such as <u>design or aesthetic problems</u>	Threadless <i>threadless.com</i>  Doritos Crash the Super Bowl Contest <i>crashthesuperbowl.com</i>  Next Stop Design <i>nextstopdesign.com</i>
Distributed Human Intelligence Tasking	Organization tasks crowd with <u>analyzing large amounts of information</u>	Ideal for large-scale data analysis where <u>human intelligence is more efficient or effective than computer analysis</u>	Amazon Mechanical Turk <i>mturk.com</i>  Subvert and Profit <i>subvertandprofit.com</i>

[SeeClickFix | 311 Request and Work Management Software](#)

[Challenges – Wazoku](#) (now Wazoku)

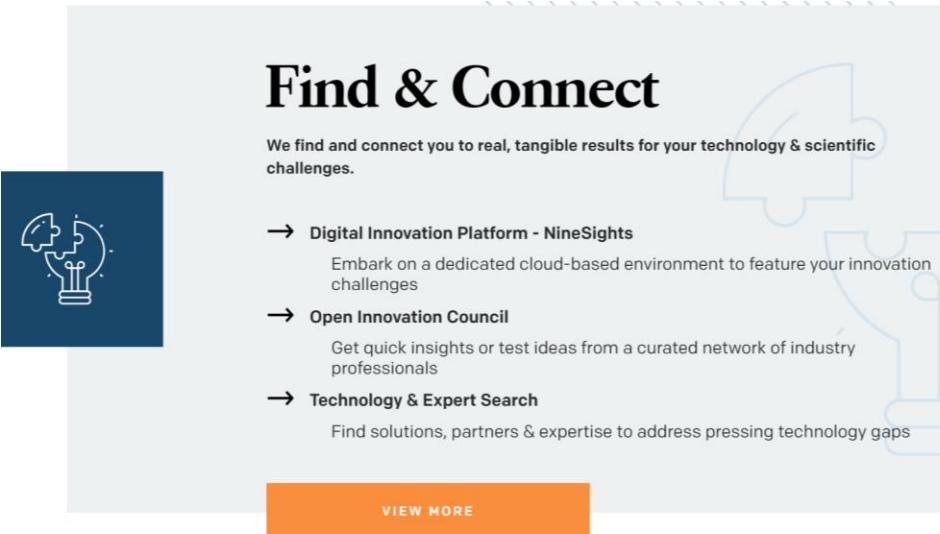
[Threadless](#)

[Amazon Mechanical Turk](#)

# Crowdsourcing for innovation: Another typology

## – Intermediary platforms

- Research & Development platforms (e.g. Innocentive, NineSigma)
- Marketing, Design & Idea platforms (e.g. 99designs)
- Collective intelligence & Prediction platforms (e.g. Kaggle)
- HR and Freelancers platforms (e.g. TopCoder, Amazon Mechanical Turk)
- Open innovation software
- Intermediary open innovation services



The image shows a screenshot of the NineSigma website's 'Find & Connect' section. At the top, there is a large blue button with a white gear icon. To the right, the heading 'Find & Connect' is displayed in bold black text. Below it, a sub-headline reads 'We find and connect you to real, tangible results for your technology & scientific challenges.' A list of three services is provided, each with an arrow icon:

- Digital Innovation Platform - NineSights: Embark on a dedicated cloud-based environment to feature your innovation challenges
- Open Innovation Council: Get quick insights or test ideas from a curated network of industry professionals
- Technology & Expert Search: Find solutions, partners & expertise to address pressing technology gaps

A 'VIEW MORE' button is located at the bottom of the section.

[Contribute to open innovation - We make innovation happen | NineSigma](#)



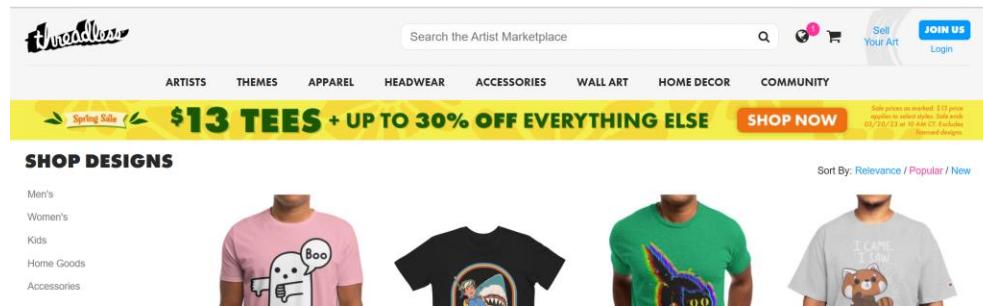
Categories How it works Find a designer Inspiration Studio

<https://99designs.com.au/>

# Crowdsourcing for innovation: Another typology (Cont.)

## – Creative co-creation

- E.g. **Threadless**, [Custom Tattoo Design Contests & Tattoo Ideas | CreateMyTattoo.com](#)



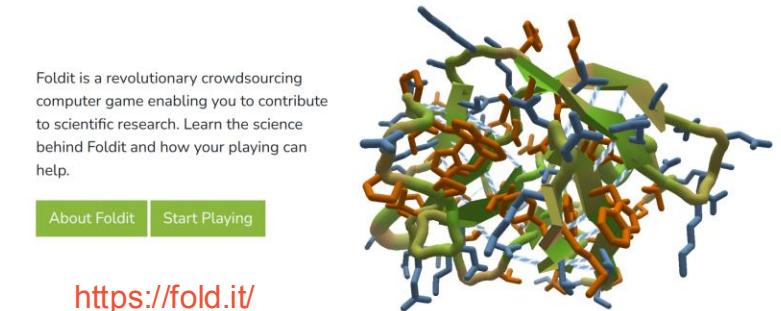
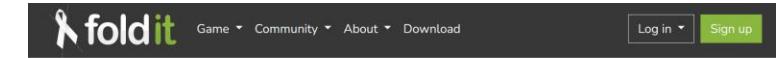
[Browse Designs | Threadless](#)

## – Corporate initiatives

- Product ideas crowdsourcing (e.g. IBM InnovationJam [IBM InnovationJam® - Overview | IBM](#))
  - *What began as an internal experiment in 2001... is now a proven management tool for driving innovation and collaboration. IBM's InnovationJam® offering is ideal for companies and enterprises looking to kick-start a transformation or change program through a transparent 'conversation'.*
- Branding and Design crowdsourcing (e.g. Fluevog)

# Crowdsourcing for innovation: Another typology (Cont.)

- Peer production
  - E.g. Linux, Wikipedia
- Public crowdsourcing
  - E.g.
  - Fold it - a *revolutionary crowdsourcing computer game enabling you to contribute to scientific research. Learn the science behind Foldit and how your playing can help.*
- Nasa Open Innovation



<https://fold.it/>

A screenshot of the DATA.NASA.GOV website's "Open Innovation Sites" section. The page has a dark header with the NASA logo and links for "About", "Developers", and "Sign-in". Below the header, there are four cards representing different sites:

- code.nasa.gov**: A clearinghouse site for information about NASA APIs. Acts as a passthrough site to NASA APIs elsewhere. Request a key and get to work!
- api.nasa.gov**: A clearinghouse site for information about NASA APIs. Acts as a passthrough site to NASA APIs elsewhere. Request a key and get to work!
- open.nasa.gov**: More information about all open-innovation sites like code.nasa.gov and data.nasa.gov. Information about datanauts, a problem that lets the public collaborate with nasa. Information about federal open-data mandates that apply to NASA.
- data.nasa.gov (this site)**: NASA's central open-data site for the public. Aggregates data from different archives and datasets not available anywhere else.

## Other NASA Data Sites and Science Archives

Additionally, NASA has a number of data archives, often geared around providing the public with datasets from a particular domain, field of science, or mission. Lastly, there are also open-data and open-code aggregator sites that collect open-data and open-code from across all federal government agencies; code.gov and data.gov. Both of these have some APIs for working with their datasets that make them worth checking out even if you're [scrapping interest in NASA data](#).

[Open Innovation | NASA](#)

## What is ‘Open Data’?

“Open means **anyone** can **freely access, use, modify, and share** for **any purpose** (subject, at most, to requirements that preserve provenance and openness).”

Put most concisely:

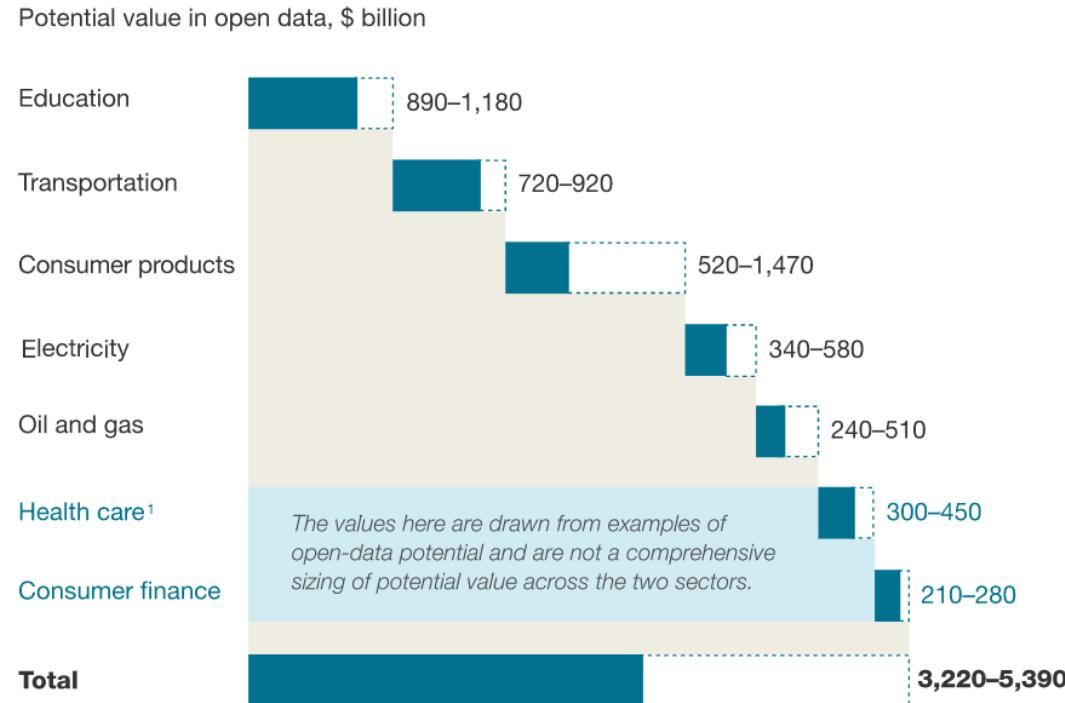
“Open data and content can be freely used, modified, and shared by anyone for any purpose”

<https://opendefinition.org/>

# Value in Open Data

Exhibit

Open data can help unlock \$3 trillion to \$5 trillion in economic value annually across seven sectors.



<sup>1</sup>Includes US values only.

Source: McKinsey Global Institute analysis

- **Economic value** e.g. increased efficiency, new products and services, and a consumer surplus (cost savings, convenience, better products)
- **Big data's impact** e.g., replacing or supporting human decision making
- **Business opportunities** e.g., new products and services
- **Governments to play a central role**

## Value in Open Data – Self-reinforcing cycle

- The benefits of open data can be **self-reinforcing**: they will increase as **individuals perceive the advantages and help to improve the accuracy** and detail of the information available.
- However, this cycle can gather momentum only if **private industries and public agencies cultivate a vibrant open-data ecosystem** and implement policies to protect stakeholders.
- For companies, that means putting in place the **technologies and talent to collect and analyze data**.
- For individuals—as both consumers and citizens – it means **being vigilant, savvy providers and users of open data**.

# What is Free Software? (using Free Software Foundation definition)

- “Free software is a matter of the users' freedom to run, copy, distribute, study, change and improve the software. More precisely, it means that the program's users have the **four essential freedoms**:
  - The freedom to run the program, for any purpose (freedom 0).
  - The freedom to study how the program works, and change it to make it do what you wish (freedom 1). Access to the source code is a precondition for this.
  - The freedom to redistribute copies so you can help your neighbour (freedom 2).
  - The freedom to distribute copies of your modified versions to others (freedom 3). By doing this you can give the whole community a chance to benefit from your changes. Access to the source code is a precondition for this. “

Source: <http://www.gnu.org/philosophy/free-sw.html>

## “Copyleft”

- Play on word “copyright”
- “Copyleft is a general method for making a program (or other work) free, and requiring all modified and extended versions of the program to be free as well.” (Free Software Foundation)
- Example of a copyleft licence is the GNU Public License (GPL)
  - More in later lectures

<http://www.gnu.org/copyleft/>

**Copyright** is a legal concept that provides **exclusive rights** to creators, while **Copyleft** is a licensing method that encourages the unrestricted sharing, modification, and utilisation of creative works.



Copyleft symbol

# What is Open Source Software (OSS)? (using Open Source Initiative definition)

- To be classified as OSS, the software must be (according to its licence):
  - Freely redistributable
  - Source code must be available for free or at reasonable reproduction cost
  - Modifications and derived works must be allowed and be distributable under same terms
  - Can protect integrity of author's source code as long as allow source code patches
  - No discrimination against people/groups
  - No discrimination against fields of endeavour
  - Must not be restricted to use with a specific product
  - Must not place restrictions on other software distributed with it
  - Must be technology-neutral

## Difference between Free Software and Open Source Software

- According to Stallman, "Open source is a development methodology; free software is a social movement."
- Open Source covers a wider range of licence types
- More ability to mix Open Source software with proprietary software than is the case for free software
- The Open Source concept was developed to bring major software businesses and other high-tech industries into the mix.
- When avoiding distinguishing between these, people use the terms:
  - FOSS (Free and Open Source Software); or
  - FLOSS (Free/Libre and Open Source Software)

Source: <http://www.gnu.org/philosophy/open-source-misses-the-point.html>



# Free software and open source software: Examples

- **OSS and copyleft** (changes to the source must be made available to others)
  - The Linux kernel
  - MariaDB (database software based on MySQL codebase)
  - Eucalyptus (for building private clouds – company bought by HP)

- **OSS and not copyleft** (the source do not need to be made available to others)
  - Apache web server
  - OpenCV (Computer Vision library originally by Intel)
  - Chromium (the core of Google Chrome web browser)

*Note: It's a bit more complicated than this as some of this software is available under multiple licences.  
More later on OSS licences.*

# Importance of FOSS in R&D and startups

- Most infrastructure used in R&D and startups uses FOSS:
  - Operating systems (e.g. Linux)
  - Containers (e.g. Docker)
  - System configuration management (e.g. Puppet, Chef)
- Most new software is built using FOSS:
  - Software platforms (e.g. Java, Scala, Python, Ruby on Rails, node.js)
  - Software libraries/frameworks (e.g. Spring framework, glibc)
  - Software build and test automation (e.g. Jenkins, Cucumber)
- Most new software contains FOSS:
  - To reduce the time and cost of development
  - To reduce testing and maintenance costs (assuming using stable FOSS)
  - To provide compatibility with other software
  - To focus on the core differentiator of your own software

## Some open source business models

- Sell support and services
  - Example: Canonical (with Ubuntu)
- Sell certified version (with support and services)
  - Example: Cloudera (with Hadoop)
- Sell “enterprise edition” (effectively proprietary software)
  - Example: MySQL “standard edition” (not “community edition”)
- Dual licensing (copyleft so need commercial license if modify source)
  - Example: Digia (with Qt)
- Other advantages to the company
  - Example: Google (with Android)

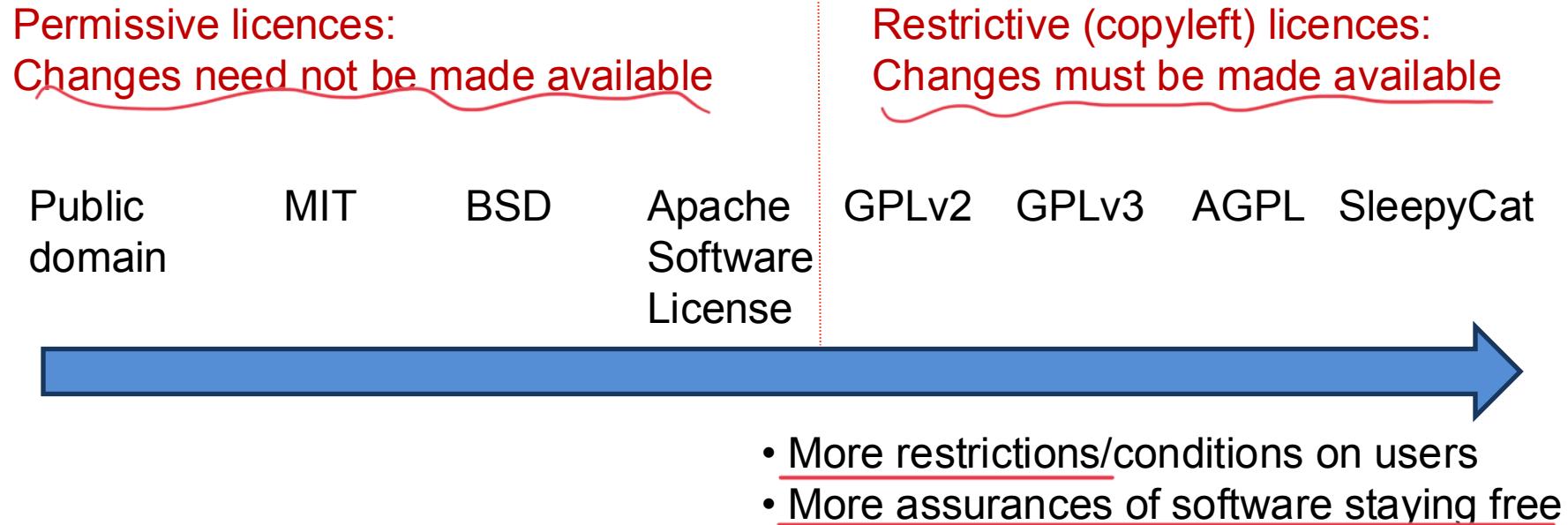
## Challenges in using FOSS in products and services

- Meeting obligations of software licenses (ensuring appropriate notices, etc.)
- Possibility of accidentally “contaminating code”
  - E.g. a programmer introduces some GPL (General Public Licence) code from the Internet into some proprietary product code and then the product is released
    - legally, the company should release the proprietary source code
- Ensuring adequate quality of the final product if it includes some open source software of unknown quality
- Avoiding security vulnerabilities in underlying code (that may already be known to hackers)

# Obligations when using open source software

- The obligations depend on the actual software licence used by the software
- Your obligations may include:
  - Nothing (i.e. no special obligations); or
  - If you redistribute the open source software in your software:
    - Mentioning that you have used it; or
    - Redistributing any changes you made to it; or
    - Not suing other companies in relation to patents you may hold related to the features of the open source software; etc

# Summary of Main open source licences



## Public domain

- Work in the public domain does not have intellectual property rights
  - (eg the right has expired or has been deliberately placed in the public domain)
- Examples: the English language, Shakespeare's works, Beethoven's music, many old photos for which copyright has expired
- Not commonly used for software because:
  - As software development is a recent activity, copyright hasn't expired yet
  - Author can't make disclaimer (unlike open source licences)

# Massachusetts Institute of Technology Licence (MIT License)

- User can do anything with the software...
- But they must make sure that the copyright of the original author is maintained
- No warranty

Copyright (C) <year> by <copyright holders>

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

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# Berkeley Software Distribution Licences (BSD Licences)

- Similar to MIT Licence but, if redistribute software is using it, it must acknowledge its use
- 4-clause (original), 3-clause (“modified”) and 2-clause (“simplified”) versions exist
- **3-clause version:**

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
- Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
- Neither the name of the <organization> nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

Removed  
in simplified  
version

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# GNU General Public Licence (GPL)



*Free as in Freedom*

- More restrictive than MIT and BSD – it is copyleft
- You can use the code and change it, but you must release all modified code under the same licence and any other code of yours that touches it
- 2 main versions - GPL v2 and GPL v3
- <http://www.gnu.org/licenses/gpl.html>
- Clause 5 of GPL v3:
  - You may convey a work based on the Program, or the modifications to produce it from the Program, in the form of source code under the terms of section 4, provided that you also meet all of these conditions:
    - a) The work must carry prominent notices stating that you modified it, and giving a relevant date.
    - b) The work must carry prominent notices stating that it is released under this License and any conditions added under section 7. This requirement modifies the requirement in section 4 to “keep intact all notices”.
    - c) You must license the entire work, as a whole, under this License to anyone who comes into possession of a copy. This License will therefore apply, along with any applicable section 7 additional terms, to the whole of the work, and all its parts, regardless of how they are packaged. This License gives no permission to license the work in any other way, but it does not invalidate such permission if you have separately received it.
    - d) If the work has interactive user interfaces, each must display Appropriate Legal Notices; however, if the Program has interactive interfaces that do not display Appropriate Legal Notices, your work need not make them do so.
  - A compilation of a covered work with other separate and independent works, which are not by their nature extensions of the covered work, and which are not combined with it such as to form a larger program, in or on a volume of a storage or distribution medium, is called an “aggregate” if the compilation and its resulting copyright are not used to limit the access or legal rights of the compilation’s users beyond what the individual works permit. Inclusion of a covered work in an aggregate does not cause this License to apply to the other parts of the aggregate.

## When creating open source software:

### How do you know what licence to use?

- Or use “Dual-licensing” – this is now very common
- Build up the market first and then provide services
- Eg:
  - Software can be licensed as GPL or proprietary licence
  - If a company doesn’t want to make their changes available, they can come to you to negotiate a proprietary licence

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

Permissive licences:

Changes need not be made available

Public  
domain

MIT

BSD

Apache  
Software  
License

Restrictive (copyleft) licences:

Changes must be made available

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:

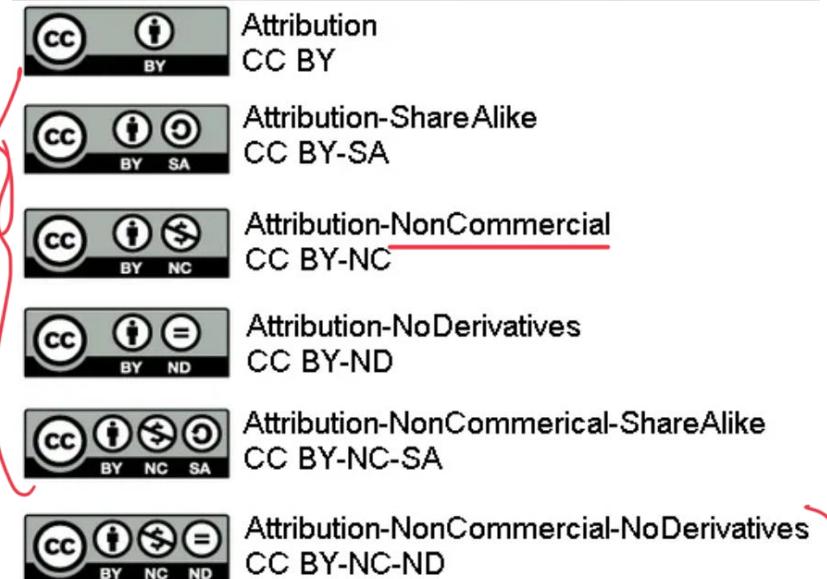
- You want to ensure that companies (using your software in their products) make their changes available (so you and others can get them):
- =>use a restrictive licence (eg GPLv3)

# Creative Commons

- Provide Creative Commons licenses and public domain tools that give every person and organization in the world a **free, simple, and standardized way to grant copyright permissions for creative and academic works; ensure proper attribution; and allow others to copy, distribute, and make use of those works**
- Creative Commons licenses give everyone from individual creators to large institutions a standardized way to grant the public permission to use their creative work under copyright law. From the reuser's perspective, the presence of a Creative Commons license on a copyrighted work answers the question, "What can I do with this work?"

The screenshot shows the Creative Commons homepage with a red header bar. The header includes links for Support CC, Store, Annual Reports, Global Network, Newsletter, Contact, and social media icons. The main navigation menu has options for Share your work, Use & remix, What We Do, and Blog. A green button labeled 'Donate Now' is visible. Below the header, a call-to-action says 'Help us build a vibrant, collaborative global commons'. To the right is a large image of a glowing circular interface with a 'CC' logo in the center, and a small text note at the bottom right.

When we share, everyone wins - Creative Commons



## “User innovation” definition

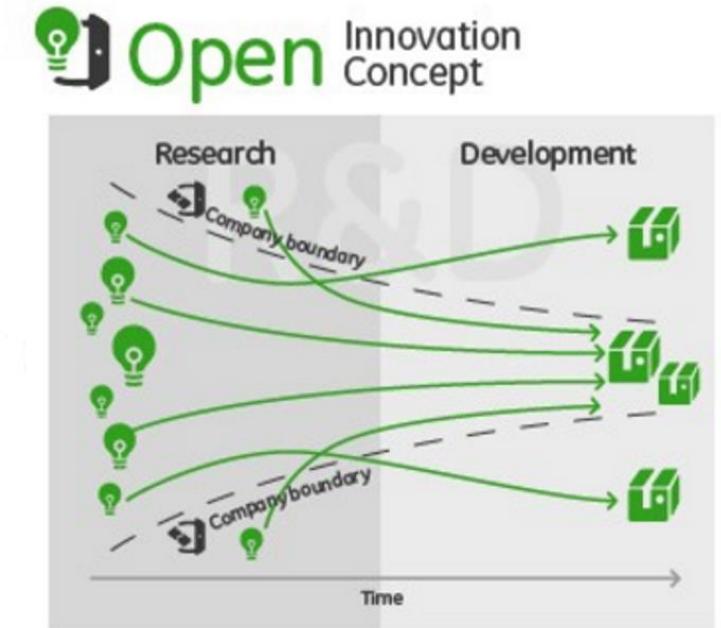
- = **User innovation** is the idea that users and consumers are more innovators of new products than suppliers.
- Eric von Hippel was among the first to notice and explore this trend.
- Products made by manufacturers (or software companies) are typically developed to meet a wide range of the needs of a wide range of people.
- Therefore, when a particular user experiences needs that are not yet felt by most consumers, they make the adjustments themselves to meet their needs.



Eric Von Hippel (MIT)

## “User innovation” definition cont’d

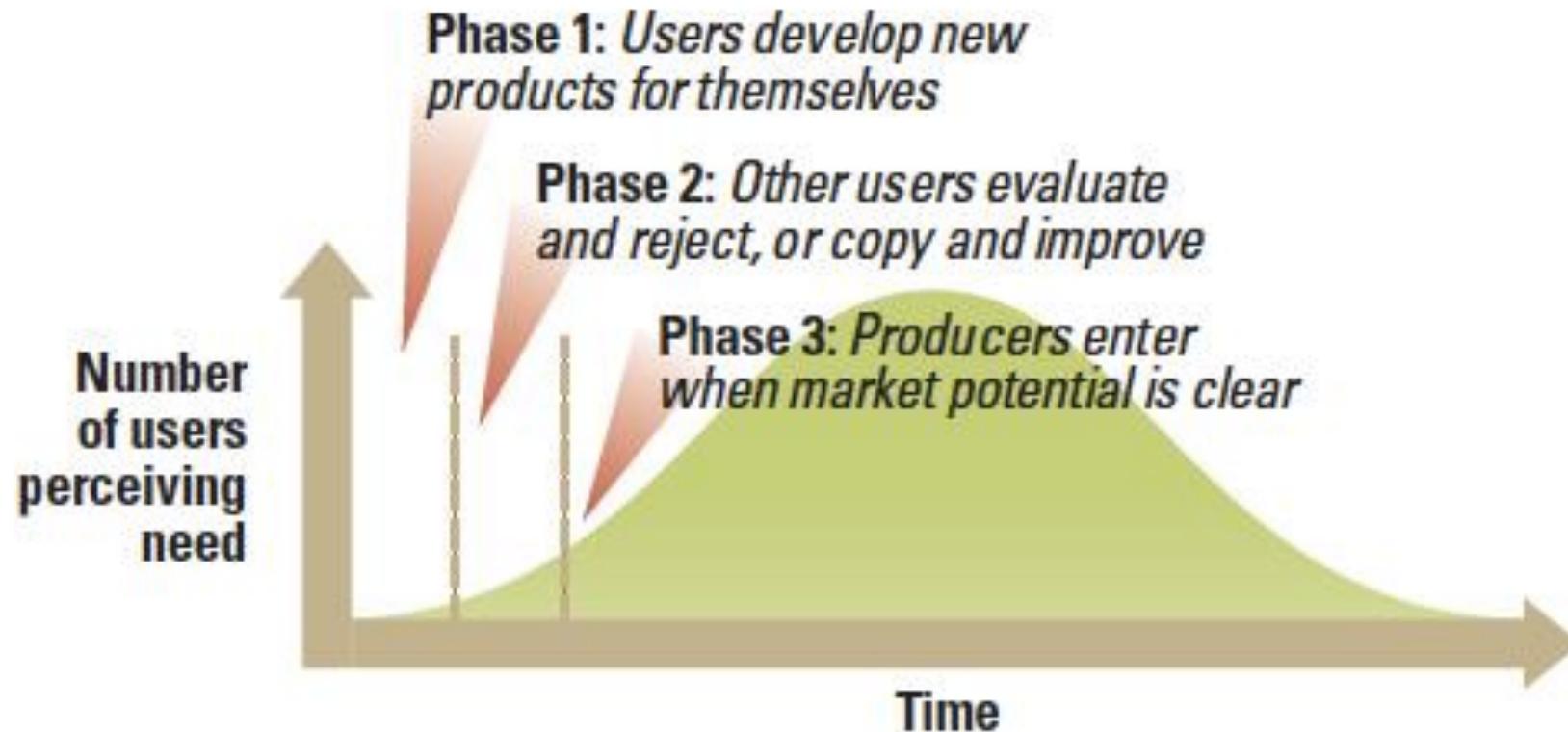
- Often, these ideas are fed back to the companies from these users in the hope that the product will be produced for them.
- **These ideas, which we discussed as part of ‘Open Innovation’ can also lead to new companies being formed, especially with IT products**



# User Innovation



Eric Von Hippel  
MIT Sloan School of Management



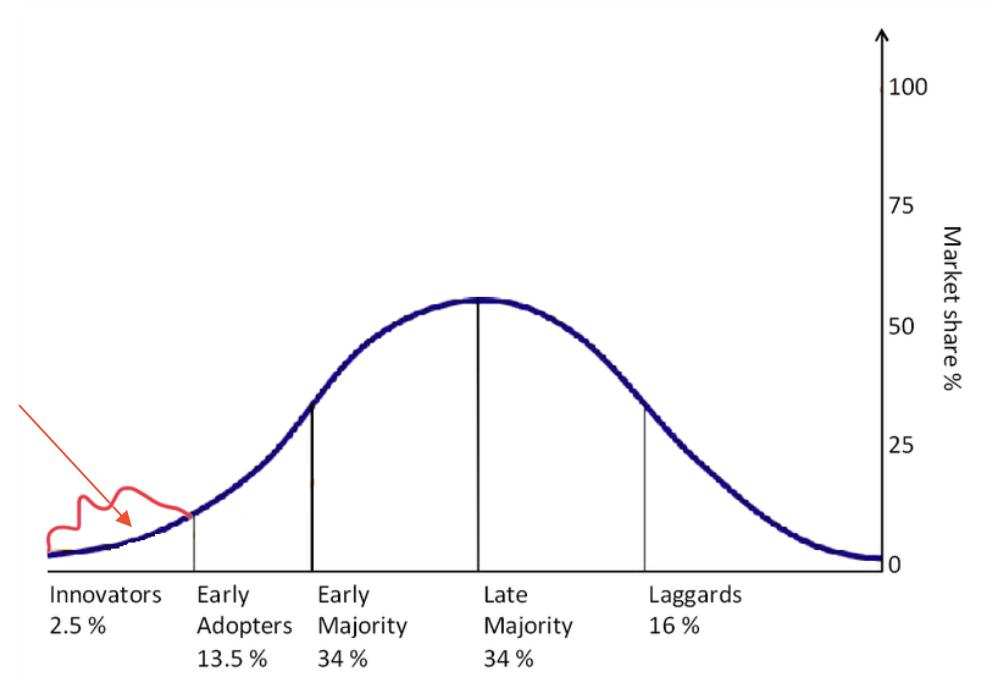
<http://sloanreview.mit.edu/article/the-user-innovation-revolution/> (MAR'25)

# Lead Users

- Involving lead users often leads to more effective innovation.
- Lead users may be individuals, companies, or communities.

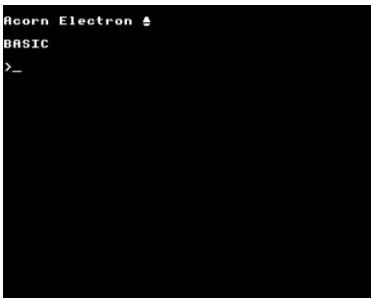


1986 journal article in **Management Science**  
“Lead Users: A Source of Novel Product Concepts”

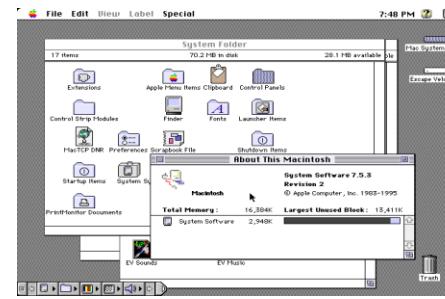


# Lead users

- In some product categories (e.g. cleaning products, food products etc), **market research** focuses on **typical users** (e.g. with interviews, or focus groups)
  - The feedback and opinions of typical users can be useful in developing new products.
- For **IT** and other **high-tech industries**, **typical users are not so effective**
  - E.g. they often suffer from "**functional fixedness**" (a cognitive bias that limits a person to use an object only in the way it is traditionally used)



Typical users not  
likely to suggest



Typical users not  
likely to suggest



# How to identify lead users

- According to Von Hippel...
- **Lead Users:**
  - Face the needs that will be general in the market, but months or years before the general marketplace realises the needs.
  - Will benefit significantly by obtaining a solution to those needs
  - Spend resources trying to solve those needs
  - Are at the leading edge of trends and are very knowledgeable about “state of the art.”
  - **Note:** Lead users are not usually a company’s “lead customers” – **they are usually not satisfied with current products, so have had to create their own**



# User-led Innovation – An alternative perspective

- **Users insights can't predict future demand:** The users themselves often have no idea if they will like a breakthrough product before they start using it.
- **User focus makes companies miss out on disruptive innovations:** “Focusing on users will lead companies to make **incremental innovations** that typically tend to make the products more expensive and complicated and ironically, in the long run, less competitive.”
- **User-led design leads to sameness:** “Even if user insights were useful, it is not a competitive advantage. Even the most advanced **user studies are now widely available.”**

<http://www.forbes.com/sites/stevedenning/2011/02/15/user-led-innovation-can-t-create-breakthroughs/#35edb5c75a9b>  
<http://www.fastcodesign.com/1663220/user-led-innovation-can-t-create-breakthroughs-just-ask-apple-and-ikea> (MAR'25)

## IT Innovation to Maker Innovation

- User Innovation propelled by IT – simple to get started as all the necessary technologies are already available e.g., APIs, open source, cloud computing, etc.
- But building, it's more difficult as there is the need for manufacturing (e.g. prototype), electronics etc.
- Things are changing with new technologies, in particular, 3d printer, Raspberry Pi etc.
- Maker movement has made tremendous interest in the recent years

# User innovation: becoming an even bigger force in innovation – e.g. “Maker movement”



Image source: <http://spotlight.macfound.org/blog/entry/craftsmanship-is-dead-long-live-maker-culture/>



Image source: <http://robodino.org/>

*“The maker movement, as we know, is the umbrella term for independent inventors, designers and tinkerers”*

<http://time.com/104210/maker-faire-maker-movement/> (MAR'25)

# What is Maker Movement

- *The Maker Movement is the embodiment of the do-it-yourself tech community — a celebration of the ever-growing culture bred from the cross-section of collaboration and creativity that is continuously recruiting people and ideas and technologies and inviting them to be tested and broken and shared. Makers are everywhere — welding in a garage, tucked away in a lab or DIY-ing on the living room floor — but the community's unofficial headquarters are all around the nation, and creating a place for makers of all kinds in the form of Makerspaces.*

[Make: Community – Home](#) (MAR'25)

## Platform businesses

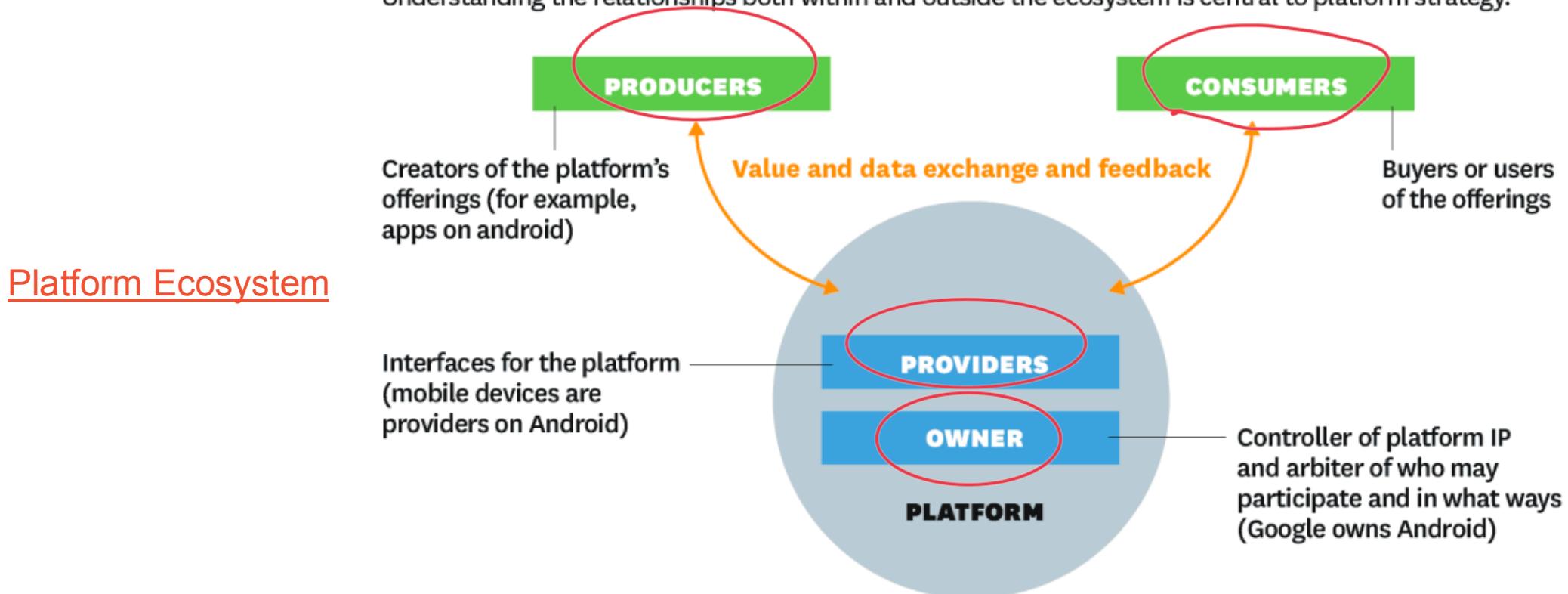
- Platform businesses bring together producers and consumers in high-value exchanges.
- Their chief assets are information and interactions, which are also the source of the value they create for their competitive advantage.

Source: Van Alstyne, Parker and Choudary

# 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.

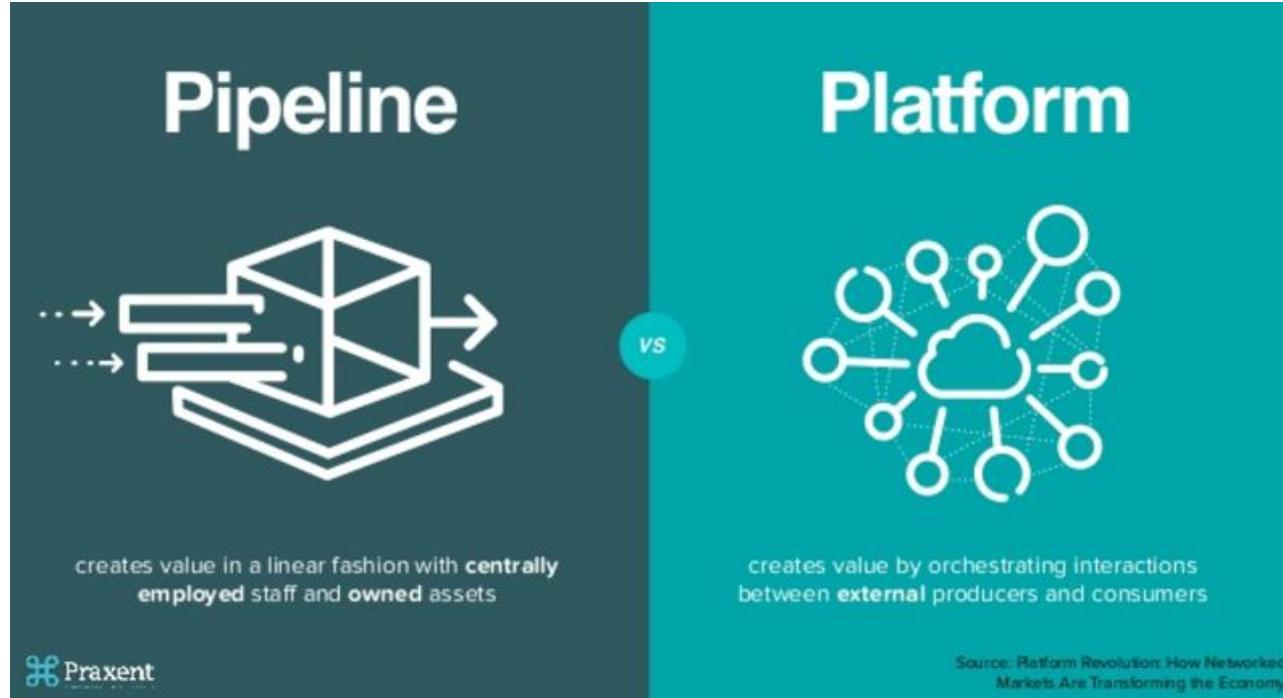


SOURCE MARSHALL W. VAN ALSTYNE, GEOFFREY G. PARKER, AND SANGEET PAUL CHOURDARY  
FROM "PIPELINES, PLATFORMS, AND THE NEW RULES OF STRATEGY," APRIL 2016

© HBR.ORG

# Pipelines vs Platforms

Companies that **take** in resources, add value to them and then release products that are higher value



Can be both (e.g., Amazon, Apple)

<https://www.slideshare.net/praxent/launching-a-hyper-scalable-platform-business-by-praxent>  
(MAR'25)

## **Strategy: From Pipeline focus to Platform focus**



1. From *resource control* to *resource automation*
  - The main asset for platforms is the network of producers and consumers
2. From *internal optimisation* to *external interaction*
  - Platforms focus on facilitating interactions in the network
3. From a focus on *customer value* to a focus on *ecosystem value*
  - Platforms focus on the total value of the expanding network

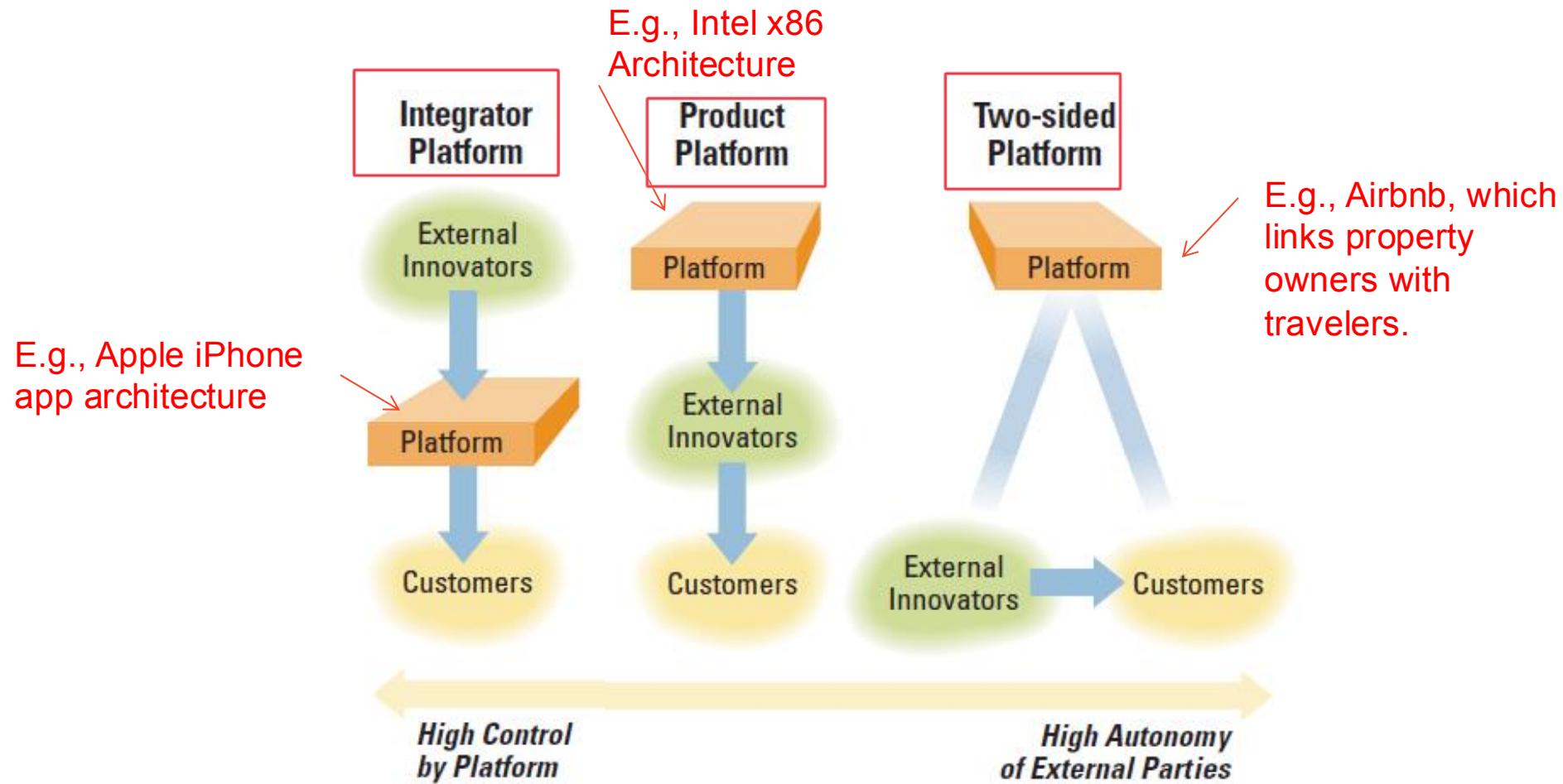
Source: Van Alstyne, Parker and Choudary

# Measuring a platform business

- Interaction failure:
  - Failure of a key interaction between producers and consumers
- Engagement:
  - Level of participation enhancing network effects
- Match quality:
  - Level of quality of interactions between producer and consumer
- Negative network effects:
  - Need to manage the platform carefully to avoid e.g., over-supply or over-demand

Source: Van Alstyne, Parker and Choudary

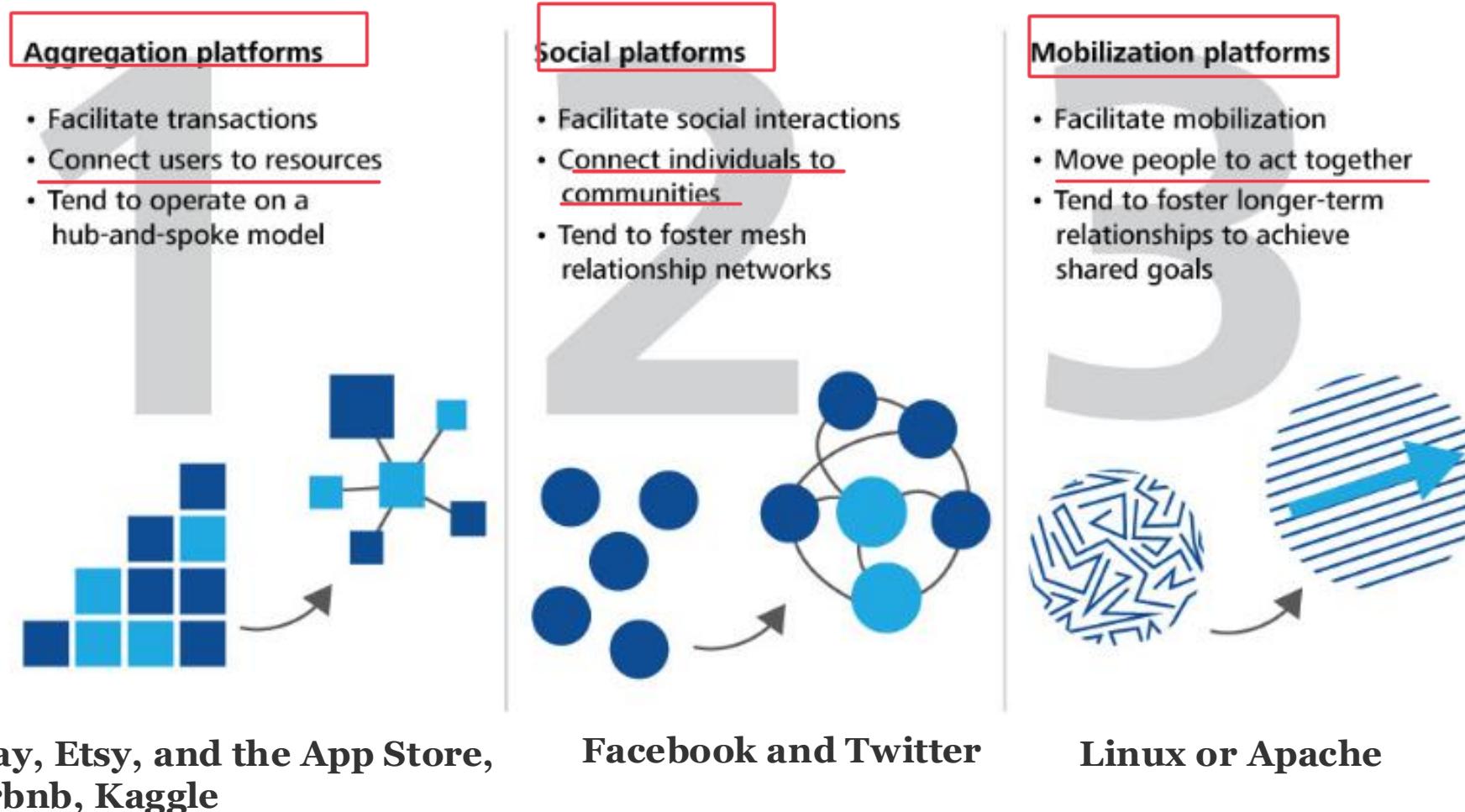
# Different forms of platform businesses



Source: K.J. Boudreau and K.R. Lakhani

# Common Platform Types

Figure 2. Three common platform types that facilitate transactions, interactions, and mobilization



Deloitte, 2015

## Governance – Protocols or Standards

- A couple of **key elements** come together to support a well-functioning platform:
  - **A governance structure:** including a set of protocols that determines who can participate, what roles they might play, how they might interact, and how disputes get resolved.
  - **An additional set of protocols or standards:** is typically designed to facilitate connection, coordination, and collaboration.
- Platforms are increasingly supported by global digital technology infrastructures that help to scale participation and collaboration

# Apple – Pioneering the App platform

- Apple (along with Google's competing Android system) overran the incumbents by exploiting the **power of platforms** and leveraging the new rules of strategy they give rise to.
- **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.
- Understanding this, Apple conceived the iPhone and its operating system as more than a product or a conduit for services. **It imagined them as a way to connect participants in two-sided markets – App developers on one side and App users on the other – generating value for both groups.**

Marshall W. Van AlstyneGeoffrey G. ParkerSangeet Paul Choudary, 2016

## Apple – leveraging the Network Effect

- As the number of participants on each side grew, that value increased – a phenomenon called “network effects,” which is central to platform strategy. By January 2025, the company’s App Store had offered 1.92 million apps, and the developers generated US\$1.1 trillion in total billings and sales in the App Store ecosystem in 2022.
- Apple’s success in building a platform business within a conventional product firm holds critical lessons for companies across industries.
- Firms that fail to create platforms and don’t learn the new rules of strategy will be unable to compete for long.

## Platform Economy – Global companies

- Seven of the 10 most valuable companies globally are now based on a platform business model: the creation of digital communities and marketplaces that allow different groups to interact and transact. Companies like Apple, Google, Amazon and Alibaba have used the model to grow exponentially and grab significant market share from established firms.
- Platforms represent a big change in the way industries have traditionally been organized. And first mover advantage is important in an environment where the winner often takes all.
- More than 30% of global economic activity — some \$60 trillion — could be mediated by digital platforms in six years' time, according to a McKinsey research report, and yet experts estimate only 3% of established companies have adopted an effective platform strategy.

# The **Unicorn Club** – Billion dollar Startups

- Coined in a TechCrunch article, "Welcome To The **Unicorn Club**: Learning from Billion-Dollar Startups".
- A **unicorn** is generally defined as a **privately held startup with a \$1 billion valuation** – something rare (like a unicorn).
  - **Private** companies are run the same way as public companies, except that ownership in the company is limited to a relatively small number of investors. Some of the most famous companies in the world are **private** companies, including Ikea, agriculture giant Cargill, and candy maker Mars.
  - **Valuation** – how much the company is valued **based on** its assets, future cash flow, profit, etc.

# Why so many more ‘unicorn’ companies now?

- **Compelling products that are easier than ever to adopt**
- A perception of **winner-take-all** markets (Dominant design)
- Competitive later stage capital
- Vibrant public markets
- New Technologies
- New disruptions

[Competitive neutrality: regulating interconnection disputes in the transition to competition](#) (Apr'25)

# Five primary business models among Unicorns

- 36% **E-Commerce companies** – companies where a consumer pays for a good or service through the internet or mobile, e.g., companies like Uber and Airbnb
- 27% **Audience companies** – the product is free to use for consumers, the company makes money through ads or leads, e.g., SnapChat
- 20% **Enterprise software companies** – where a business customer pays for larger scale software, often ‘on-premises’ vs cloud-based, or hardware with software, e.g., Cloudera, MagicLeap
- 12% **SaaS companies** – cloud-based software offered often via a ‘freemium’ or monthly model, e.g., Slack and MongoDB
- 6% **Consumer Electronics/Internet of Things** – where the consumer pays for a physical product, e.g., Xiaomi

<https://techcrunch.com/2015/07/18/welcome-to-the-unicorn-club-2015-learning-from-billion-dollar-companies/> (Apr'25)

## Five primary business models among Unicorns

- An important note – 32% **has characteristics of broad or local network effects**, where the value of the product/service gets better the more people are part of the system.
- Many are platform companies, e.g., bytedance, **uber, stripe**

<https://techcrunch.com/2015/07/18/welcome-to-the-unicorn-club-2015-learning-from-billion-dollar-companies/> (Apr'25)

# Unicorns, Decacorns and Undercorns

- **Unicorns** – private companies valued at more than \$1 billion....
  - **Private** companies are run the same way as public companies, except that ownership in the **company** is limited to a relatively small number of investors. Some of the most famous companies in the world are **private** companies, including Facebook (until 2012), Ikea, agriculture giant Cargill, and candy maker Mars.
- **Decacorns** – private companies valued at over \$10 billion are now the gold standard for startup success.
- **Undercorns** - Unicorns that sell or go public below their last private valuation

# Size and structural dimensions of companies

- However, **large companies** might also be **disadvantaged in innovation** because...
  - R&D efficiency may decrease due to loss from managerial control
  - Large companies can have more **bureaucratic inertia**
  - More commitments **tie companies to current technologies**
    - Learning effects (see Week 3); dominant design
- **Small firms** are often **more flexible and entrepreneurial**
  - Can change direction quickly based on changing circumstances or new observations (pivot)
- **Innovation favours agility** - It's easier for a small company to be agile than a large company

[Mac OS 1997 case \(Apr'25\)](#)

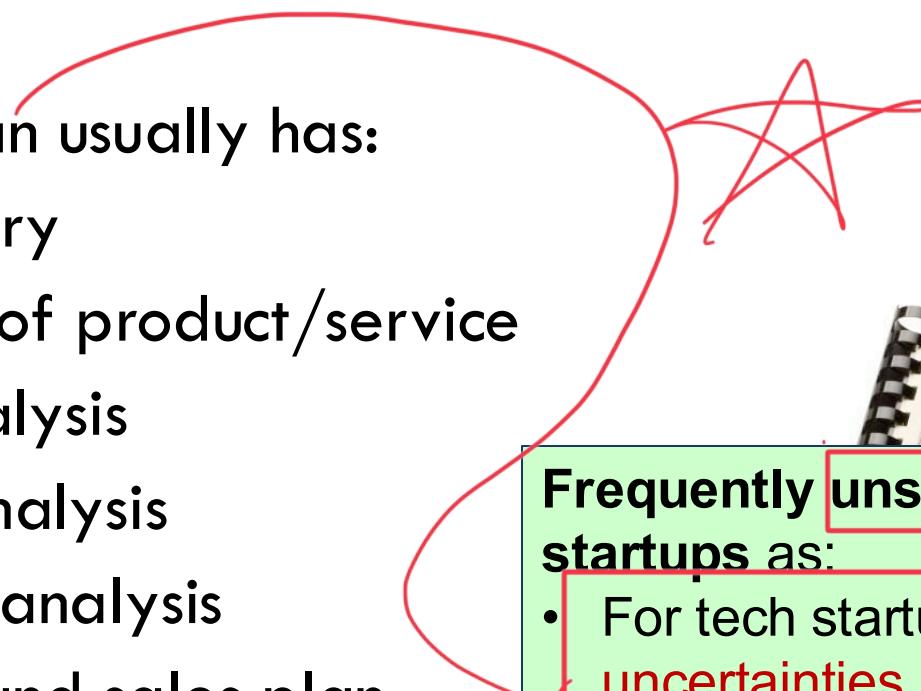
## **Traditional approach: Treat startup as small version of large company**

---

- The **business plan focused on:**
  1. Identifying business opportunities (addressable market)
  2. Problem to be solved
  3. Planned solution to the problem
  4. Forecast for income, profit, costs, etc. (e.g. for 5 years)

# Traditional business plan

- The business plan usually has:
  - Exec summary
  - Description of product/service
  - Industry analysis
  - Customer analysis
  - Competitor analysis
  - Marketing and sales plan
  - Operations and HR plans
  - Financial plan



Frequently **unsuccessful** for tech startups as:

- For tech startups, there are many **uncertainties**
- The plan may have many **untested assumptions**
- Much of the plan may rely on these untested assumptions
- The business plan is often rigid, and it is hard to change direction quickly

## **Established companies vs startups**

- Established companies...
- Startups...
- **Execute a business model**
- **Search for a business model**

## Paul Graham: How to get startup ideas



Paul Graham, Founder of Y Combinator

Some of their startups:  
Reddit, Scribd, Dropbox,  
Airbnb, Stripe, Heroku,  
Weebly, ...

- The way to get startup ideas is not to try to think of startup ideas. It's to look for problems, preferably problems you have yourself.

The very best startup ideas tend to have three things in common:

- they're something the founders themselves want,
- that they themselves can build,
- and that few others realise are worth doing.

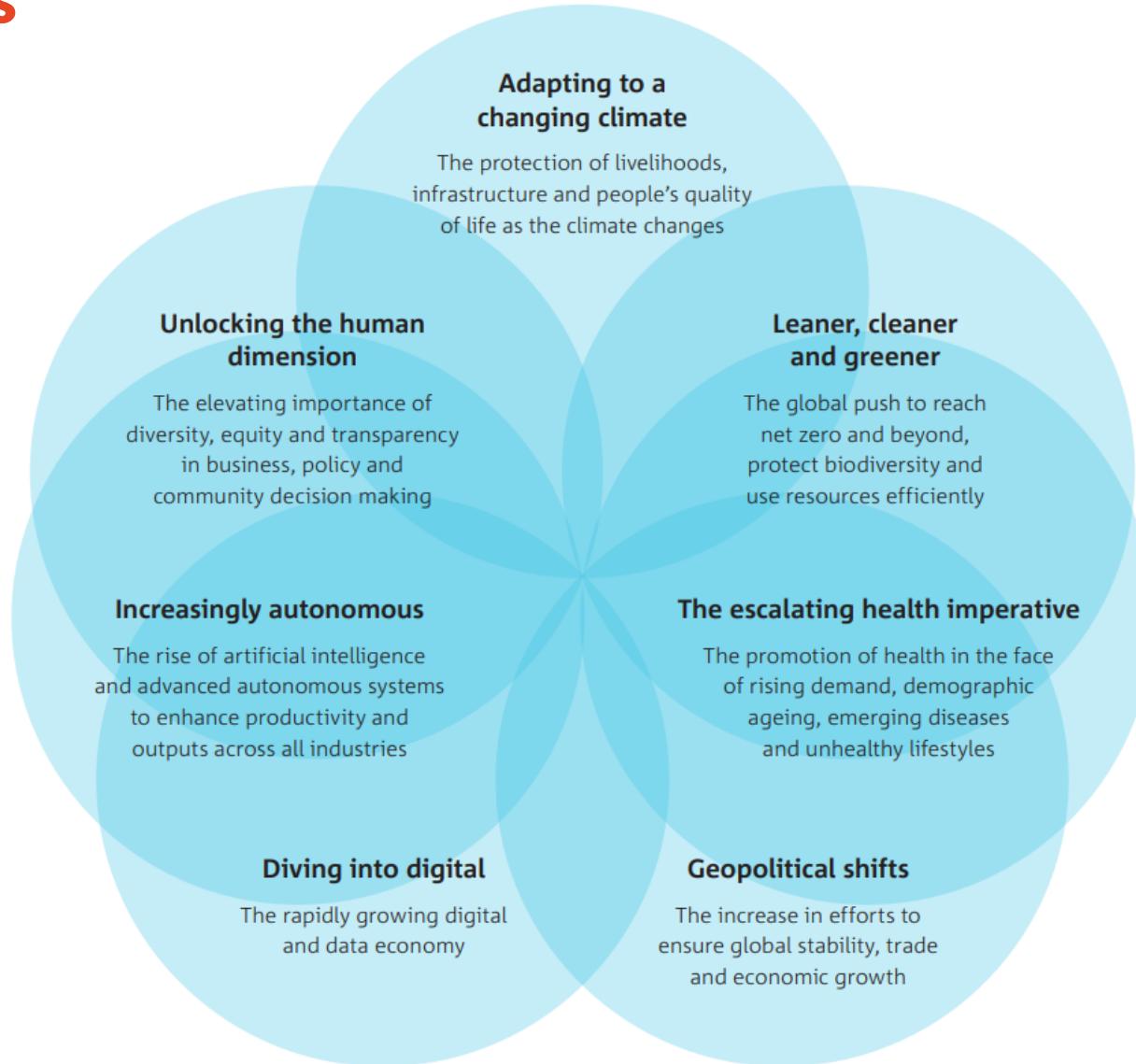
Microsoft, Apple, Yahoo, Google, and Facebook all began this way.

# Paul Graham: How to get startup ideas

- Real problems:
  - Address real problems, not made-up problems
- The “Well”:
  - Build something a small number of people want a lot rather than something a large number of people want a little
    - It helps you focus and build quickly
- Getting yourself ready
  - Be at the leading edge of a field (even if just a user)
  - **“Live in the future, then build what’s missing”**
  - External stimulus hitting a prepared mind
- Noticing:
  - Not “think up ideas” but “notice”
  - It’s OK to work on projects that produce “toys” as it prepares you to notice
  - **“Live in the future and build what seems interesting”**

# CSIRO: 7 Megatrends

- Looking to the future can be difficult, but there are many information out there...



# 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

E.g. [http://www.slideshare.net/sblank/why-product-managers-need-sneakers?from=ss\\_embed](http://www.slideshare.net/sblank/why-product-managers-need-sneakers?from=ss_embed) (Apr'25)

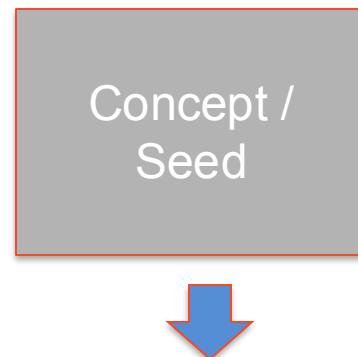
# The startup – 3 key principles

- Customer Development  
“get out of the building”
  - including hypothesis-driven experiments with customers, pivoting etc.
- Business Model Canvas  
“Sketch Out Your Hypotheses.”
- Agile software development  
“Quick, Responsive Development.”  


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>

# Introducing new products to a market: Traditional model

New Product Introduction model:



Come up with concept

Define product and product features

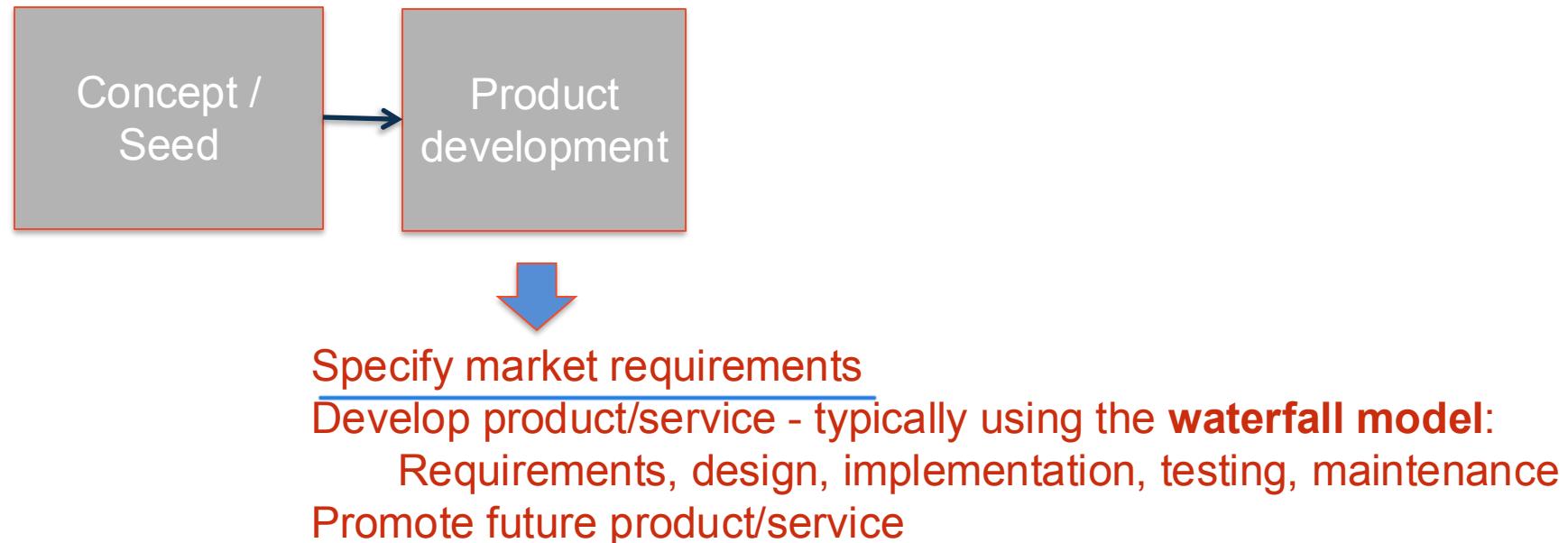
Determine customers

Do market research (statistical and some interviews)

Develop business plan

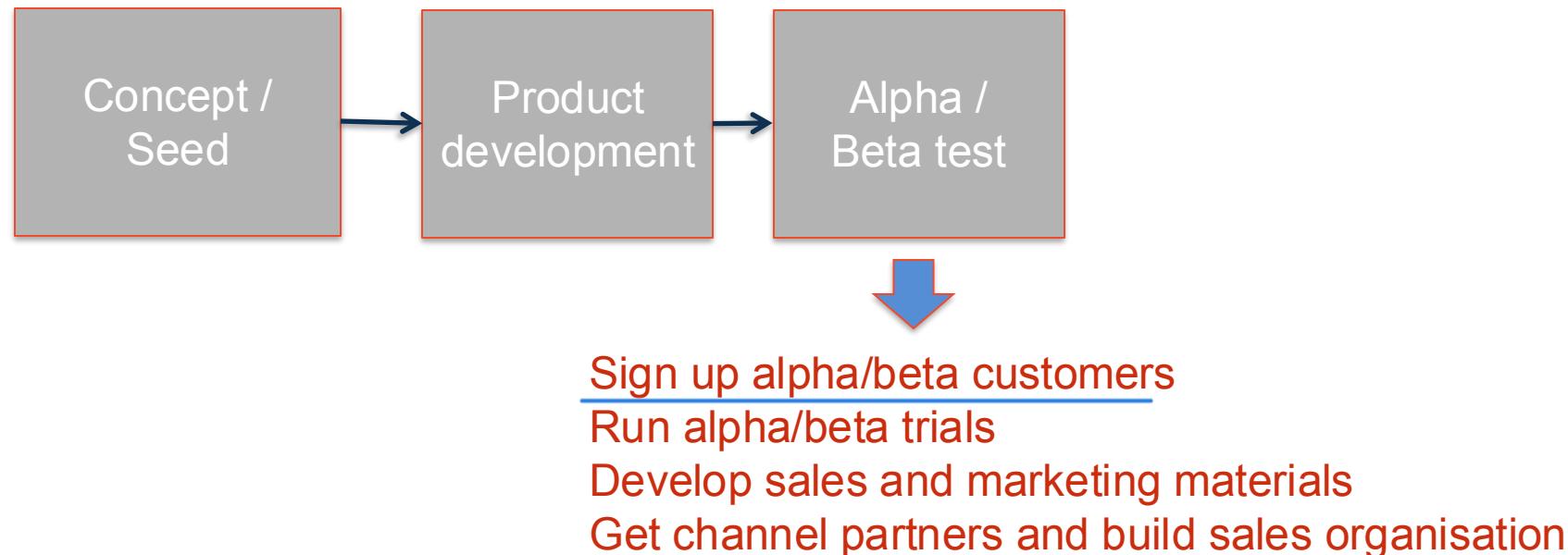
# Introducing new products to a market: Traditional model

New Product Introduction model:



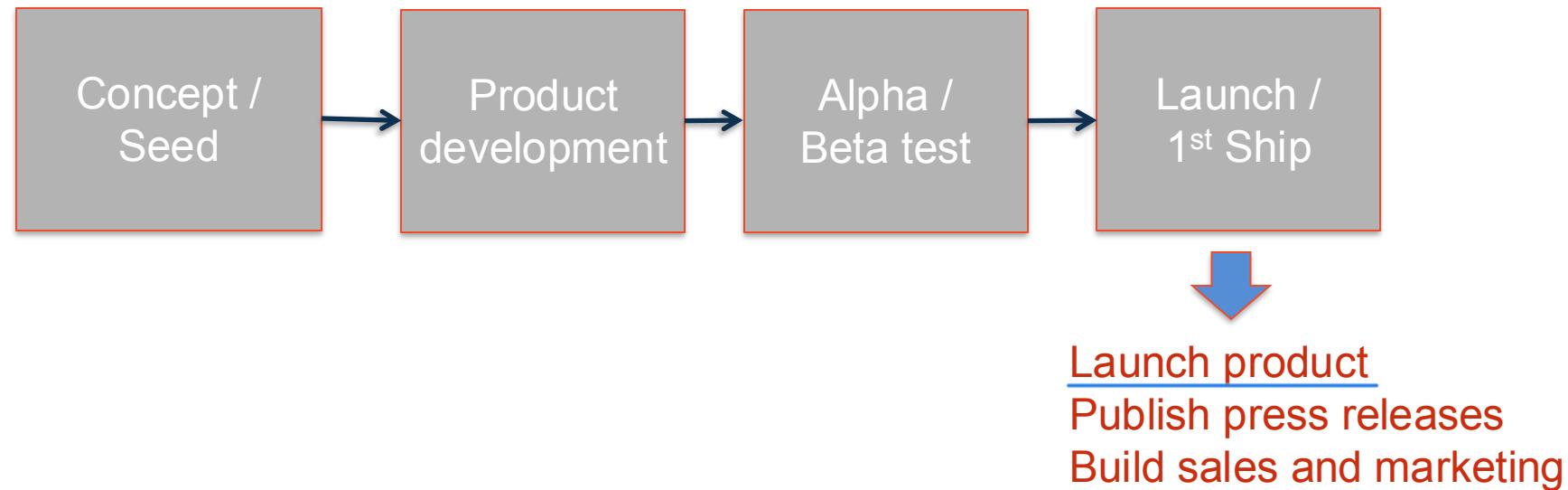
# Introducing new products to a market: Traditional model

New Product Introduction model:



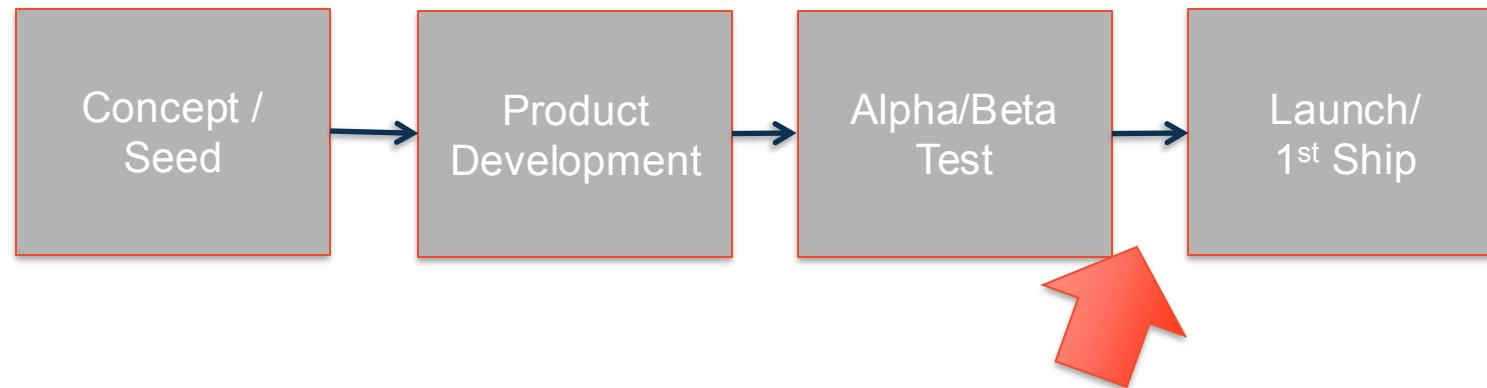
# Introducing new products to a market: Traditional model

New Product Introduction model:



# Introducing new products to a market: Traditional model

New Product Introduction model:



First contact between product and customer.  
Too late!

“No business plan survives first contact with customers” – Steve Blank

# Introducing new products to a market: Traditional model

## New Product Introduction model (Traditional):

**Works** where customers are known, product features can be specified in advance, the market is well-defined, and the basis of competition is understood

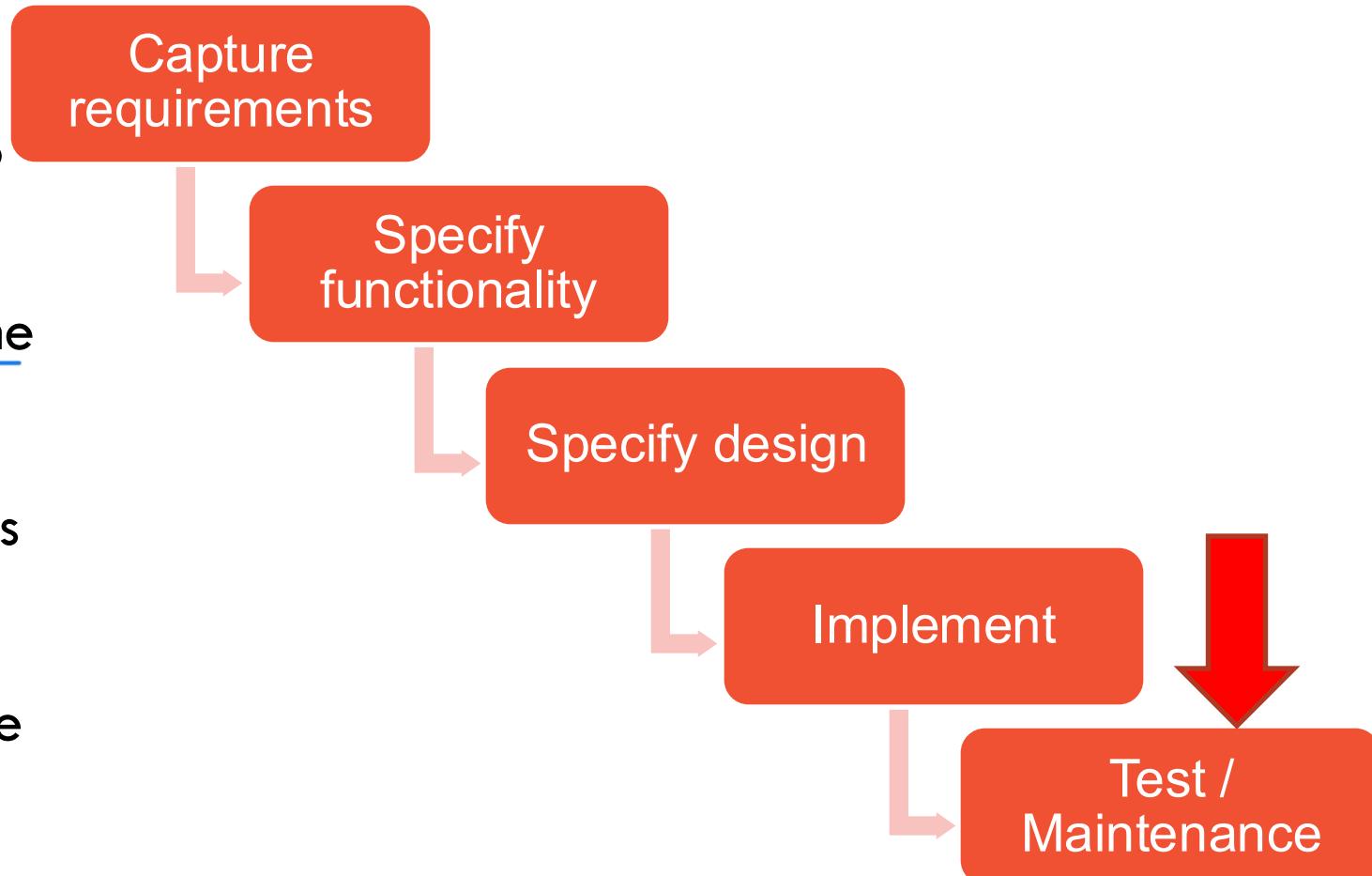
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# What's wrong with the New Product Introduction Model (for startups)

- “The **9 Deadly Sins** of the New Product Introduction Model”:
  1. Assuming “I know what the customer wants”
  2. The “I know what features to build” flaw
  3. Focus on a Launch date
  4. Emphasis on execution instead of hypotheses, testing, learning and iteration
  5. Traditional business plans assume no trial and no errors
  6. Confusing traditional job titles with what a startup needs to accomplish
  7. Sales and marketing execute a plan
  8. Presumption of success leads to premature scaling
  9. Management by crisis leads to a death spiral

# Problems with the traditional model

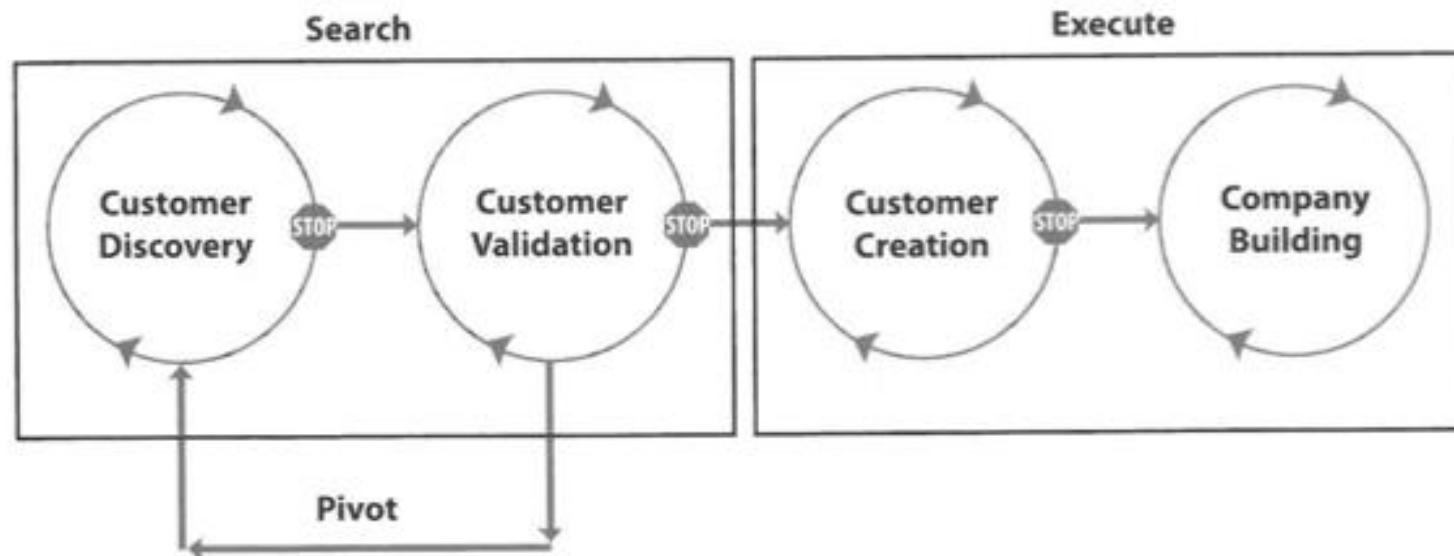
- It is impossible to know all requirements in advance
  - The project takes time, so the requirements at the time of capture may be different from those at the time of delivery
  - Some **requirements** are **only apparent** when users are using the product
  - It takes too long to get customer validation of the product



# Alternative approach for startups: Customer Development Process

## Customer Development Process:

Works where customers are unknown, product features unknown, the market is unknown, basis of competition is unknown – i.e. ~~the 9 deadly sins~~  
Designed to solve “**the 9 deadly sins**”



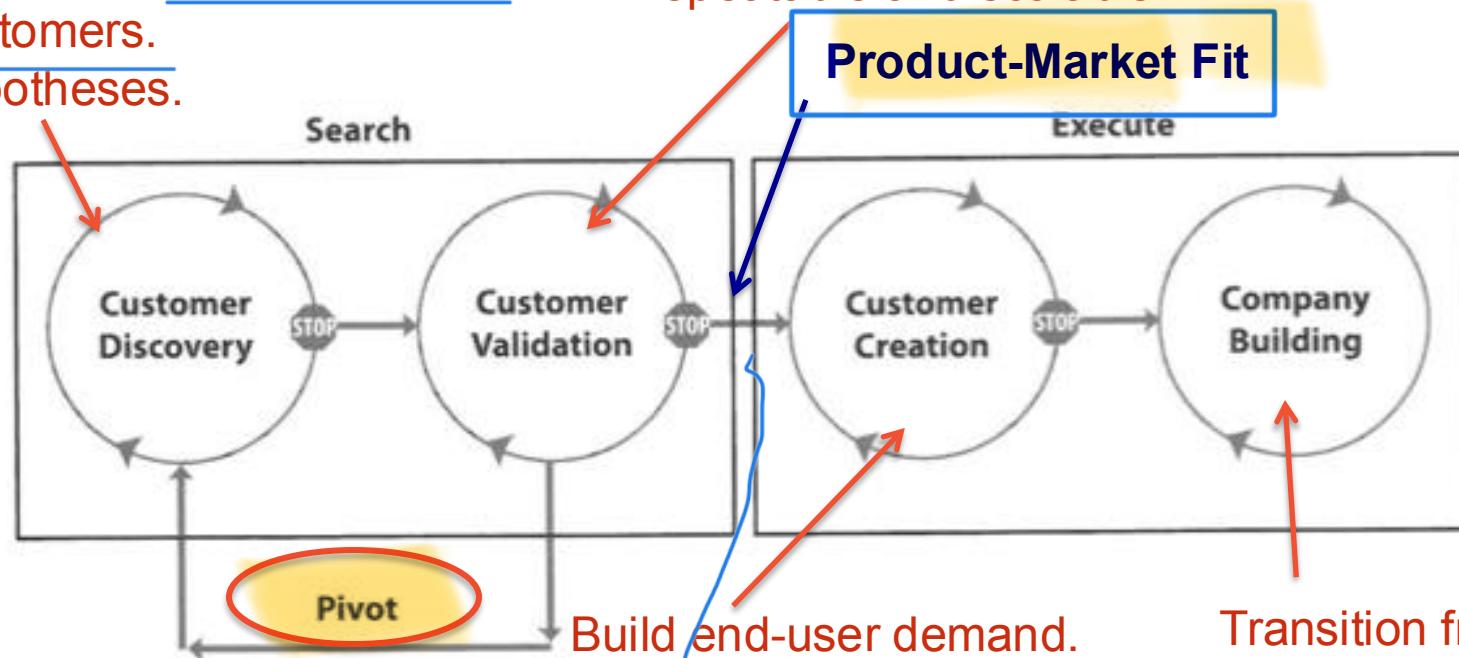
*Customer Development Process (Figure 2.1)*

Source: Steve Blank and Bob Dorf, “The Startup Owner’s Manual” (2012)

# Alternative approach for startups: Customer Development Process

Capture vision and turn it into business model hypotheses.  
Develop plan to test hypotheses with customers.  
Test hypotheses.

Test whether related business model is repeatable and scalable



Transition from startup to typical company

Customer creation: turn prospects into purchasers (Apr'25)

Source: Steve Blank and Bob Dorf, "The Startup Owner's Manual" (2012)

# Product Market Fit

- Definition (Marc Andreessen): “Product-market fit means being in a good market with a product that can satisfy that market.”
- You can always feel when product-market fit is not happening.
  - The customers are not quite getting value out of the product, word of mouth is not spreading, usage is not growing that fast, press reviews are kind of "blah", the sales cycle takes too long, and lots of deals never close.

Product-market fit  
means being in a good market with a product that  
can satisfy that market.



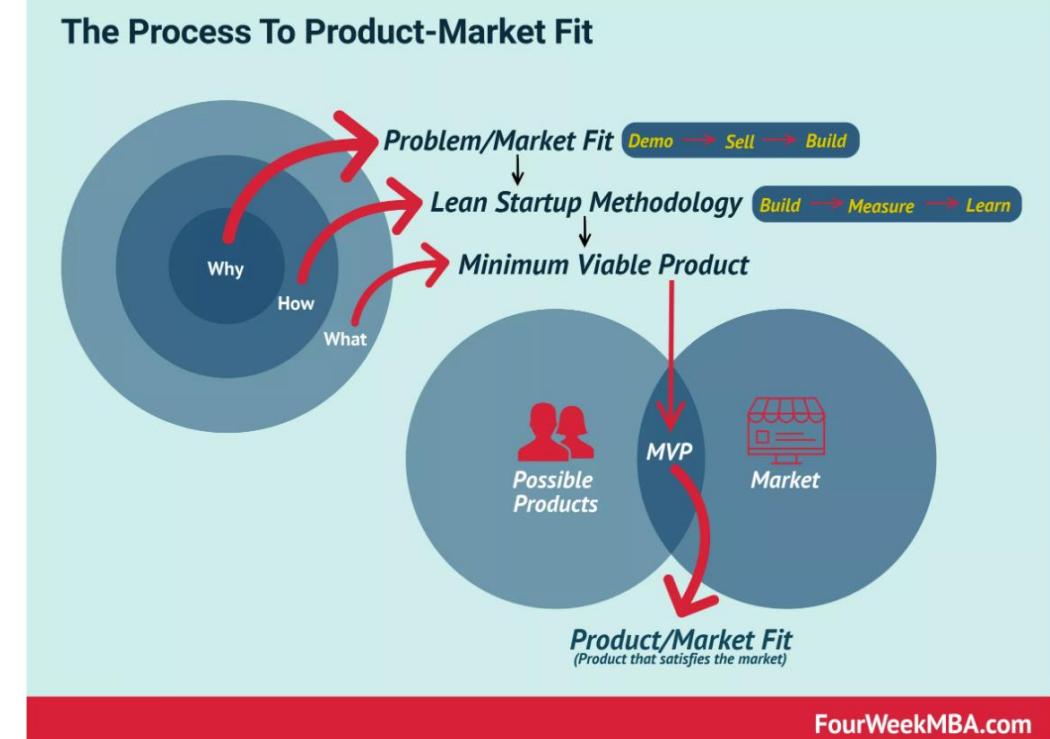
Marc Andreessen

<https://youtu.be/zfOsP3PmI1U>

<http://web.stanford.edu/class/ee204/ProductMarketFit.html> (Apr'25)

# Product-Market Fit

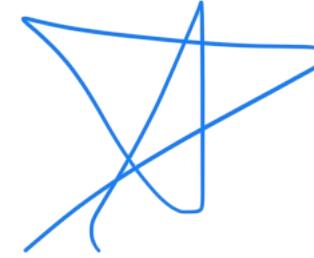
- A degree to which a product satisfies a strong market demand.
- A step in between customer validation and customer creation
- Steve Blank



FourWeekMBA.com

<https://fourweekmba.com/product-market-fit/>

# The Minimum Viable Product (MVP)

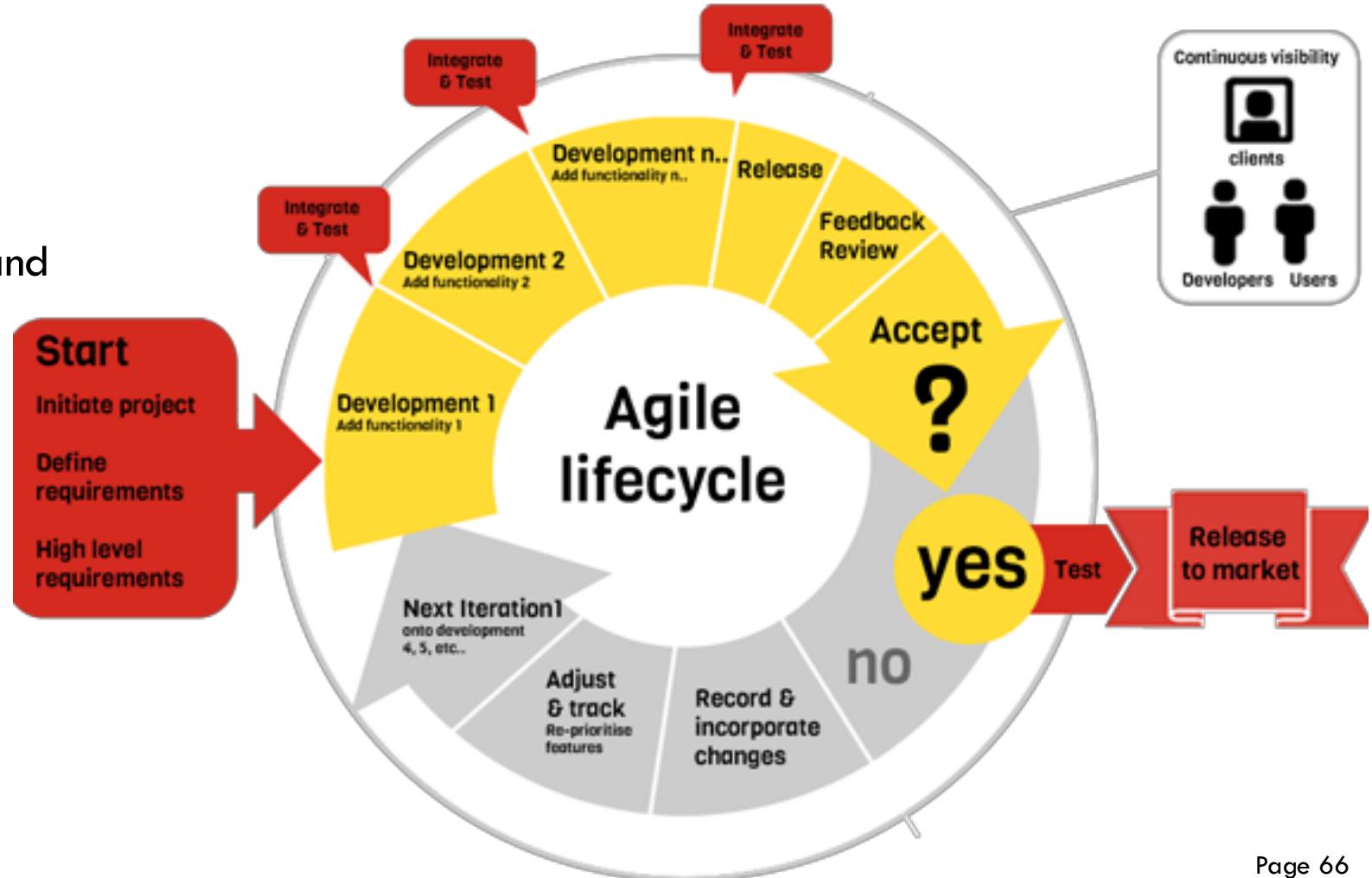


- Definition (from Eric Reis):  
“the minimum viable product is that version of a new product which allows a team to collect the maximum amount of validated learning about customers with the least effort.”
- The MVP is a **crucial solution for new product releases**, balancing the need for essential features with the risk of overwhelming complexity.

**“Customer discovery in the quickest time frame with minimum effort”**

# Agile development

- Iterative, incremental and evolutionary
- Efficient and face-to-face communication
- Very short feedback loop and adaption cycle
- Quality focus



# Agile Alliance - Key Agile Concepts (Management)

- **User Stories:** In consultation with the customer or product owner, the team divides the work into functional increments called "user stories." Each user story is expected to contribute to the overall product's value. E.g., "**As a** shopper, I want to be able to search for products on the website **so that** I can easily find what I am looking for"
- **Daily Meeting:** Each day at the same time, the team meets to bring everyone up to date on the vital information for coordination: each team member briefly describes any "completed" contributions and any obstacles that stand in their way.
- **Incremental Development:** Nearly all Agile teams favour an incremental development strategy; in an Agile context, each successive version of the product is usable, and each builds upon the previous version by adding user-visible functionality.

# Agile Alliance - Key Agile Concepts (Management)

- **Iterative Development:** Agile projects are iterative as they intentionally allow for "repeating" software development activities and potentially "revisiting" the same work products.
- **Team:** A "team" in the Agile sense is a small group of people assigned to the same project or effort, nearly all of them on a full-time basis. A small minority of team members may be part-time contributors or have competing responsibilities.
- **Milestone Retrospective:** Once a project has been underway for some time, or at the end, all of the team's permanent members (not just the developers) invest from one to three days in a detailed analysis of the project's significant events.
- **Personas:** When the project calls for it - for instance when user experience is a major factor in project outcomes - the team crafts detailed, synthetic biographies of fictitious future product users; these are called "personas."

# Three common forms of Agile development

- There are at least a dozen agile innovation methodologies, which share values and principles but differ in their emphases. Experts often combine various approaches. Here are three of the most popular forms and the contexts in which each works best.

	SCRUM	KANBAN	LEAN DEVELOPMENT
Guiding Principles	Empower creative, cross-functional teams	Visualize workflows and limit work in process	Eliminate waste from the system as a whole
Favorable Conditions for Adoption	Creative cultures with high levels of trust and collaboration, or Radical innovation teams that want to change their working environment	Process-oriented cultures that prefer evolutionary improvements with few prescribed practices	Process-oriented cultures that prefer evolutionary improvements with overarching values but no prescribed practices

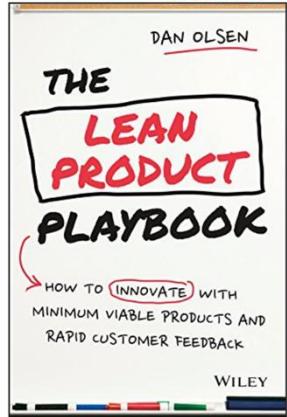
# Common Agile methodologies

- **Lean Methodology** eliminates waste by selecting only the valuable features for a system, prioritising those selected, and delivering them in small batches. It emphasises the speed and efficiency of development workflow and relies on rapid and reliable feedback between programmers and customers.
  - Lean uses the idea of work product being “**pulled**” via customer request.
  - It **focuses** decision-making authority and ability on **individuals** and **small teams** since research shows this to be faster and more efficient than a hierarchical control flow.
  - Lean also concentrates on the **efficiency of the use of team resources**, trying to ensure that everyone is productive as much of the time as possible.
  - It concentrates on **concurrent work and the fewest possible intra-team workflow dependencies**.
  - Lean also strongly recommends that **automated unit tests be written** at the same time the code is written.

# Common Agile methodologies

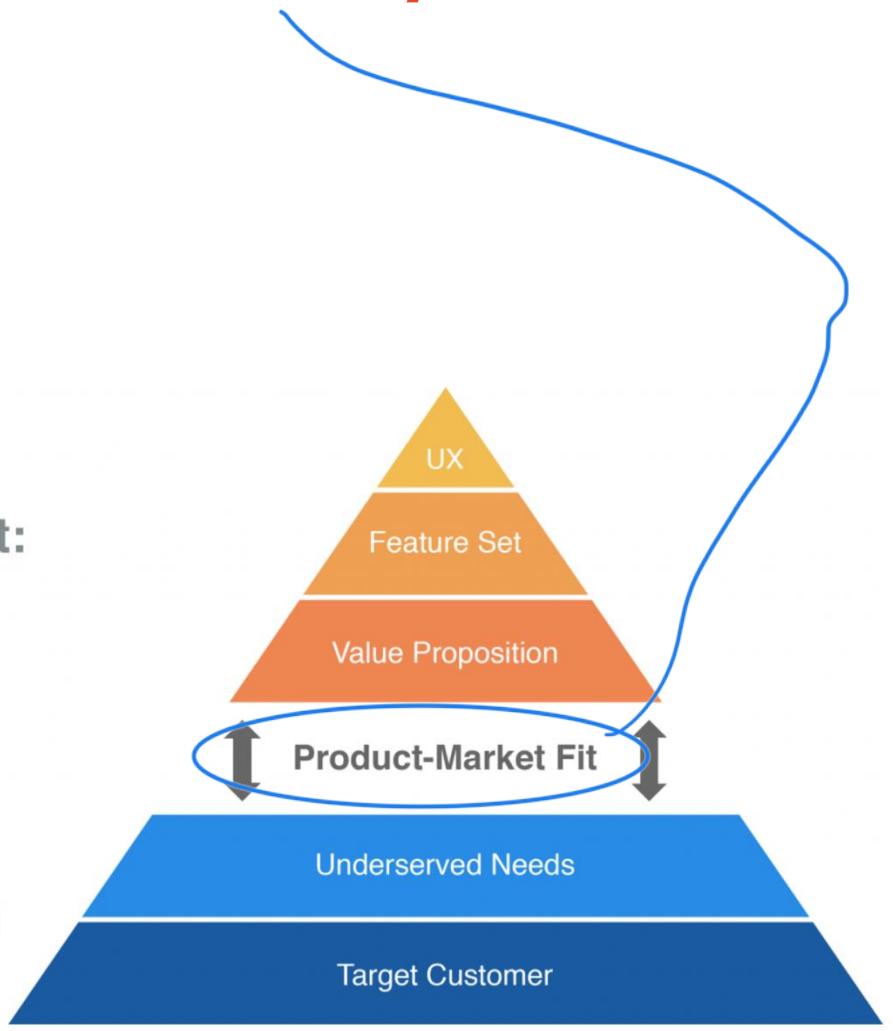
- **Scrum** is a process framework for managing product development and other knowledge work. Scrum is empirical in providing a means for teams to establish a hypothesis of how they think something works, try it out, reflect on the experience, and make appropriate adjustments.
- Organisations use **Kanban** to manage the creation of products with an emphasis on continual delivery while not overburdening the development team. Like Scrum, Kanban is designed to help teams work together more effectively.

# Product-Market Fit Pyramid for Lean Product Process



Product:

Market:



- Test your MVP with customers
- Create your MVP prototype
- Specify your Minimum Viable Product (MVP) feature set
- Define your value proposition
- Identify underserved customer needs
- Determine your target customer

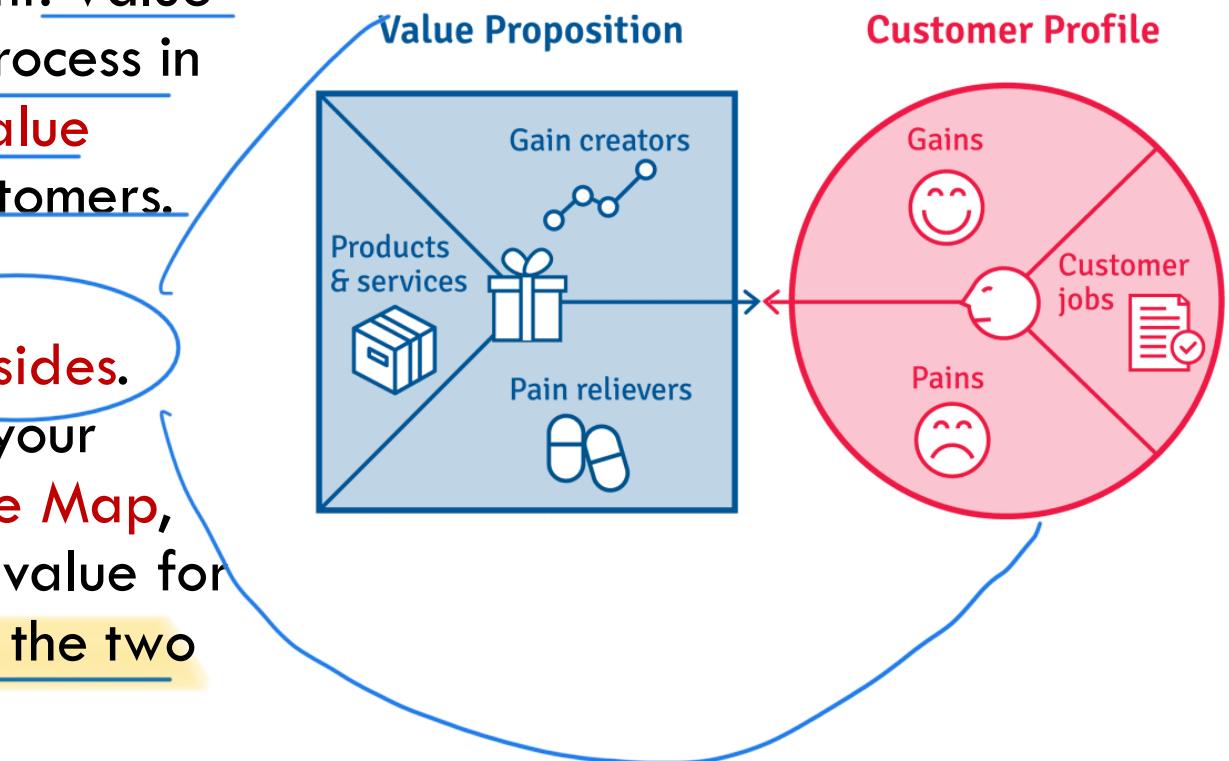
# Differences between the Lean Startup approach and the traditional approach (for established companies)



Steve Blank (2013)

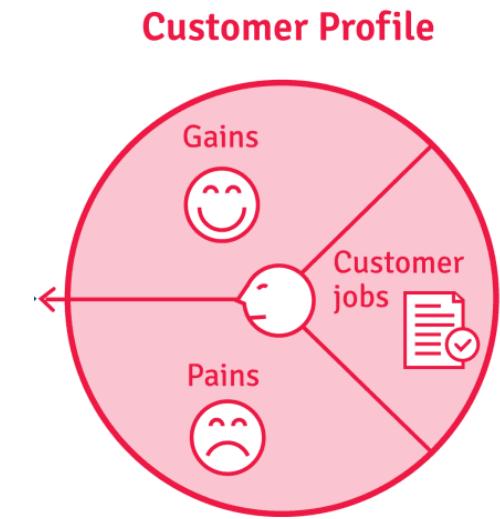
# Value Proposition Canvas

- The Value Proposition Canvas helps you to design and test great value propositions in an **iterative search** for what customers want. **Value proposition design is a never-ending process in which you must constantly evolve the value proposition(s) to keep it relevant to customers.**
- The Value Proposition Canvas has **two sides**. With the **Customer Profile**, you clarify your customer understanding. With the **Value Map**, you describe how you intend to create value for that customer. You **achieve Fit between the two when one meets the other.**



# Part 1: Customer Profile

- The Customer Profile describes a specific customer segment in your business model. It analyses what the customer does (customer jobs) and, in doing so, the gains that the customer wants and the pains it experiences.
- There are three components:
  - **Customer Jobs:** Describe what customers are trying to accomplish in their work and lives, as expressed in their own words.
  - **Gains:** Describes the outcomes customers want to achieve or the benefits they are seeking
  - **Pains:** Describes terrible outcomes, risks, and obstacles related to the customer's job.



# Customer Jobs

- Jobs describe what your customers are **trying to accomplish** in their work or lives. A customer's job could be the tasks they are trying to perform and complete, the problems they are trying to solve, or the needs they are trying to satisfy. Make sure you take the customer's perspective when investigating jobs. What you think of as necessary from your perspective might not be a job customers are trying to get done.

<b>Functional Jobs</b>	When your customers try to perform or complete a specific task or solve a specific problem, for example, write software, write a report, or help clients as a professional.
<b>Social Jobs</b>	When your customers want to look good or gain power or status, these jobs describe how customers want to be perceived by others. For example, they are perceived as competent as a professional or look trendy.
<b>Personal &amp; Emotional Jobs</b>	When your customers seek a specific emotional state, such as feeling good or secure. For example, seeking peace of mind regarding one's investments as a consumer or achieving job security at the workplace.

# Customer Pains

- Pains describe anything that annoys your customers before, during and after trying to get a job done or prevents them from getting a job done. Pains also describe **risks**, that is, potential bad outcomes related to **getting a job poorly done or not at all**.

<b>Undesired outcomes, problems and characteristics</b>	Pains are <b>functional</b> (e.g. a solution doesn't work or doesn't work well, or has adverse side effects), <b>social</b> ("I look bad doing this"), <b>emotional</b> ("I feel bad every time I do this"), or <b>ancillary</b> ("it's annoying to do it"). This may involve <b>undesired characteristics customers do not like</b> (e.g. <b>the user interface is ugly</b> ).
<b>Obstacles</b>	These are things that <b>prevent customers</b> from even getting started with a job or that slow them down (e.g. "I lack time to get this done accurately" or "I cannot afford any of the existing solutions").
<b>Risks (undesired potential outcomes)</b>	What <b>could go wrong and have important negative consequences</b> (e.g. "I might lose credibility when using this type of solution" or "A security breach would be disastrous for us").

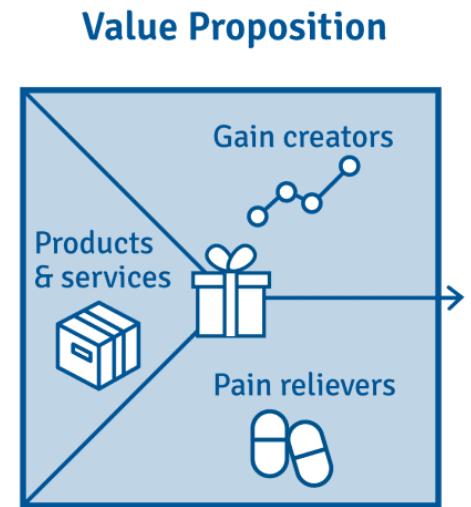
# Customer Gains

- Gains describe the outcomes and benefits your customers want. Some gains are required, expected or desired by customers, and some would surprise them. Gains **include** functional utility, social gains, positive emotions and cost savings.

<b>Required Gains</b>	These are gains <u>without which a solution wouldn't work</u> . For example, the <u>most basic</u> expectation from a smartphone is that we can make a call with it.
<b>Expected Gains</b>	These are relatively <u>basic gains that we expect from a solution</u> , even if it could work without them. For example, we expect <u>phones</u> to be well-designed and look good since Apple launched the iPhone.
<b>Desired Gains</b>	These gains <u>go beyond what we expect from a solution</u> , but we would love to have them. These are usually gains customers would come up with if you asked them. For example, we want smartphones to integrate with our other devices seamlessly.
<b>Unexpected Gains</b>	These are gains that <u>go beyond customer expectations and desires</u> . They <u>wouldn't even come up with</u> them if you asked them. Before Apple brought touch screens and the App Store to the mainstream, nobody really thought of them as part of a phone.

## Part 2: Value Map

- The Value Map describes how you create value for your Customer Segment. It is a combination of gain creators and pain relievers that addresses the pains and gains of your customers.
- There are three components:
  - Product offering: It is the product offering and its associated features.
  - Gain Creators: It describes how your product offering and its associated features create customer gains.
  - Pain Relievers: It describes how your product offering and associated features alleviate customer pain.



# Product Offering

- This is simply your product offering, including the list of features.

## Types of Product Offering:

<b>Digital</b>	Products such as software as-a-service (SaaS), marketplace platforms, music streaming etc.
<b>Physical/ tangible</b>	Goods, such as manufactured products.
<b>Intangible</b>	Products such as copyrights or services such as after-sales assistance.
<b>Financial</b>	Products such as investment funds and insurances or services such as the financing of a purchase.

## Pain Relievers

- Pain Relievers describe how exactly your product offering alleviates specific customer pains. They explicitly outline how you intend to eliminate or reduce some of the things that annoy your customers before, during or after they are trying to complete a job or prevent them from doing so.
- Great value propositions focus on pains that matter to customers, particularly extreme pains. You do not need to develop a pain reliever for every pain identified in the customer profile – no value proposition can do this. Great value propositions often focus only on a few pains that they alleviate exceptionally well.

## Gain Creators

- Gain creators describe how your product offerings create customer gains. They explicitly outline how you intend to produce outcomes and benefits your customer expects, desires, or would be surprised by, including functional utility, social gains, positive emotions, and cost savings.
- As with pain relievers, gain creators don't need to address every gain identified in the customer profile. Focus on those relevant to customers and where your product can make a difference.

## Part 3: Fit

- You achieve fit when customers get excited about your value proposition, which happens when you address important jobs, alleviate extreme pains, and create essential gains that customers care about.

# Value Proposition Pyramid

## SOCIAL IMPACT



Self-transcendence



Provides hope



Self-actualization



Motivation



Heirloom



Affiliation/belonging

## EMOTIONAL



Reduces anxiety



Rewards me



Nostalgia



Design/aesthetics



Badge value



Wellness



Therapeutic value



Fun/entertainment



Attractiveness



Provides access

## FUNCTIONAL



Saves time



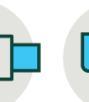
Simplifies



Makes money



Reduces risk



Organizes



Integrates



Connects



Reduces effort



Avoids hassles



Reduces cost



Quality



Variety



Sensory appeal



Informs

# Functional

Value Proposition	Definition	Example
Saves time	Saving time in tasks or transactions	Target, REI and other retailers have in-store pickup for online orders and/or same-day rush delivery from store.
Simplifies	Reducing complexity and simplifying	Amazon's 1-Click feature simplifies the order checkout process.
Makes money	Helping to make money	Google's AdSense helps independent blogs and websites to generate advertising revenue.
Reduces risk	Protecting from losses	Charles Schwab's Accountability Guarantee refunds fees if clients are not fully satisfied with the investment product.
Organises	Becoming more organized	The Container Store helps people organize their possessions at home.
Integrates	Integrating different aspects of life	Square offers invoice management, payroll and other services that integrate billing functions into its point-of-sale hardware and software.
Connects	Connecting with other people	Energy drink maker Red Bull sponsors extreme sports competitions and communities that connect enthusiasts around the world.
Reduces effort	Getting things done with less effort	Facebook added the ability to send money directly to friends via its Messenger app.
Avoids hassles	Avoiding or reducing hassles	Zappos offers free shipping and generous return policies.
Reduces cost	Saving money in purchases, fees or subscriptions	Nordstrom, J. Crew and other retailers introduced budget brands.
Quality	Providing high-quality goods or services	USAA delivers high-quality insurance, banking and investment products and services tailored to its members—those who have served in the military and their families.
Variety	Providing a variety of things to choose from	Fitbit has branched out from a simple step counter to different products for everyday users and high-performance athletes.
Sensory Appeal	Appealing in taste, smell, hearing and other senses.	Starbucks acquired tea company Teavana and bakery La Boulange to improve its non-coffee products.
Informs	Providing reliable and trusted information about a topic	Vanguard added low-fee advice to its core investment services.

# Emotional

<b>Value Proposition</b>	<b>Definition</b>	<b>Example</b>
<b>Reduces anxiety</b>	Helping people worry less and feel more secure	Discover allows cardholders to instantly freeze and unfreeze their accounts without canceling their cards.
<b>Rewards me</b>	Providing benefits for being a loyal customer	Starwood has earned strong customer loyalty among frequent travellers through a robust rewards program.
<b>Nostalgia</b>	Reminding people of something positive in the past	Volkswagen's Beetle line of cars emulates the popular design originally created in the 1930s and produced through the 1970s.
<b>Design &amp; aesthetics</b>	Providing an appealing form or design	Apple's attention to design has helped differentiate its computers, smartphones and other products from those of competitors.
<b>Badge value</b>	Representing achieved status or aspirations	Prada's understated luxury clothing and accessories are designed to be recognized by fashionistas.
<b>Wellness</b>	Improving people's physical or mental state	Westin added fitness equipment in some guest rooms, "superfoods," and exercise clothing rentals to reposition the brand as part of the well-being movement.
<b>Therapeutic value</b>	Providing therapeutic value or well-being	Dr. Scholl's products aim to soothe a broad range of foot conditions.
<b>Fun &amp; entertainment</b>	Offering fun or entertainment	Norwegian, Royal Caribbean and other cruise lines offer almost round-the-clock entertainment ranging from indoor sky diving to bumper cars to art auctions.
<b>Attractiveness</b>	Helping people feel more attractive	Victoria's Secret created bold retail designs in an undergarment industry that had been quiet and discreet.
<b>Provides access</b>	Providing access to information, goods, services or other valuable items	CVS Health added in-pharmacy clinics that provide basic medical services and assorted wellness services.

# Life Changing

Value Proposition	Description	Example
Provides hope	Providing something to be optimistic about	Fitbit sells wearables designed to help people to live a healthier and fitter lifestyle, as well as for other purposes such as reducing weight.
Self-actualisation	Providing a sense of personal accomplishment or improvement	Students whom undertake online courses on Udemy or Coursera engage in their own personal and/or professional development.
Motivation	Spurring people to achieve their goals	Spotify added a music-streaming feature for runners that detects their tempo and finds music to match it.
Heirloom	A good investment for future generations	Bitcoin positions itself as an alternative to currencies and gold to store and retain value for the current and future generations.
Affiliation and belonging	Helping people become part of a group or identify with people they admire	Facebook enables people to connect with people whom they know, as well as new people based on common interests.

# Social Impact

Value Proposition	Description	Example
<b>Self-transcendence</b>	Helping other people or society more broadly	When Tesla sells an electric car, the driver is helping humanity in its fight against climate change.

# Business Model Canvas: Introduction

- A **business model** describes how an organisation creates, delivers and captures value. A business model is built around an innovation – a clear business model is required for successful commercialisation
  - The Business Model Canvas provides us with a **framework** to analyse and develop business models
  - The combination of the building blocks makes up the business model. The individual building blocks, as well as the relationships between the building blocks, are important to ensure that there is **alignment** within the business model
-

# Filling in the Business Model Canvas

- Startup = the search for a business model
- Business model canvas = a representation of a business model
- **A startup can track its search for a business model by iteratively filling in a business model canvas**
- The Business Model Canvas:
  - Good for representing:
    - what's known (results of hypothesis testing); and
    - what hypotheses still need to be tested

# Overview of the 9 Building Blocks

<b>Customer Segments</b>	Block 1	... are the <u>groups of people and/or organisations a company or organisation aims to reach</u> and create value for with a dedicated value proposition.
<b>Value Propositions</b>	Block 2	... are the <u>value created and delivered to a Customer Segment</u> in the form of Pain Relievers or Gain Creators.
<b>Channels</b>	Block 3	... describe <u>how a value proposition is communicated and delivered</u> to a customer segment through communication, distribution, and sales channels.
<b>Customer Relationships</b>	Block 4	... outline <u>what type of relationship is established and maintained</u> with each customer segment and explain how customers are acquired and retained.
<b>Revenue Streams</b>	Block 5	... result from a value proposition successfully offered to a customer segment. It is <u>how an organisation captures value with a price</u> that customers are willing to pay.
<b>Key Activities</b>	Block 6	... are the <u>most critical activities</u> an organisation must do to deliver Value Propositions to a Customer Segment and generate revenue.
<b>Key Resources</b>	Block 7	.... are <u>the most important assets required</u> to offer and deliver the previously described elements.
<b>Key Partnerships</b>	Block 8	... shows <u>the network of suppliers and partners</u> that bring in external Activities and Resources.
<b>Cost Structure</b>	Block 9	... outlines <u>all major costs incurred</u> to operate the business model

## Block 1: Customer Segments cont.

- Once this decision is made, a business model can be carefully designed around a strong understanding of specific customer needs.
- Customers represent **separate segments** if:
  - Their needs **require and justify** a distinct offer
  - They are reached through **different distribution channels**
  - They require **different types of customer relationships**
  - They have **substantially different profitability**
  - They are **willing to pay for different aspects of the offer**

# 5 Types of Customer Segments

<b>Mass Market</b>	Business models focussed on <u>mass markets</u> don't distinguished between different customer segments. The Value Propositions, Distribution Channels, and Customer Relationships all <u>focus on one large group of customers with broadly similar needs and problems</u> . This type of business model is often found in the consumer electronics and automotive sector.
<b>Niche Market</b>	Business models targeting niche markets cater to specific, specialised Customer Segments. The Value Propositions, Distribution Channels, and Customer Relationships are all <u>tailored to the specific requirements of a new niche market</u> . Such business models are often found in <u>supplier-buyer relationships, where the supplier depend heavily on purchases from the buyer</u> . Examples include Qualcomm which depend heavily on purchases from smartphone makers for its system-on-chips (Snapdragon).
<b>Segmented</b>	Some business models distinguish between market segments with slightly different needs and problems. For example, Apple distinguish between users that want computers with varying mobility, performance and size requirements— <u>all of whom had similar but varying needs</u> . As such, <u>Apple offers each segment with slightly different Value Propositions with its MacBook Air, MacBook Pro and iMac / iMac Pro</u> .
<b>Diversified</b>	An <u>organisation with a diversified customer business model serves two unrelated Customer Segments with very different needs and problems</u> . For example, in 2006, Amazon.com decided to diversify its retail business by selling “cloud computing” services: online storage space and on-demand server usage. Thus, it started catering to a totally different Customer Segment (i.e. organisations requiring cloud computing). The strategic rationale behind this diversification can be found in Amazon.com's <u>powerful IT infrastructure</u> .
<b>Multi-sided platforms (or multi-sided markets)</b>	Some organisations <u>serve two or more interdependent Customer Segments</u> . A data annotation platform needs a large base of AI companies that require labelling services, and a base of annotators that can label data. Both segments are required to make the business model work.

# Case Studies



**Qualcomm**

Mass Market  
Strategy



Niche Market  
Strategy



Segmented  
Strategy



Diversified  
Strategy

Multi-Sided Platform  
Strategy

## Block 2: Value Propositions

- ~~The Value Propositions Building Block describes the bundle of products and services that create value for a specific Customer Segment~~
- The Value Proposition is why customers turn to one company over another. It solves a customer problem or satisfies a customer's need.
- Each ~~Value Proposition consists~~ of an offering that caters to the requirements of a specific Customer Segment.
  - What is the organisation's offering?
  - What are the Gain Creators and Pain Relievers? (Refer to the Value Proposition Canvas)
  - What Value Propositions are offered to the Customer Segment (as a result of the Gain Creators and Pain Relievers)?

# Case Studies



**KICKSTARTER**



Self-Trancendence

Affiliation  
& Belonging

Design  
& Aesthetics

Provides  
Access

Simplifies

## Block 3: Channels

- **The Channels Building Block describes how a company communicates with and reaches its Customer Segments to deliver a Value Proposition.**
- Communication, distribution and sales Channels comprise a company's interface with customers.
- Channels are customer touch points that play an important role in the customer experience.
- A few questions to be considered here are, “through which Channels do our Customer Segments want to be reached? How are we reaching them now? Which ones work best?”

## Block 3: Channels cont.

- **Channels serve several functions**, including:
  - Raising **awareness** among customers about a company's product offerings
  - Helping customers **evaluate** a company's Value Proposition
  - Allowing customers to **purchase** specific products and services
  - Delivering a Value Proposition to customers
  - Providing **post-purchase customer support**

# Channel Types & Phases

## Channel Types

There are online and offline channels. Online channels include:

- Web: This include self-service sign-ups, logins and documentation; and live chats with a real person or AI (chatbot).
- Phone calls: With a real person or chatbot.
- Emails: Replied by a real person, or via pre-determined logic pathways
- Advertisements: Social media and search
- Payments

And more

## Channel Phases

Phase 1 - Awareness	Phase 2 - Evaluation	Phase 3 - Purchase	Phase 4 - Delivery	Phase 5 – After Sales
How do we <u>raise awareness</u> about our company's product offering?	How do we <u>help customers to purchase</u> specific products and services?	How do we <u>allow customers to purchase</u> specific product offerings?	How do we <u>deliver a Value Proposition</u> to customers?	How do we <u>provide post-purchase</u> customer support?

# Case Studies



INTERCOM

ActiveCampaign ➤

Web  
+  
Phase II, V

Email  
+  
Phase I, II, III



Advertisement  
+  
Phase I



Payments  
+  
Phase III



WORDPRESS

Web  
+  
Phase I, II, III, IV, V

## Block 4: Customer Relationships

- The Customer Relationships Building Block describes the types of relationships a company establishes with specific Customer Segments
- A company should clarify the type of relationship it wants to establish with each Customer Segment.
- Relationships can range from personal to automated. The following motivations may drive Customer Relationships:
  - Customer acquisition (Onboarding new customers);
  - Customer retention (Retaining repeat customers);
  - Upselling and cross-selling (Selling higher priced product offerings or selling other complementary products)

# Types of Customer Relationships

Personal Assistance	This relationship is <u>based on human interaction</u> . The customer can communicate <u>with a real customer representative</u> to get help during the sales process or after the purchase is complete. This may <u>happen on-site at the point of sale, through call centres, by email or through other means</u> .
Dedicated Personal Assistance	This relationship involves dedicating <u>a customer representative specifically to an individual client</u> . It represents the deepest and most intimate type of relationship and normally develops over a long period of time. In private banking services, <u>for example, dedicated bankers serve high net worth individuals</u> . Similar relationships can be found in other businesses in the form of key account managers who maintain personal relationships with important customers.
Self-Service	In this type of relationship, a company maintains <u>no direct relationship with customers</u> . It <u>provides all the necessary means for customers to help themselves</u> .
Automated Services	This type of relationship mixes a more <u>sophisticated form of customer self-service with automated processes</u> . For example, personal online profiles give customers access to <u>customised services</u> . Automated services can recognise individual customers and their characteristics, and <u>offer information related to orders or transactions</u> . At their best, automated services can simulate a personal relationship (e.g. offering book or movie recommendations).
Communities	Increasingly, companies are utilising user <u>communities to become more involved with customers/prospects and to facilitate connections between community members</u> . Many companies <u>maintain online communities</u> that allow users to exchange knowledge and solve each other's problems. Communities can also help companies better understand their customers.
Co-Creation	More companies are going beyond the traditional customer-vendor relationship to <u>co-create value with customers</u> . Amazon.com invites <u>customers to write reviews and thus create value for other book lovers</u> . Others, such as YouTube, rely on their content producers to develop and maintain relationships with their followers and supporters.

# Case Studies



Personal  
Assistance



Self-Service



Automated Services  
(e.g. Recommendations)



Communities

## Block 5: Revenue Streams

- The Revenue Streams Building Block represents **the cash a company generates from each Customer Segment** (i.e. how the company earns money from its Customer Segment)
- If customers comprise the **heart** of a business model, Revenue Streams are its **arteries**. A company must ask itself, how can it quantify the financial value of the Value Proposition that it delivers to its Customer Segment?
- How much of that financial value can the company capture? What methods can it capture that financial value?
- For example, a certain product offering saves a Customer Segment 5,000 hours per year, estimated to be equivalent to \$1 million in financial value per year. Out of the \$1 million, the company expects to capture \$200,000 per year via an annual subscription model.

# Types of Revenue Streams

<b>Asset Sale</b>	The most widely understood Revenue Stream derives from <u>selling ownership rights to a physical product</u> . Amazon.com sells books, music, consumer electronics, and more online. Fiat sells automobiles which buyers are free to drive, resell or even destroy.
<b>Usage Fee</b>	This Revenue Stream is <u>generated by the use of a particular service</u> . The more a service is used, the more the customer pays. A <u>cloud computing platform may charge customers based on the number of minutes</u> which a virtual machine is being run. A scooter ridesharing startup like Lime may charge customers based on a combination of the number of kilometres travelled on the scooter (it can also be argued that Lime is ).
<b>Subscription Fee</b>	This Revenue Stream is generated by <u>selling continuous access to a service</u> . A <u>SaaS platform</u> like Asana sells its members monthly or yearly subscriptions in exchange for access and usage of its project management tool.
<b>Lending, Renting or Leasing</b>	This Revenue Stream is created by <u>temporarily granting someone the exclusive right to use a particular asset for a fixed period in return for a fee</u> . For the lender, this provides the advantage of recurring revenues. Renters or lessees, on the other hand, enjoy the benefits of incurring expenses for only a limited time rather than bearing the full costs of ownership. Zipcar.com allows customers to <u>rent cars by the hour</u> .
<b>Licensing</b>	This Revenue Stream is generated by <u>giving customers permission to use protected intellectual property in exchange for licensing fees</u> . Licensing allows rights-holders to generate revenues from their property without having to commercialise an invention. In the technology sector, patentholders grant other companies the right to use a patented technology in return for a license fee.
<b>Transaction or Brokerage Fees</b>	This Revenue Stream derives from <u>intermediation services performed between or on behalf of two or more parties</u> . Tripe, for example, generate revenue by <u>taking a percentage of the value of the transaction</u> executed between the merchant and the buyer.
<b>Advertising</b>	This Revenue Stream results from fees for <u>advertising a particular product</u> . For example, Google Adwords has a “pay-per-click” model and may charge their advertising customer \$1.50 for every click of their advertisement displayed in the search results on Google.

# Case Studies



Asset Sale



Usage Fee



Subscription Fee



Lending, Renting  
or Leasing



Transaction  
or Brokerage Fee

## Block 6: Key Activities

- **The Key Activities Building Block describes the most important things a company must do to make its business model work**
- Every business model calls for several Key Activities. These are the most important actions a company must take to operate successfully.
- Key Activities enable other building blocks (Value Propositions, Channels... etc).
- Key Activities differ depending on the business model of the organisation. For example, the key activities for Microsoft would be software development, whereas for Dell (PC manufacturer), it would be supply chain management.

## Block 7: Key Resources

- The Key Resources Building Block describes the most important assets required to make the business model work
- Every business model requires Key Resources. These resources allow an enterprise to create and offer a Value Proposition, reach markets, maintain relationships with Customer Segments, and earn revenues. Different Key Resources are needed depending on the type of business model.
- A self-driving car startup requires large volumes of training data to develop its computer vision model, whereas Wikipedia requires the underlying open-source software (Media Wiki).

# Types of Key Resources

Technology	This may include <b>proprietary or open-sourced software</b> . Various libraries and frameworks are often used in the development of proprietary technologies.
Data	Data is crucial for AI companies as training data is required to develop AI models. Either <b>open data or proprietary data</b> may be accessed and used.
Human	Every enterprise requires human resources, but people are particularly prominent in specific business models. For example, human resources are <b>crucial in knowledge-intensive and creative industries</b> . For example, a pharmaceutical company such as Novartis relies heavily on human resources: its business model is predicated on an army of <b>experienced scientists</b> and a large and skilled sales force.
Intellectual	Intellectual resources such as <b>proprietary knowledge, patents and copyrights</b> , and <b>insights into technical and business problems</b> are increasingly important in a modern business model. Intellectual resources are challenging to develop but, when successfully created, may offer substantial value. Smartphone maker Huawei has the most patents on 5G in the world, which has enabled the organisation to achieve its dominant position in 5G globally today.
Physical	This category includes physical assets such as <b>manufacturing facilities, buildings, vehicles, machines, systems, point-of-sales systems</b> and <b>distribution networks</b> . eCommerce platforms like Amazon rely heavily on physical resources for logistics and fulfilment functions.
Financial	Some business models call for <b>financial resources</b> , such as <b>cash, debt or stock options</b> for hiring key employees.

## Block 8: Key Partnerships

- The Key Partnerships Building Block describes the network of suppliers and partners that make the business model work.
- Companies forge partnerships for many reasons, and partnerships are becoming a cornerstone of many business models.
- Companies create alliances to optimise business models, reduce risk, or acquire resources.
- We can distinguish between four different types of partnerships:
  - Strategic alliances between non-competitors
  - Cooperation: Strategic partnerships between competitors
  - Joint ventures to develop new businesses
  - Buyer-supplier relationships to ensure reliable supplies

## Block 9: Cost Structure

- **The Cost Structure describes all costs incurred to operate a business model**
- This building block describes the most important costs incurred under a particular business model.
- Creating and delivering value, maintaining Customer Relationships, and generating revenue all incur costs. Such costs can be calculated relatively easily after defining Key Resources, Key Activities, and Key Partnerships. Business models enabled by technology are more cost-efficient than others.

# Type of Costs

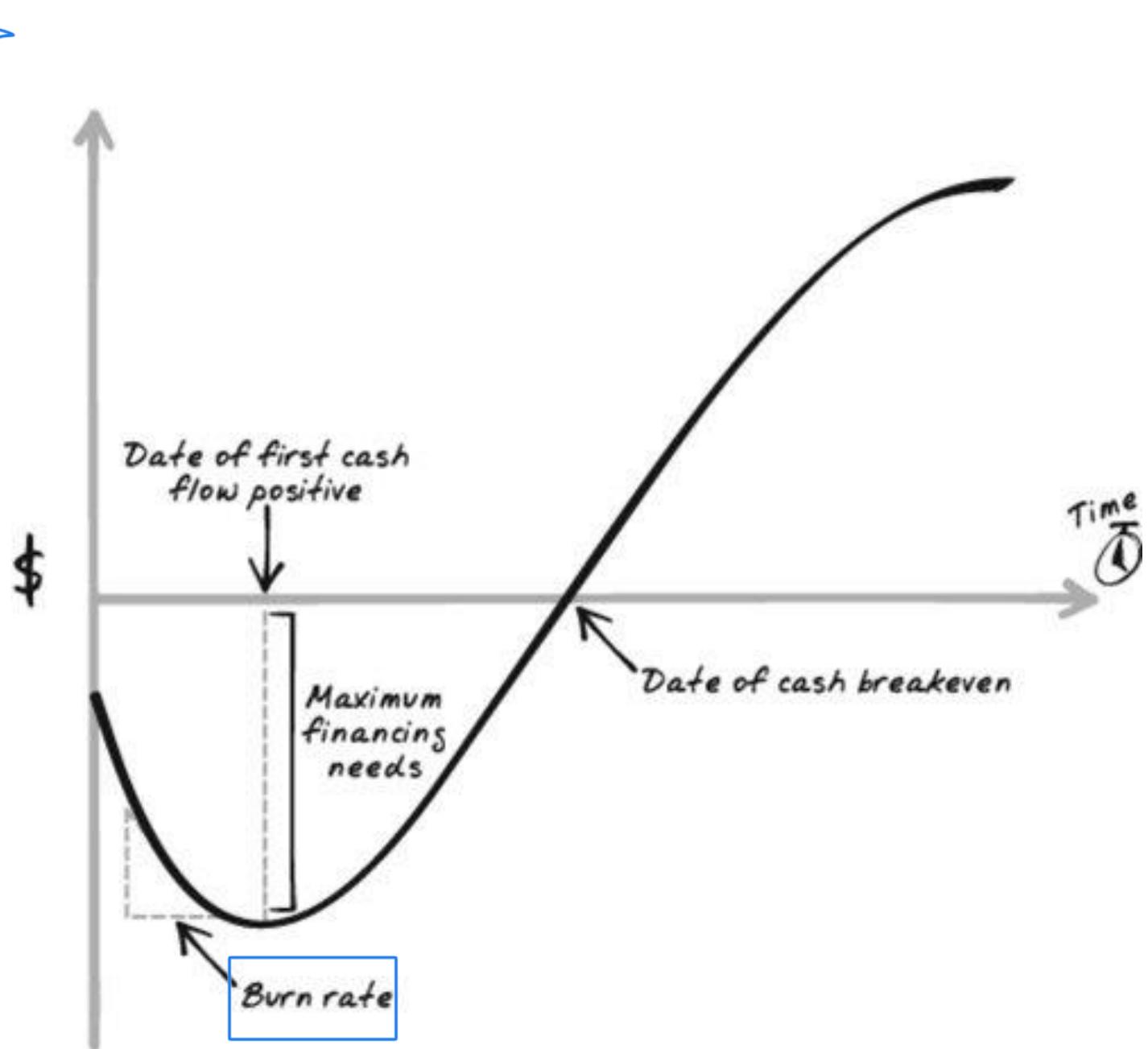
<b>Fixed Costs</b>	Costs that <u>remain the same despite the volume of goods or services produced</u> . Examples include <u>salaries, rent, and physical manufacturing facilities</u> . Some businesses, such as manufacturing companies, are characterised by a high proportion of fixed costs.
<b>Variable Costs</b>	Costs that <u>vary proportionally with the volume of goods or services produced</u> . Some businesses, such as SaaS companies, are characterised by a high proportion of variable costs.

## The Valley of Death – “The J Curve”

Massive losses in early-stage startups

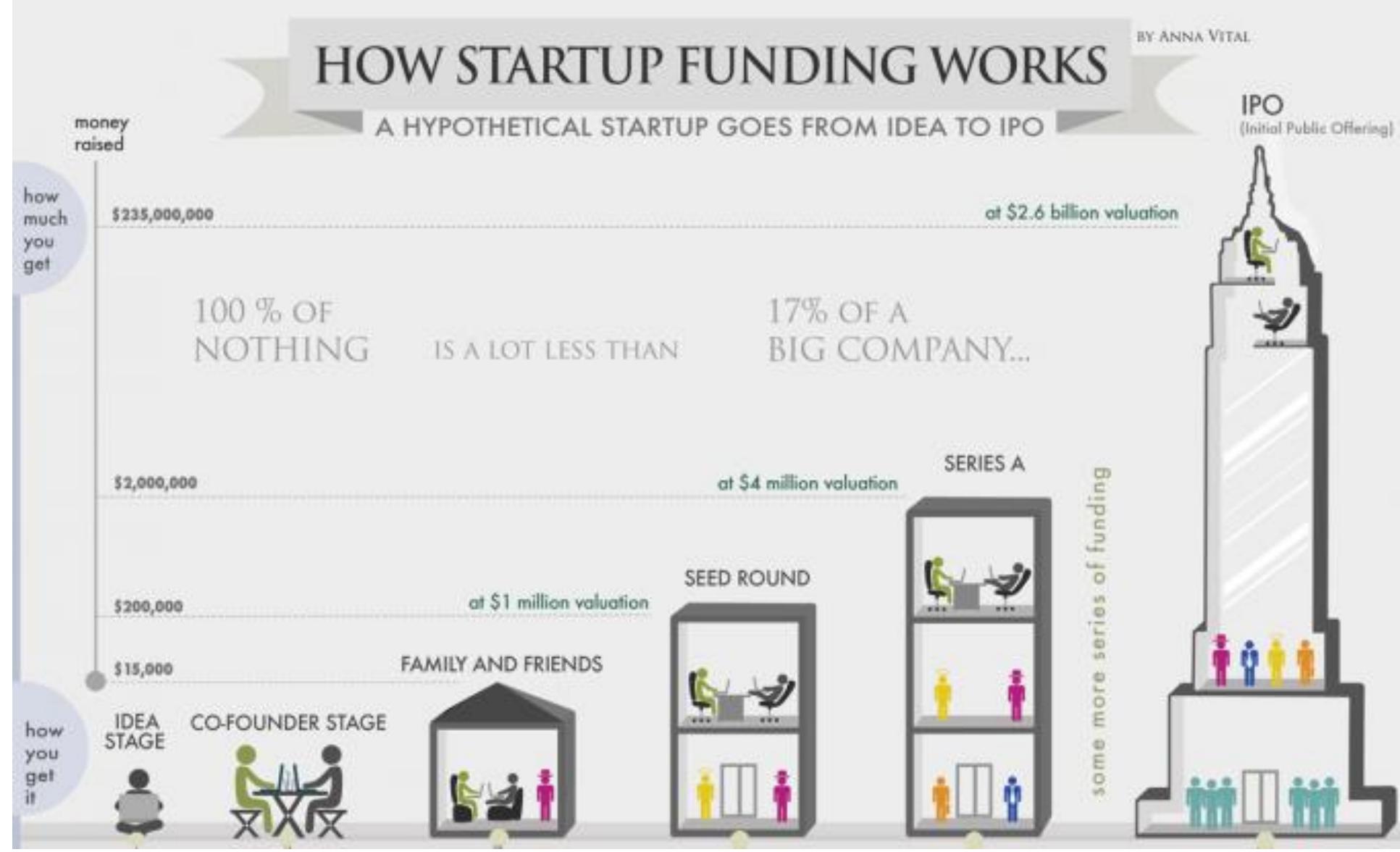
What does it mean to have a loss?

$$\begin{array}{r} \text{Revenue} \\ - \\ \text{Expenses} \\ \hline = \text{Profit OR Loss} \end{array}$$



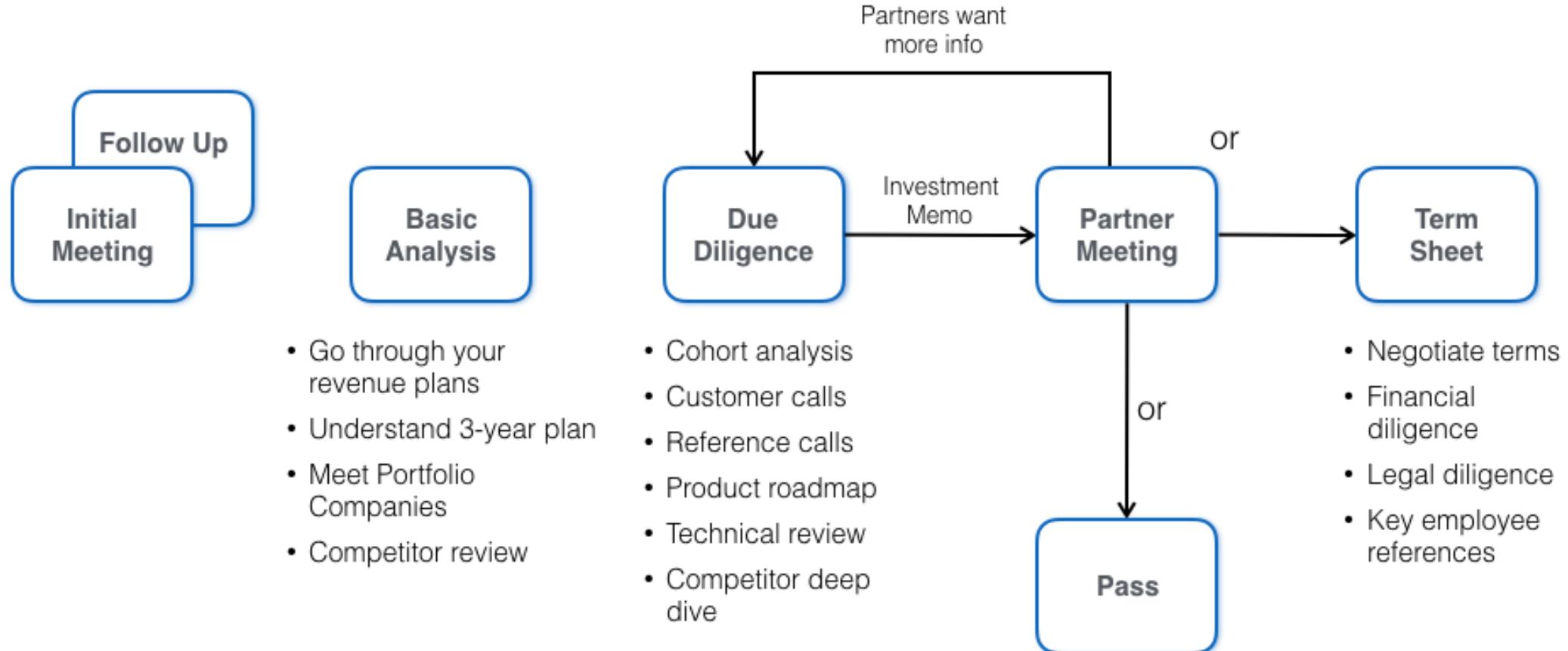
## Funding rounds: From Zero to IPO

IPO stands for initial public offering



# Raising capital from investors

How does the process look like?



# Pitch Format - Continued

<b>Introduction</b>	<ul style="list-style-type: none"><li>• Introduce yourself</li><li>• One sentence elevator pitch</li><li>• Traction teaser (if you have it)</li></ul>
<b>What is the problem/ opportunity</b>	<ul style="list-style-type: none"><li>• What problem are you solving?</li><li>• Do you have a deep understanding of this problem?</li><li>• What is your solution?</li><li>• Is your solution well validated?</li></ul>
<b>What is your market</b>	<ul style="list-style-type: none"><li>• Who uses your product?</li><li>• Why do people need your product?</li><li>• How big is the market?</li><li>• Is the market large and/or growing?</li><li>• Is your understanding of the market accurate and complete?</li><li>• Why is now the right time?</li></ul>
<b>Who you are</b>	<ul style="list-style-type: none"><li>• What about the founders will allow the startup to succeed?</li><li>• How well do the founders work together?</li></ul>
<b>Business Model and Growth</b>	<ul style="list-style-type: none"><li>• Do you have a visible and well-understood revenue or funding model?</li><li>• How will you grow and achieve scale?</li></ul>
<b>How and why you can win</b>	<ul style="list-style-type: none"><li>• What else is out there?</li><li>• Why are you better?</li><li>• What's your traction/ progress to date?</li><li>• How big can this get?</li><li>• How far will you be by the end of MAP?</li></ul>

# Investor Types

## Angel Investors



[Sydney Angels](#)



[Build, Lead, Invest | AngelList](#)

## Venture Capital



ANDREESSEN  
HOROWITZ

[Andreessen Horowitz | Software Is  
Eating the World \(a16z.com\)](#)

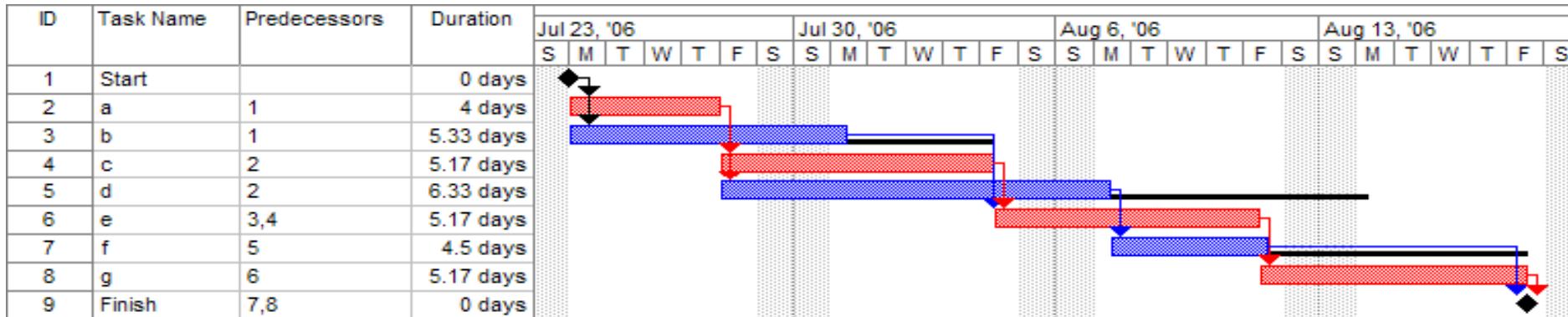
## Strategic Investors



[Telstra Ventures | Venture  
Capital Investing Based in  
Data Science](#)

# Influence of Taylorism in organisations

- Scientific management used not just in factories, but in most organisations
- Gantt charts (by Henry Gantt who worked with Taylor)



- **Using budgets for accountability and performance measurement**
- **Key performance indicators, linked to Incentives**

# Taylorism and Innovation

- But Taylorism was designed for repetitive work with known functions
  - e.g., the production of known items in the factory
- Not suitable for creative work with many unknowns
  - e.g., technological innovation
  - Taylorism does not promote new ideas/thinking
- Not for startups

# **Creating a culture for generation of new ideas**

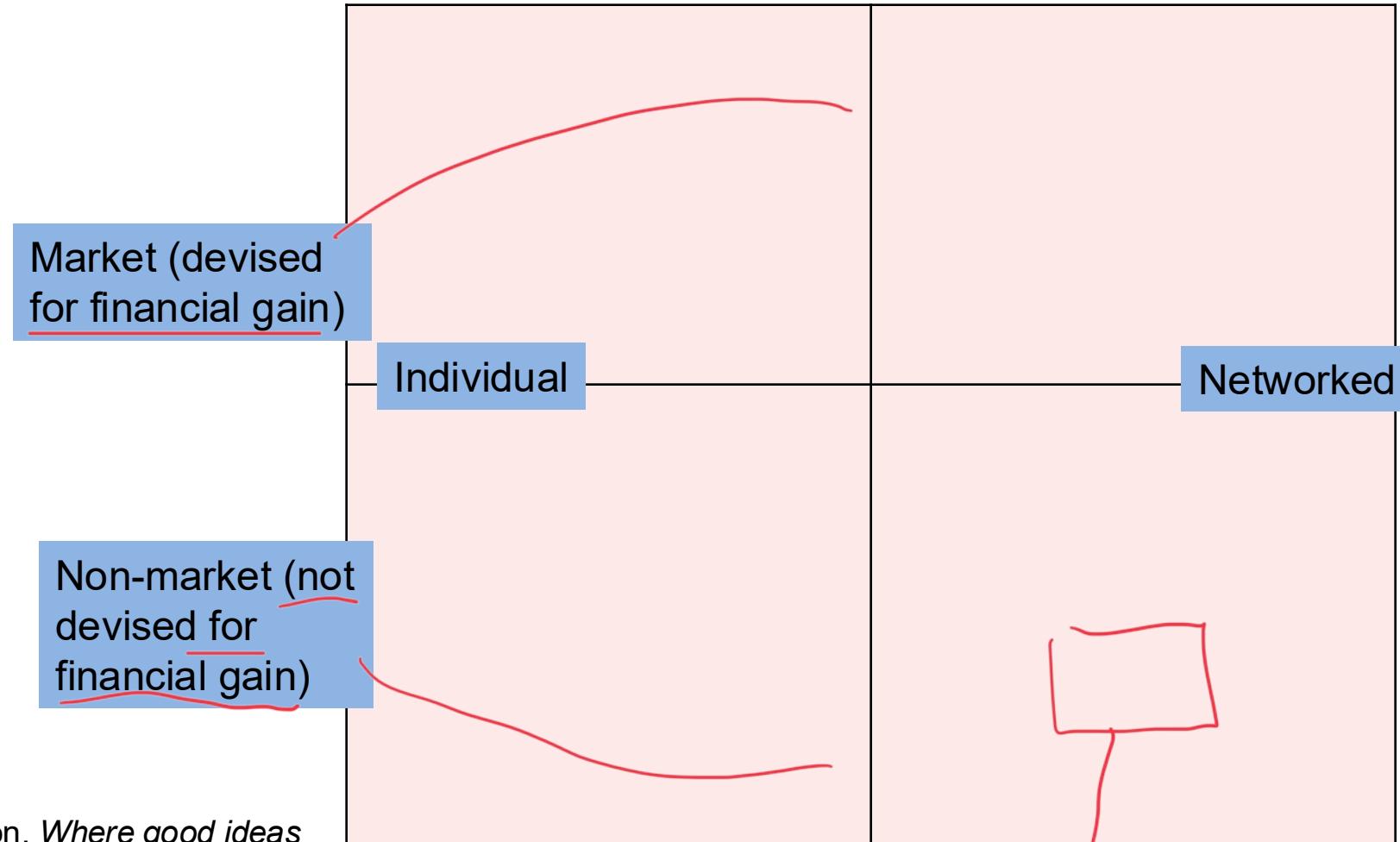
- **Liquid Networks** – having a diversity of expertise and it's ideas bouncing between different expertise that can trigger the big breakthrough
  - **Slow Hunch** – a great idea slowly fades into view over a long period of time
  - **Connecting vs Protecting** – interaction leads to the overall best result... keeping an idea to oneself leads to thought stagnation because our experiences and genetic makeup usually take us down the same thought path repeatedly



<https://www.youtube.com/watch?v=NugRZGDbPFU>

# Innovations: 1800 – now

## Where good ideas come from?



Steven Johnson, *Where good ideas come from: The natural history of innovation*. ePenguin, 2010.

## Innovations: 1800 – now

- Non-market focused approaches (not devised for financial gain) produce much more innovation than market-focused approaches
- Non-market focused approaches can lead to many new market opportunities
- Network is much more valuable than individual. This is consistent with the open innovation concept
- Quadrant 4 supports ‘liquid network’, ‘slow hunch’ as it is not driven by markets, and ‘connected’
- So when designing a culture for innovation, we need to be:
  - flexible (liquid networks, i.e., diversity of expertise),
  - allocate time (slow hunch), and
  - **be connected**

# Structural dimensions which influence innovation

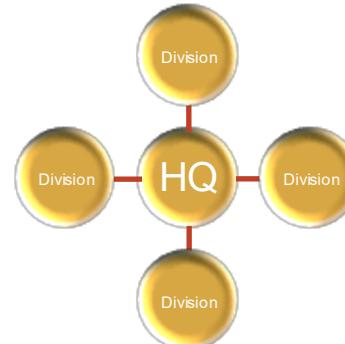
1. **Formalisation:** The degree to which the company uses rules and procedures to structure the behaviour of employees
2. **Standardisation:** The degree to which company activities are performed uniformly
3. **Centralisation:**
  - Centralised authority: The degree to which decision-making authority is kept at top levels of the company
  - Centralised activities: The degree to which activities are performed at a central location



[http://www.kingserv.org/design\\_examples.htm](http://www.kingserv.org/design_examples.htm)



© 2009 by [Deutsche Bank AG](#) via [Flickr](#) licenced under [CC](#)



Source: Schilling (2013)

# Mechanistic vs Organic Structures

- **Mechanistic Structures** have high formalisation and standardisation
  - Suitable for operational efficiency, reliability
  - Minimises variation → may stifle creativity
- **Organic structures** have low formalisation and standardisation; they are described as “free-flowing”
  - It may encourage creativity and experimentation
  - It 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”
- It can also alternate through different structures over time
- Sometimes, new product development can be quite independent of even the main R&D division (e.g., “skunk works” – explained later)

## In Summary, Organisational culture....

- Culture and innovation in a Digital Age - Virtuous Cycle of success from ideas/concepts
- An appetite for risk - Building **a culture where people feel comfortable trying things that might fail**
- **Making bold bets** – driving bold, decisive actions that enable the business to pivot rapidly, sometimes at a very large scale. Such moves require risk-taking, including aggressive goal-setting and nimble resource reallocation

## Summary cont.

- Culture for innovation
  - The importance of networked individuals for generating new ideas
  - The importance of innovation openness
- 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

# Typical Judging Criteria (Technology)

## TECHNOLOGY

Engineering qualities

01

## Design

02

Aesthetic and  
design qualities

## INNOVATION

03

New Product/Service, Innovate  
Beyond Existing Products

## FEASIBILITY

04

User value, Broad  
Appeal, Global Impact

## CONCEPT

05

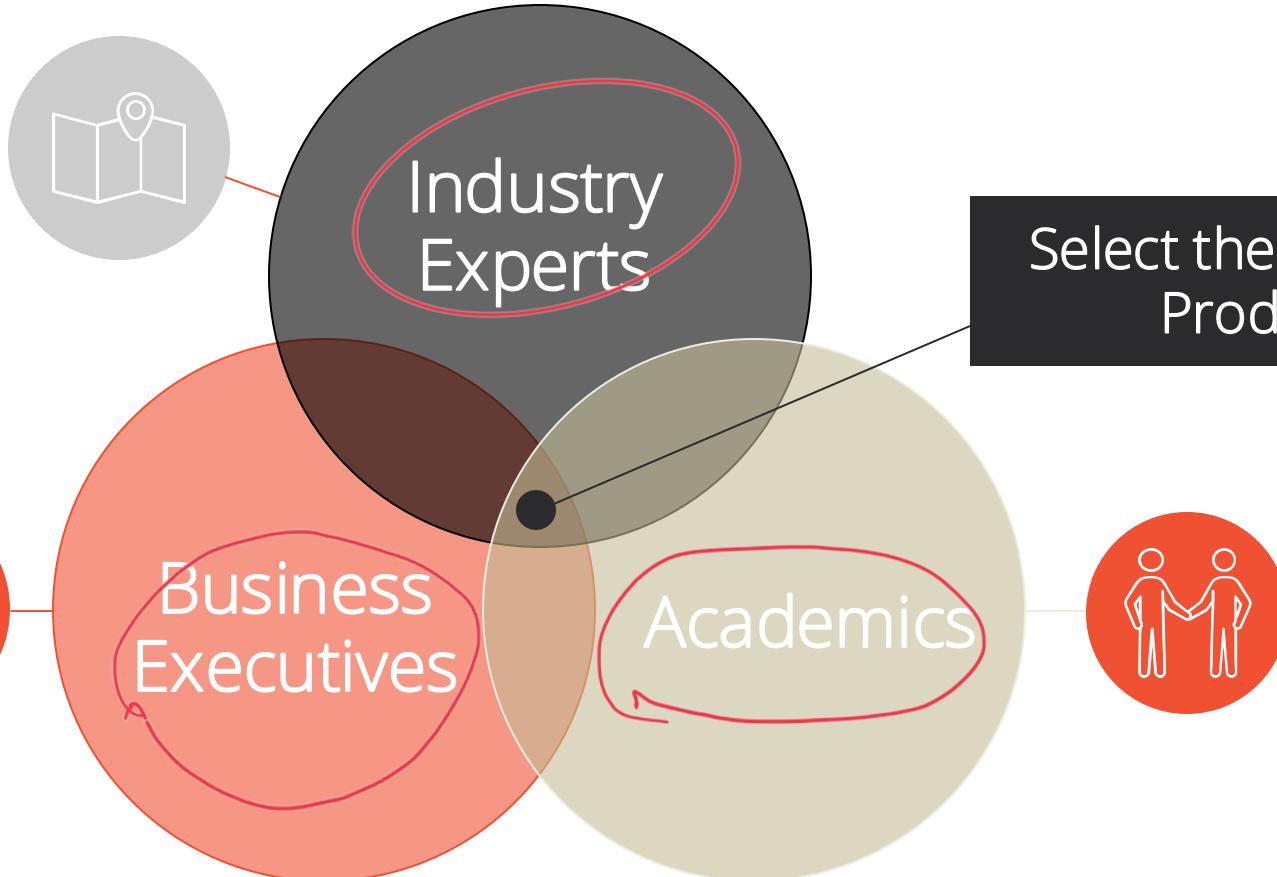
Business Model,  
Marketplace competitiveness

# Judging Panel



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

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



<http://www.edisonawards.com/criteria.php> (May'25)

# Examples: Berkeley's Big Ideas

- **Two-stage judging criteria:**
  - The pre-proposal round focuses on the extent to which the teams propose a creative solution to a social problem and the project's intended social impact,
  - Full Proposals are judged primarily on the project's potential social impact and the viability of the project plans.



Eligibility	Requirements	Judging Criteria
Teams will be judged on the following criteria:		
	1. Innovation	2. Social Impact
	3. Long Term Viability	4. Proposal Quality
<a href="#">Learn more about judging criteria</a>		



# Berkeley's Big Ideas

- **Incentives for Judges** – The incentive for judges to participate varies, but many choose to participate for one of three reasons:
  1. The opportunity **to give back** while also getting a first-hand look at some of the most innovative student ideas as they are being developed,
  2. The opportunity **to build their professional networks** by attending Big Ideas events and mixers where they can meet other judges, professional mentors, faculty and students or
  3. A **professional courtesy** to the category sponsor. It is worth noting that, generally speaking, judges who are incentivised by “giving back” and “professional development/networking” tend to be more committed and reliable judges

# Imagine Cup Judging Criteria

Criteria	Description	Weighting
Technology	<ul style="list-style-type: none"><li>-Does the project make effective and appropriate use of the Azure technology features of its chosen platform(s)?</li><li>-Does the project include innovations in user experience?</li><li>-Does the project include innovations in technical design and/or implementation?</li></ul>	50%
Innovation	<ul style="list-style-type: none"><li>-Does the project create a new category of product or service?</li><li>-Does the project clearly and meaningfully innovate beyond existing products or services?</li></ul>	20%
Concept	<ul style="list-style-type: none"><li>-Does the project address a clear need, problem, or opportunity and is the solution clearly explained?</li><li>-Does the project have broad appeal and global impact?</li></ul>	15%
Feasibility	<ul style="list-style-type: none"><li>-Does the team have a credible plan for getting their project to market in terms of business model, any required partnerships, or other factors?</li></ul>	15%

# Imagine Cup Judging Criteria

- Judging Criteria can be designed to suit the needs of the ‘competition’
  - Encourage the use of MS technologies
  - Think blue sky – young students are best at making big claims and also in achieving them
  - Maximise student engagement – this is their core aim

# Harvard invent-imagine-impact (i3) Innovation



- Harvard's premier student startup competition
- Students compete for project grants and incubator space to help them realise their innovative visions.
- i3 is a year-long program that cultivates, coaches and showcases Harvard's rapidly growing group of student entrepreneurs. Every year, they receive innovative applications from students in all 12 houses, 4 class years, and almost every concentration.
- Technology and Entrepreneurship Centre at Harvard
  - *Renegade—Regulation—Resource—Requirement*

<https://seas.harvard.edu/news/2013/04/imagining-impact-and-believing-it> (May'25)

# i3 Judging Criteria

Innovative Approach, Substantial & Measurable Impact

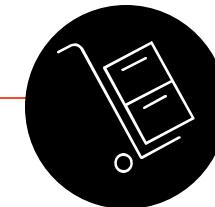


IMPACT

Realistic, Financially Sustainable



TEAM



PLAN

Skills, Commitment, Complementary Talent, & Resources

# CES - Consumer Electronic Show



- CES Innovation Award is the world's gathering place for all consumer technologies. It has served as the proving ground for innovators and breakthrough technologies.
- The annual CES Innovation Awards program celebrates outstanding product design and engineering in brand-new consumer technology products.
- Each product category has a three-member judging team composed of an independent industrial designer, an independent engineer and a member of the trade press.
- Best of Innovation Awards honorees are invited to the CES exhibition, take home the Innovation Awards trophy and are entitled to display the CES Innovation Awards logo on the product packaging & marketing materials.

<https://www.ces.tech/> (May'25)

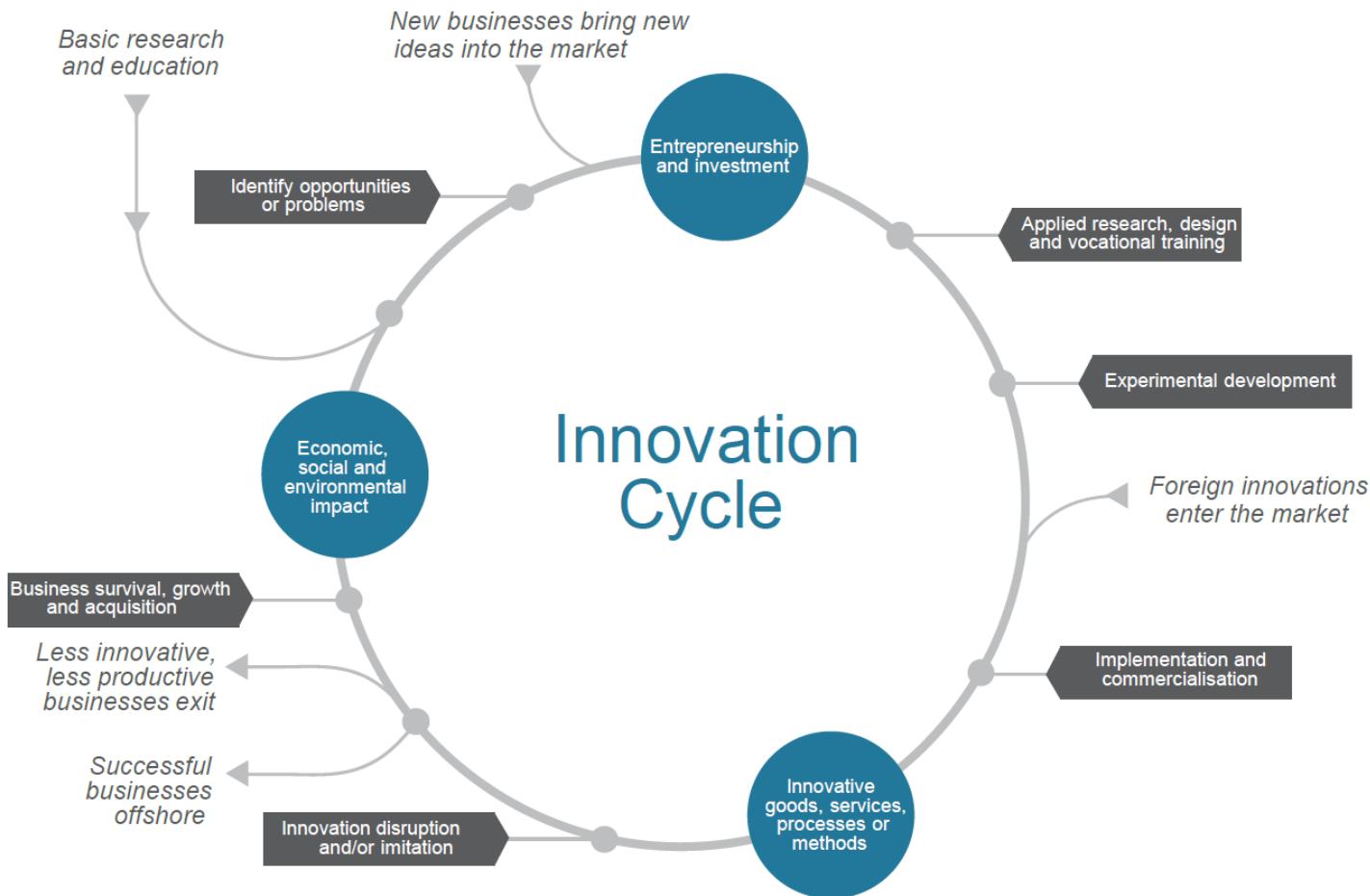
# CES Judging Criteria (from 2019)

- **Criteria 1: Engineering qualities**
  - The product should be crafted to address the quality attributes of availability, security, safety, reliability and performance.
- **Criteria 2: Aesthetic and design qualities**
  - The design attributes and user experience, including vision, hearing and perceptual design (e.g. touch)
- **Criteria 3: Product use/function and user value**
  - The design attributes and user experience, including vision, hearing and perceptual design (e.g. touch)
- **Criteria 4: Innovation**
  - How products demonstrate a new or adaptive way of solving a problem or introduce a completely new approach to solving the problem. Also, regarding the product's unique/novel features and features that consumers would find attractive
- **Criteria 5: Market Potential**
  - Understanding of competitors and existing solutions. Also, how the design and innovation of this product directly compare to other products in the marketplace.

## Summary

- It is important to know the judging criteria in order to judge IT Innovation
- Although judgment is subjective, the criteria can be used to make a fair and comparative assessments
- The judgement criteria is dependent on the user / product category / event
- The judging panel should comprise of (i) Industry Experts; Business Executives; and Academics, each having complimentary expertise and knowledge

# Innovation Cycle

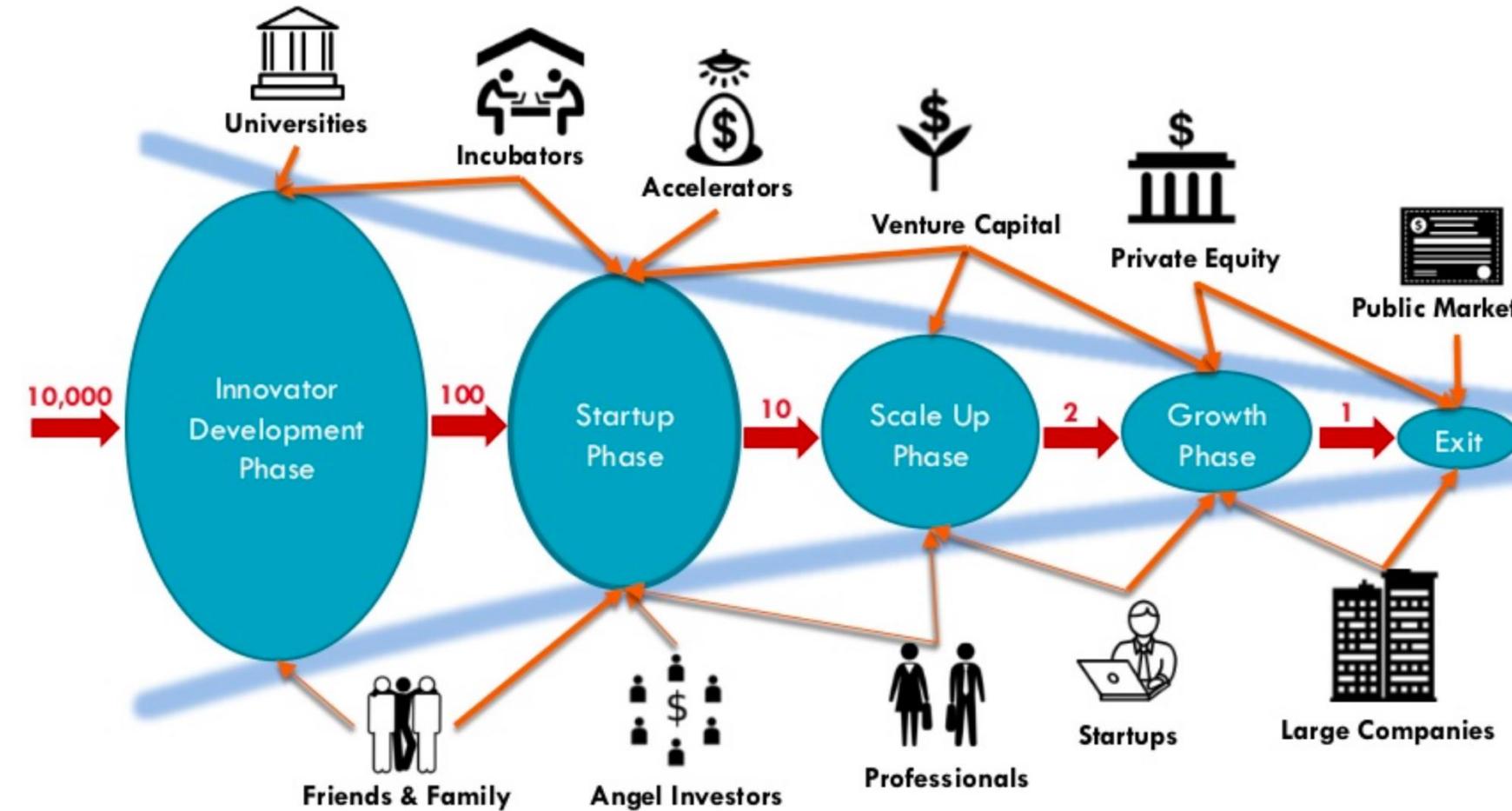


## The innovation system – what is it?

- An innovation system is **an open network of organisations** that interact with each other and operate within framework conditions that regulate their activities and interactions.
- These **three components** of the innovation system —
  - innovation activities,
  - networks and
  - framework conditionscollectively function **to produce** and **diffuse** innovations that have, in aggregate, economic, social and/or environmental value.

<https://www.industry.gov.au/publications/australian-innovation-system-monitor> (Oct'24)

# The innovation ecosystem – An example representation



The process of developing, testing and scaling innovation for sustainable impact cannot be undertaken by any one actor working in isolation

<https://www.idiainnovation.org/ecommerce-actors> (May'25)

Source: <https://www.slideshare.net/MaherHakim/building-innovation-ecosystem> (May'25)

# Why is Silicon Valley a successful innovation ecosystem?

1. Strong research-driven universities (with endowments)
2. Globally experienced repeat entrepreneurs
3. Sophisticated risk capital
4. Social capital
5. Knowledge sharing
6. Tolerance for risk-taking
7. Creative destruction
8. Constructive failure
9. Positive aggregate returns
10. Supportive government policy



# 1. Strong research-driven universities (with endowments)

- Endowment: Approx US\$36.5 billion (Aug. 2023)
- Fundraising: Approx > US\$1 billion per year



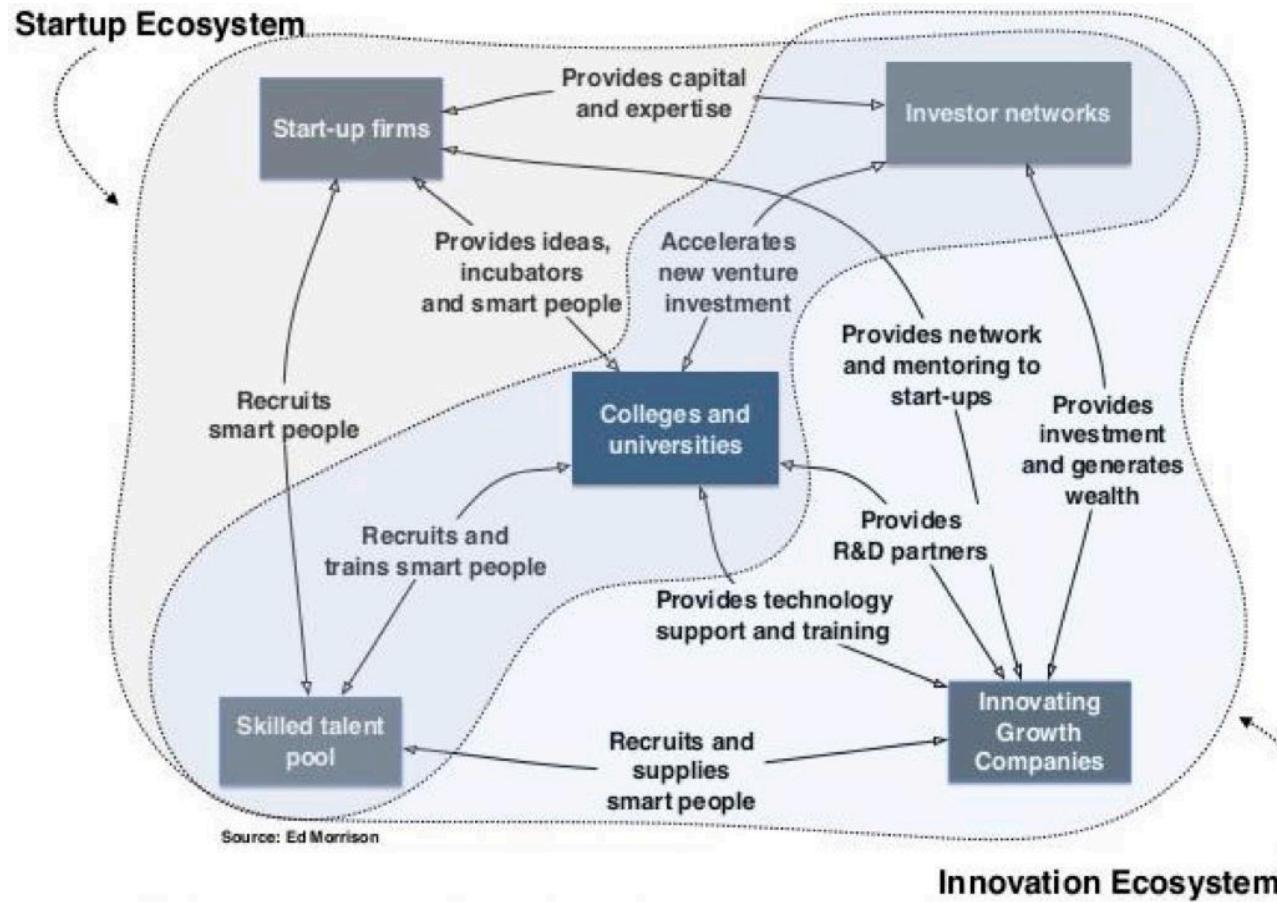
<http://stanford.edu>  
**Stanford University**



<http://berkeley.edu>  
**University of California Berkeley**

<https://facts.stanford.edu/administration/finances/> (May'25)

# University Operate Within Ecosystems



<http://www.slideshare.net/edpro/strengthening-purdue-innovation-ecosystem>

## 2. Globally experienced REPEAT entrepreneurs

Eg Elon Musk



Twitter



TESLA



THE  
**BORING**  
COMPANY



### 3. Sophisticated Risk Capital



ANDREESSEN  
HOROWITZ

Sophisticated venture capital



Sophisticated angel investors  
Eg Ron Conway

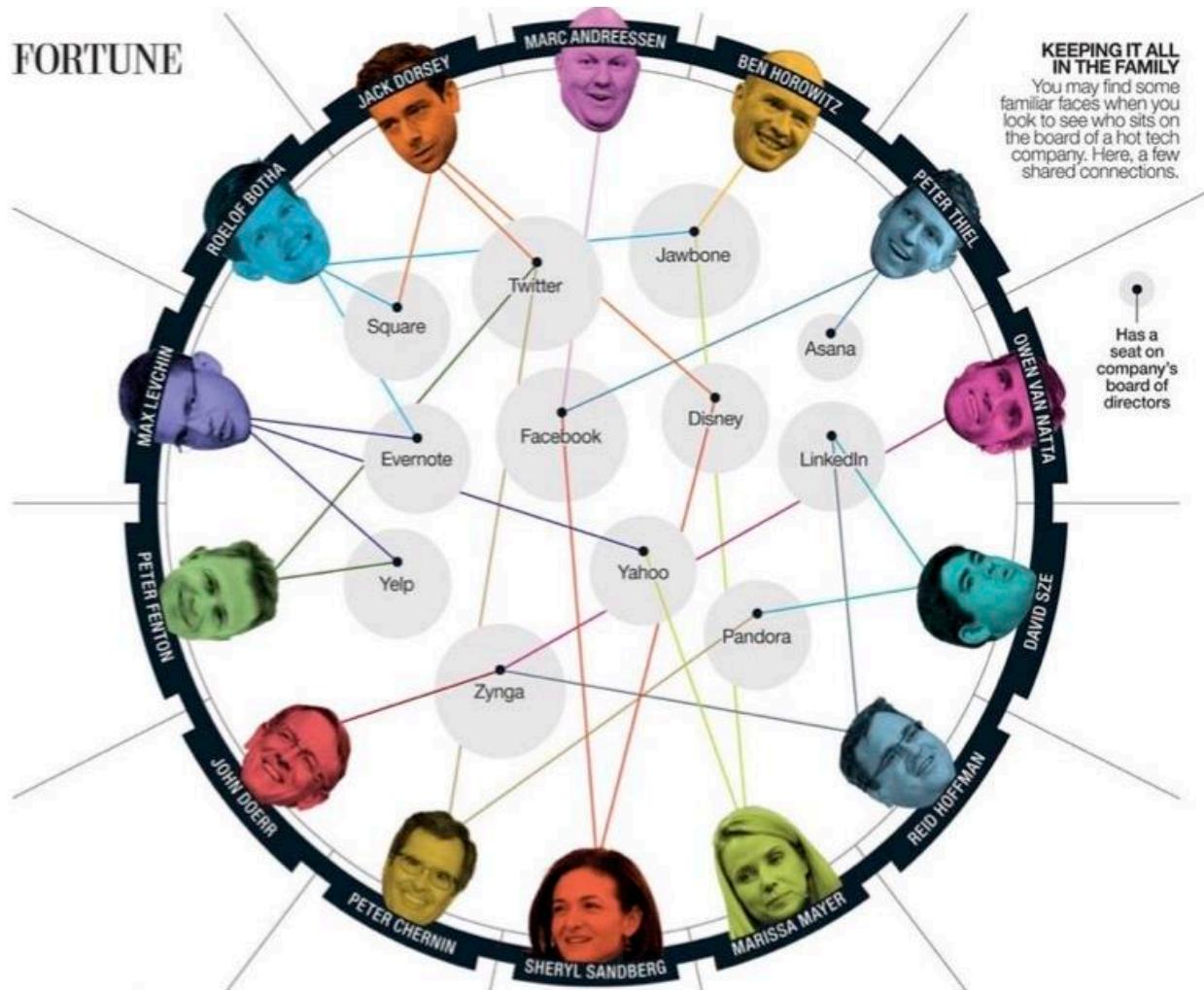
"With us and many other angel groups, Y Combinator startups get moved to the top of the list automatically." – Ron Conway

Sophisticated corporate investors



1/3 of all venture capital investment in USA is invested in Silicon Valley (SV has < 1% of US population)

## 4. Social capital



“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.”

## 5. Knowledge Sharing

- Meetings and Forums
  - Expertise in every corner
  - Giving back to the community
  - Liquid Network



<https://www.youtube.com/watch?v=NugRZGDbPFU>

## **6. Tolerance for Risk Taking**

- Entrepreneurs take risks by taking on ambitious missions
- Employees take risks by working for unproven startups
- Banks take risks by lending to unproven startups
- Attorneys take risks by doing pro-bono work
- Property owners take risks by offering accommodation to unproven startups

## 7. Creative destruction – Creating new Businesses while destroying old ones

### S&P 500 Churn Over the Past Decade

Sample companies that have entered and exited the index since 2002

#### Entered the index:



#### Exited the index:



S&P 500 index is a stock market index of companies listed on Nasdaq and NYSE

<http://www.aei.org/wp-content/uploads/2014/01/Churn.jpg>

## 8. Constructive Failures



EO Personal Communicator (originally by Go Corp)

Failed in market but staff went on to form:

intuit®



## 9. Positive Aggregate Returns

- Many failures, so need large successes
- For example,
  - In 1997, Benchmark invested \$6.7M in eBay. In 1999, this was worth \$5b
  - Peter Thiel, Facebook's first big investor, has sold off most of his stake, turning his initial \$500,000 investment in 2004 into more than \$1 billion in cash in 2012

<https://money.cnn.com/2012/08/20/technology/facebook-peter-thiel/index.html> (May'25)

## **10. Supportive government policy**

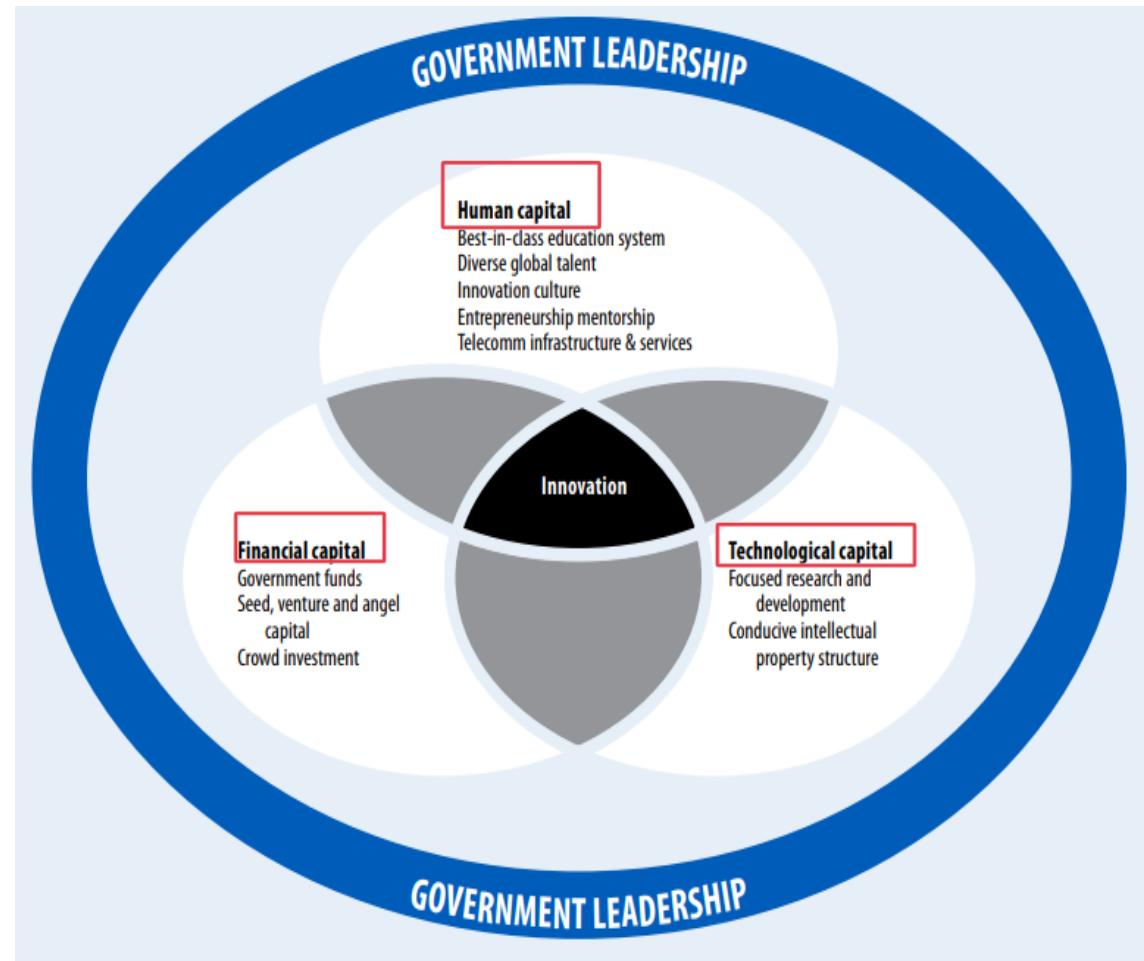
**For example:**

- Stock options are not treated as taxable income until exercised
- Flexible labour laws
- Tax incentives to encourage new ventures
- Large Govt/defence R&D funding

# UAE “Innovation Eco-System”



- The three pillars of the innovation ecosystem are human capital, financial capital, and technological capital.
- The UAE is actively working to promote innovation through policies and targeted initiatives aimed at developing the human element of the ecosystem while also addressing the key enablers of the human factor: the requirements of financial and technological capital.



## Summary

- Healthy ecosystems are important for innovation
- Successful areas (e.g. Silicon Valley) are successful because of the ecosystem, not just the people and companies
- We can learn from successful innovation ecosystems (and the Australian government is putting in place changes to improve the Australian ones)
- There are lots of people who are able and willing to help in the ecosystem, so always feel free to ask for help

## Support for specific Tech sector

Five key strategy areas to promote further growth and innovation in the industry. The strategy aims to:

- support industry in commercialising research and development
- grow exports and attract investment into the NSW medical technology sector
- support skills development
- improve connectivity and collaboration within the NSW medical technology industry
- improve the business environment.



[Medical technology - Industry sectors \(nsw.gov.au\) \(May'25\)](http://Medical%20technology%20-%20Industry%20sectors%20(nsw.gov.au).pdf)