

# Understanding IT Innovation Notes

## Assessment Information

Assignment	Type	Percentage	Due Date
Weekly Submissions	Individual	4%	Every week
Case Studies	Individual	16%	Every week
Innovation Report	Group	30%	-
Final Exam	Individual	50%	-

## Exam Information

Multiple Choice Question	10 Marks
Scenario Based Question	45 Marks
Long Question and Answer	30 Marks
Short Question and Answer	15 Marks
Time	2 hours 10 mins

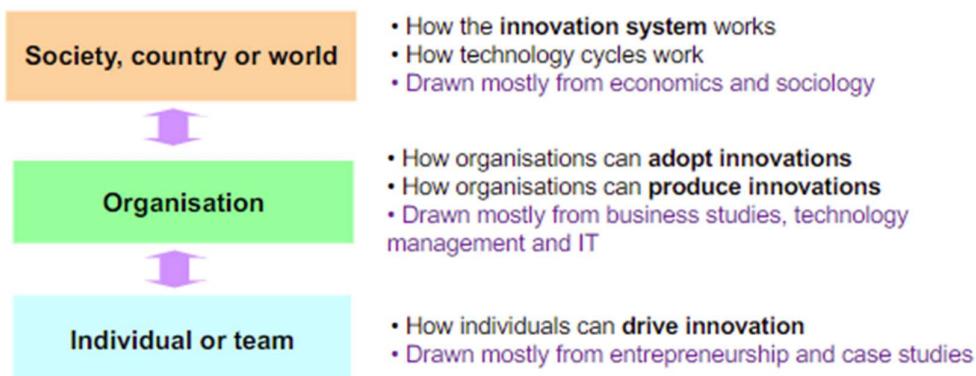
Important Weeks – Week 7, 8, 9, and 10. (Scenario Based questions based on these 4)

## Week 1

GPT are short for General Purpose Technology. This should not be confused with ChatGPT. Innovations in the IT field is called IT innovation. The classical IT innovations were Graphical User Interfaces, WWW architecture, Google search engine, Relational databases, etc. Some of the new innovations are edge computing, electric cars, AI, 3D mapping, etc.

This unit is about understanding IT innovations and how customer problems can be dealt with innovative solutions. The unit takes inspiration from IT, economics, sociology, psychology, business, entrepreneurship, and technology management. A few questions that this unit targets revolves around technological innovation, different types, how they spread, how do companies create innovations, etc.

## Levels of Involvement



## **Innovation and Invention**

There is a difference between innovation and invention. 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. The difference between the two has been given below:

	<b>Invention</b>	<b>Innovation</b>
<b>Definition</b>	The creation of a new device, process, or method that did not previously exist.	The process of translating an idea or invention into a good or service that creates value or for which customers will pay.
<b>Concept</b>	It is about creating something new.	It is about making something better or more effective.
<b>Development Stage</b>	It is the initial creation or discovery.	It is the subsequent application and adoption.
<b>Market Orientation</b>	It may not immediately have a market application.	It is inherently tied to market needs and often driven by consumer demand.
<b>Scope</b>	It can be a singular event.	It is often a continuous process of improvement and adaptation.

## **General Purpose Technology**

A General-Purpose Technology (GPT) is a technology that has broad applications across a wide range of sectors and significantly impacts economic and social structures. GPTs are characterized by their pervasive use, continuous improvement, and ability to spur complementary innovations. Here are the main features:

- Pervasiveness

GPTs spread across various industries and sectors, influencing multiple areas of the economy and society. They are not limited to a single application but have diverse uses.

- Improvement over time

These technologies evolve and improve over time, enhancing their performance and expanding their applications. Continuous advancements lead to increased efficiency and new capabilities.

- Complementary Innovation

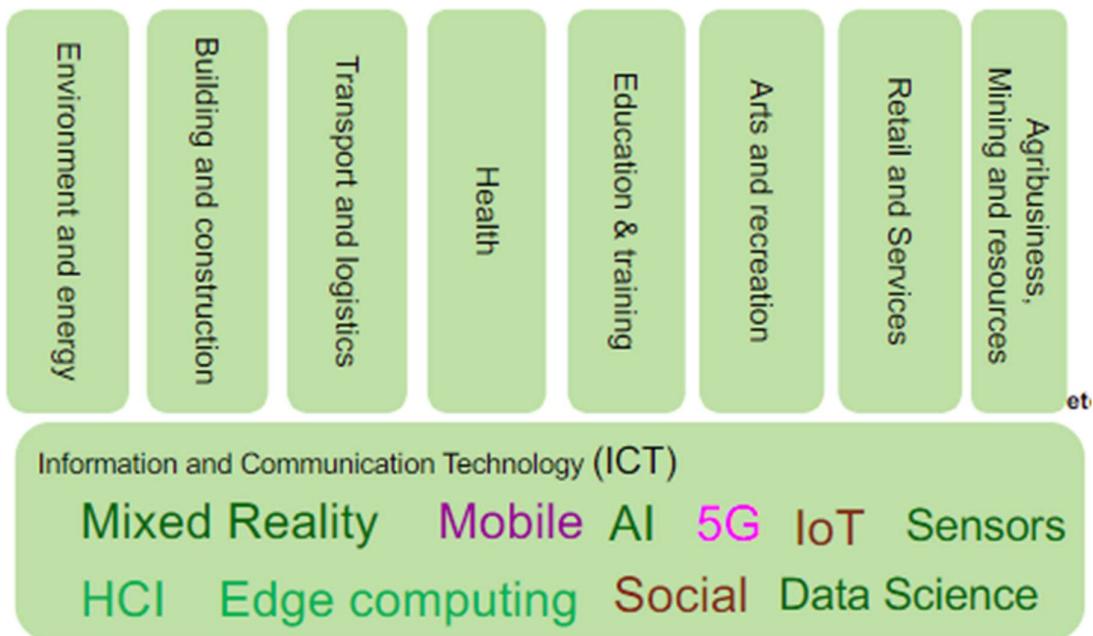
GPTs often require or stimulate the development of complementary technologies, products, and processes. They serve as a foundation for further innovations and technological progress.

- Transformational Impact

GPTs have a profound impact on productivity, economic growth, and societal change. They can lead to shifts in business models, organizational structures, and even cultural norms.

A few well known examples of General-Purpose Technologies would be electricity, internet, steam engine, computers, AI, etc. GPTs are very important for multiple reasons such as:

- GPTs drive economic expansion by improving productivity and enabling new industries and markets.
- They act as catalysts for further technological advancements and innovation across multiple sectors.
- GPTs often lead to significant social changes, altering how people live, work, and interact.



## WEEK – 2

### Diffusion of Innovation

Diffusion of innovation is a theory that explains how, why, and at what rate new ideas and technologies spread through cultures, societies, and organizations. Developed by sociologist Everett Rogers in his 1962 book "Diffusion of Innovations," the theory outlines the process by which an innovation is communicated and adopted over time among the members of a social system.

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.

- (1) A product innovation, process innovation, business model innovation etc.
- (2) By word-of-mouth, TV, trade journals, Internet, social media, etc.
- (3) This is the “rate of adoption” of an innovation.
- (4) There are different types of people – some tend to adopt innovations early after initial availability, others later.
- (5) A social system has external influencers (e.g. media, govt) and internal influencers (e.g. opinion leaders)

## The Innovation Development Process

### 1. Recognising a problem or need.

The process begins by identifying a problem, gap, or need in the market or society that requires a solution. Conducting market research, surveys, and stakeholder interviews to understand unmet needs. Observing existing problems and gathering insights from users and industry experts.

### 2. Basic and Applied research.

Basic research involves exploring fundamental principles and theories to gain a deeper understanding of the phenomena. Applied research focuses on practical application of scientific knowledge to solve specific problems identified in the first step. The key activities undertaken for the research are - Basic research: Conducting experiments, studies, and theoretical analysis to uncover new knowledge. Applied research: Translating theoretical insights into practical applications and exploring potential solutions.

### 3. Development

Turning research findings into tangible products, processes, or technologies. The activities involved in this are Designing, prototyping, and testing new solutions. Iterative refinement based on feedback and performance evaluations.

### 4. Commercialization

The process of bringing the developed product or technology to the market. The key activities involved in this process are:

- Developing a business plan and marketing strategy.
- Securing funding and investment.
- Setting up production and distribution channels.
- Launching the product or service to the market.

### 5. Diffusion and Adoption

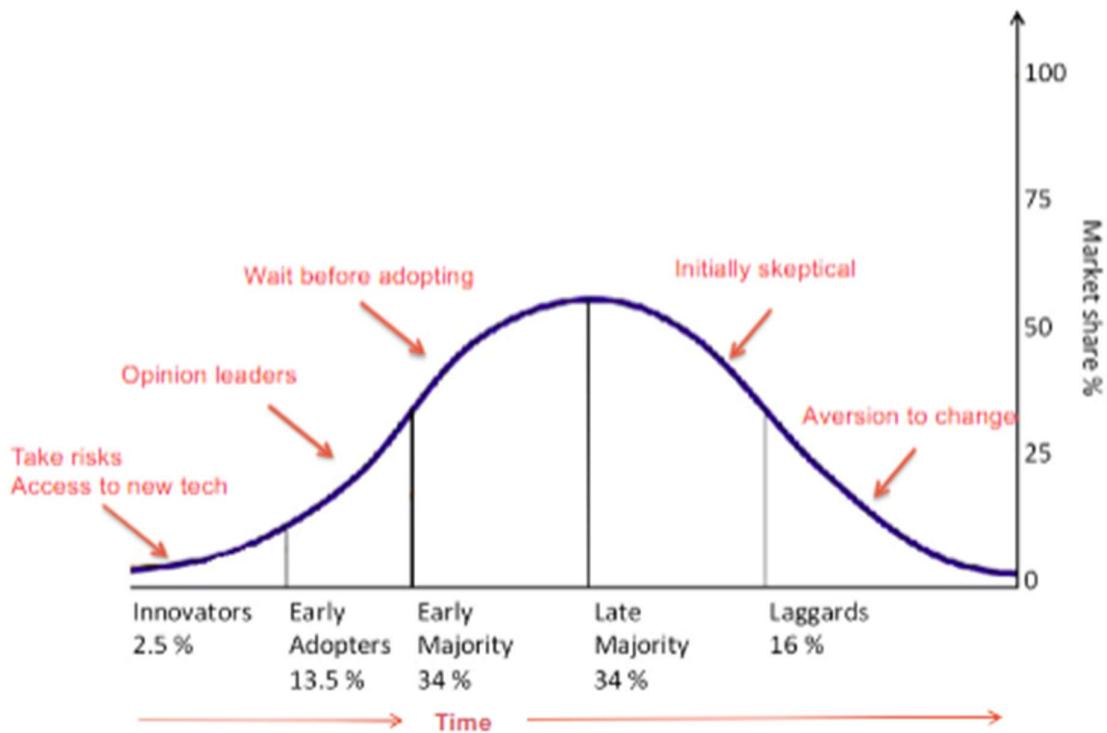
The spread of the innovation through the target market or society and the process by which it is adopted by users. The main activities involved in this step are Promoting the innovation through marketing and communication strategies. Engaging early adopters and influencers to drive adoption. Providing customer support and training.

### 6. Consequences

The impacts and effects of the innovation on individuals, organizations, and society. The key activities are Monitoring and evaluating the effects of the innovation. Assessing both positive and negative consequences. Adjusting or improvements based on feedback and observed outcomes.

## Technology Adoption Lifecycle Model

The Technology Adoption Lifecycle Model, also known as the Diffusion of Innovation Theory, is a theoretical framework that describes the process by which new technologies or innovations are adopted by individuals, groups, or organizations over time. Developed by Everett Rogers in the early 1960s, this model identifies distinct stages through which innovations progress as they spread through a population. The following is the Lifecycle model and its 5 types of adopters:



- **Innovators:**  
Innovators represent the pioneering individuals who eagerly embrace new technologies or innovations at the earliest stages of their introduction. They are characterized by their adventurous spirit, high tolerance for uncertainty, and willingness to take risks. Typically, innovators are well-educated, technologically savvy, and financially secure, allowing them to invest time and resources into exploring emerging technologies. Innovators often serve as opinion leaders within their social networks, influencing others through their enthusiasm and early adoption of innovations. Their contributions play a crucial role in the initial phase of innovation diffusion, providing feedback and insights that help refine and improve new technologies.
- **Early Adopters:**  
Early Adopters follow the innovators in embracing new technologies, but they do so with a more measured approach. These individuals are respected opinion leaders within their communities or industries, admired for their open-mindedness and forward-thinking attitudes. While they share some characteristics with innovators, such as a willingness to try new ideas, early adopters tend to be more cautious and discerning in their decision-making. They carefully evaluate the potential benefits and risks of adopting new technologies before committing to them. Early adopters play a significant role in legitimizing and popularizing the adoption of innovations among their peers, serving as role models and influencers within their social circles.
- **Early Majority:**  
The Early Majority represents the larger segment of the population that adopts innovations after they have been embraced by innovators and early adopters. These individuals are pragmatic and cautious in their approach to new technologies, preferring to observe and evaluate their effectiveness before making a commitment. The early majority requires evidence of an innovation's reliability and practicality before they are willing to adopt it. They are influenced by the experiences and opinions of innovators and early adopters, using their feedback to inform their own adoption decisions. The adoption of an innovation by the early majority marks a significant milestone in its

diffusion, signalling widespread acceptance and paving the way for its penetration into the mainstream market.

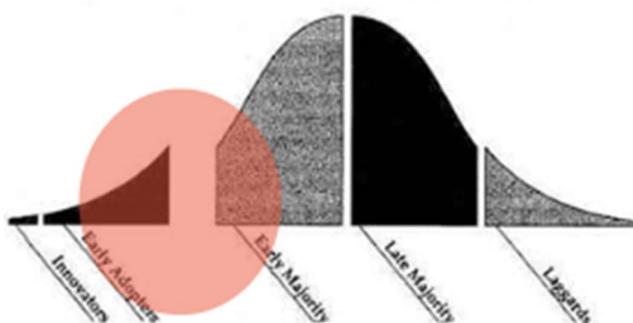
- Late Majority:

The Late Majority consists of individuals who adopt innovations reluctantly, typically after they have become well-established and widely accepted by most of the population. Unlike the early majority, who adopt innovations out of pragmatic considerations, the late majority adopts new technologies primarily due to social pressure or economic necessity. These individuals are sceptical and risk-averse, preferring to stick to familiar routines and practices rather than embrace change. Barriers such as cost constraints or fear of disruption may further delay their adoption of new technologies. The late majority's adoption signifies the saturation of the market and the normalization of the innovation within society, albeit at a slower pace than earlier adopter groups.

- Laggards:

Laggards are the final group to adopt new technologies, often long after most of the population has embraced them. These individuals are highly resistant to change and innovation, preferring to maintain traditional ways of doing things. Laggards are characterized by their conservative attitudes and behaviours, which may stem from a fear of the unknown or a reluctance to deviate from established norms. They perceive new technologies as unnecessary or threatening to their established routines and values, leading them to resist adoption until they have no other choice. The adoption of an innovation by laggards, if it occurs at all, represents the final stage in the diffusion process, marking the completion of the technology adoption lifecycle for that innovation.

**The Revised Technology Adoption Life Cycle**



**Figure from "Crossing the Chasm"**

The "chasm" refers to a critical and often challenging phase in the Technology Adoption Lifecycle Model, where an innovation faces a significant barrier to widespread adoption as it transitions from early adopters to the early majority. The term describes the gap or divide between the early adopter market and the broader mainstream market. A few characteristics of the chasm are:

- Market Segmentation:

The market is divided into distinct segments, with early adopters representing a smaller, niche market and the early majority representing a larger, mainstream market.

- Differing Needs and Expectations:

Early adopters are more willing to take risks and embrace new technologies, often seeking innovative solutions to address specific challenges. In contrast, the early

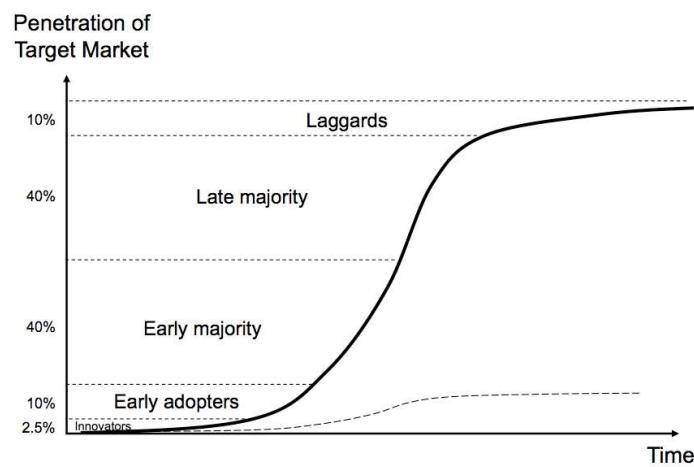
majority is more risk-averse and requires more tangible evidence of an innovation's value and reliability before adopting it.

- **Crossing the Gap:**

Innovations that successfully navigate the chasm are able to transition from the early adopter market to the early majority market, achieving widespread adoption and market dominance.

### The Technology Adoption S Curve

The Technology Adoption S Curve, also known as the Innovation S Curve or Technology Life Cycle Curve, is a graphical representation that illustrates the rate of adoption of a new technology or innovation over time within a population. The curve typically takes the shape of an "S," reflecting the pattern of slow initial growth, followed by rapid acceleration, and eventual leveling off as saturation is reached. Following is a diagram of the S-Curve and the features:



- **Introduction Phase:**

The introduction phase marks the initial stage of the Technology Adoption S Curve, characterized by slow adoption rates as a new technology or innovation is introduced to the market. During this phase, awareness of the innovation is limited, and potential users may be hesitant to adopt due to its unfamiliarity or perceived risks. Early adopters and innovators, who are typically more willing to take risks and explore new ideas, are the primary users driving adoption in this phase. Market penetration is minimal, and growth in adoption is slow as the innovation seeks to establish credibility and gain acceptance among potential users.

- **Growth Phase:**

The growth phase represents the period of rapid acceleration in the adoption of the technology depicted by the steep upward slope of the S Curve. As awareness of the innovation spreads and early adopters validate its value through their experiences, adoption rates increase exponentially. Positive word-of-mouth and social influence play significant roles in driving adoption during this phase. Mainstream users, who may have initially been sceptical or hesitant, begin to embrace the innovation as its benefits become more apparent. Market penetration expands rapidly, and the technology gains momentum as it moves towards widespread adoption.

- **Maturity Phase:**

The maturity phase is characterized by the leveling off adoption rates as the market approaches saturation. At this stage, most potential users have already adopted

the technology, and growth rates begin to slow down. The innovation has become well-established in the marketplace, and competition among providers intensifies as multiple players enter the market. Incremental improvements and innovations sustain demand among existing users, but opportunities for significant expansion of the user base diminish. The market becomes increasingly saturated, and growth becomes more challenging to sustain.

- Saturation Phase:

The saturation phase represents the final stage of the Technology Adoption S Curve, where adoption rates plateau, and the technology achieves widespread ubiquity. By this point, most of the target population has already adopted the technology, leaving only a small percentage of non-adopters. These remaining non-adopters are typically resistant to change or have limited need for the innovation. Adoption rates stabilize, and the market reaches a state of equilibrium where the technology is widely used and accepted. Continued use and maintenance of the technology by existing users are observed, but little to no expansion of the user base occurs as the market becomes saturated.

### **The rate of adoption of an innovation**

The perceived attributes of innovations play a crucial role in determining the rate at which they are adopted by potential users. These attributes, identified by Everett Rogers in his Diffusion of Innovations theory, influence how individuals perceive the value and utility of new ideas or technologies. These attributes are:

- Relative advantage

Relative advantage refers to the extent to which an innovation is perceived as being better than the idea or product it supersedes. This could encompass improvements in efficiency, effectiveness, convenience, cost, or any other dimension that matters to potential adopters. The greater the perceived relative advantage, the more likely individuals are to adopt the innovation quickly. For example, the adoption of smartphones over traditional cell phones was accelerated by the significant relative advantages they offered, such as internet access, apps, and advanced communication features.

- Compatibility

Compatibility is the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters. An innovation that aligns well with the cultural, social, and individual norms of a target audience is more likely to be adopted rapidly. If an innovation requires significant changes in behaviour or contradicts prevailing norms and practices, its adoption may be slower. For instance, electric cars are more compatible in societies that prioritize environmental sustainability and have a supportive infrastructure for charging stations.

- Simplicity

Simplicity, or the inverse concept of complexity, refers to how easy an innovation is to understand and use. Innovations perceived as simple and straightforward are adopted more quickly because potential users do not have to invest significant time and effort to learn and integrate them into their routines. Conversely, complex innovations that require extensive learning and adaptation are likely to experience slower adoption rates. User-friendly interfaces and clear instructions can enhance the simplicity of an innovation, thereby accelerating its adoption.

- Trialability

Trialability is the degree to which an innovation can be experimented with on a limited basis before a full-scale adoption. Innovations that offer trial opportunities, such

as free trials, pilot programs, or low-cost initial investments, allow potential adopters to reduce the perceived risk associated with trying something new. This attribute helps users to experience the benefits and evaluate the innovation's relevance to their needs without committing fully. For example, software companies often provide free trial periods to allow users to test their products before making a purchase decision.

- Observability

Observability is the extent to which the results and benefits of an innovation are visible to others. When the positive outcomes of adopting an innovation are easily observable, it encourages others to adopt it as well. Innovations that produce noticeable improvements or have a significant impact on the user's life or work are more likely to be adopted quickly because potential users can see the benefits firsthand or through the experiences of others. For example, the rapid adoption of fitness trackers was partly driven by the visible results they provided in terms of health and activity monitoring.

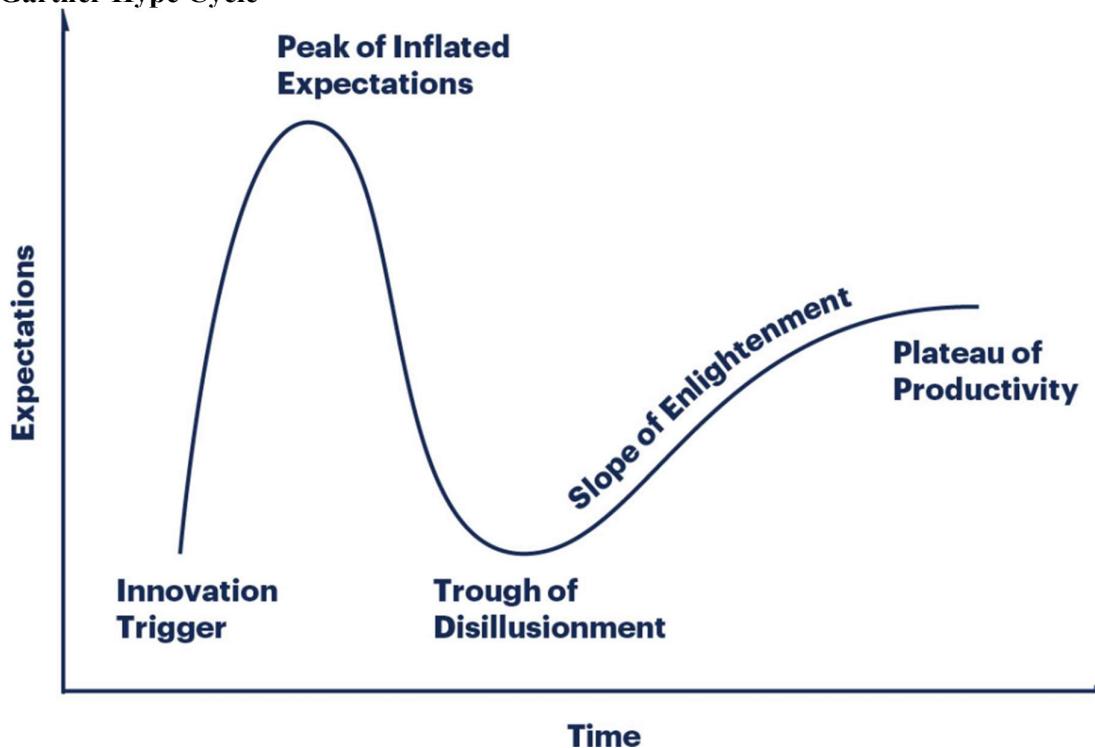
- Extent of change Agent's promotion efforts

The efforts made by change agents (such as marketers, salespeople, and advocates) to promote an innovation significantly influence its rate of adoption. Effective marketing campaigns, demonstrations, endorsements, and education can increase awareness, reduce resistance, and encourage adoption. These efforts help communicate the relative advantages, compatibility, simplicity, trialability, and observability of the innovation to the target audience.

- Other factors

Other factors that can affect the rate of adoption include the socio-economic status of potential adopters, the availability of financial and technical resources, the perceived risks and benefits, the level of access to information, and the presence of supportive infrastructure. Additionally, the innovation's cost, scalability, and the broader socio-political and economic environment can influence how quickly it is adopted.

**Gartner Hype Cycle**



The Gartner Hype Cycle is a graphical representation that illustrates the lifecycle of new technologies and innovations from their inception to maturity and mainstream adoption. Developed by the research and advisory firm Gartner, Inc., the Hype Cycle provides insights into the typical progression of a technology's visibility, expectations, and adoption over time. It consists of five key phases:

- Innovation Trigger

The Innovation Trigger marks the beginning of the Gartner Hype Cycle, where a new technology or breakthrough idea emerges, capturing the attention of the media and industry. At this stage, there is significant interest and excitement, fuelled by early demonstrations, research reports, or product announcements. However, practical products and applications are often limited or non-existent, and the commercial viability of the innovation remains largely unproven. Despite the lack of tangible outcomes, investment in the technology starts to increase as stakeholders are drawn by its potential and the promise of future advancements.

- Peak of inflated expectations

Following the initial excitement, the technology enters the Peak of Inflated Expectations. During this phase, the hype surrounding the innovation reaches its zenith, leading to unrealistic and often exaggerated expectations. Early adopters and the media contribute to the over-enthusiasm, sharing numerous success stories that may overlook the technology's limitations and challenges. As a result, there is a surge of investment and experimentation, with many projects and pilots being initiated. However, the high expectations set during this phase are typically not sustainable, as the technology's actual capabilities are still developing.

- Trough of disillusionment

The Trough of Disillusionment follows the peak, characterized by a significant decline in interest and enthusiasm. This phase occurs as the initial projects and implementations fail to meet the inflated expectations set earlier, revealing the technology's limitations and challenges. Negative publicity and scepticism grow as early adopters encounter difficulties and setbacks. Many organizations may abandon the technology, and investment slows down. However, this phase is also a critical period for learning and improvement, as developers and researchers work to address the identified issues and enhance the technology's practical applications.

- Slope of enlightenment

As the technology matures and improvements are made, it enters the Slope of Enlightenment. During this phase, a more realistic and balanced understanding of the technology's capabilities and potential emerges. Practical applications and reliable implementations start to appear, providing evidence of the innovation's value. Organizations begin to invest in the technology more cautiously, informed by the lessons learned from earlier experiences. Case studies, pilot projects, and successful implementations demonstrate the technology's benefits, encouraging broader adoption. The focus shifts to refining and optimizing the technology for more widespread use.

- Plateau of productivity

The final phase of the Gartner Hype Cycle is the Plateau of Productivity, where the technology achieves mainstream adoption and stable growth. By this stage, the technology's benefits are widely recognized and understood, and it becomes an integral part of industry practices and consumer habits. Market penetration stabilizes, and the technology is no longer seen as novel but as a standard component of the market. Incremental improvements and optimizations continue, but the innovation is no longer the focal point of excitement. Instead, it is valued for its proven reliability and effectiveness, contributing to long-term productivity and efficiency.

## **Dominant Design**

A dominant design is a specific architecture, configuration, or set of features of a product or technology that becomes the standard in its industry. Once established, it often dictates the direction of future innovation and competition. A dominant design becomes the industry standard, meaning it is widely accepted and adopted by most producers and consumers within that industry. This design defines the basic architecture of products and influences the development of complementary goods and services. The emergence of a dominant design leads to the stabilization of the market, reducing uncertainty among producers and consumers by providing a clear direction for technological development and investment. This stabilization helps firms focus on incremental improvements and efficiencies rather than radical innovation.

The adoption of a dominant design often benefits from network effects, where the value of the product increases as more people uses it. As more consumers and firms adopt the dominant design, it becomes more attractive to others due to increased compatibility, availability of complementary products, and reduced costs. The industry can become path-dependent on the dominant design, making it challenging for alternative designs to gain traction even if they are technically superior. The ecosystem of complementary products, user familiarity, and established supply chains reinforces the dominant design. While the establishment of a dominant design can stifle radical innovation, it encourages incremental innovation and improvements within the established framework. Companies focus on enhancing the dominant design, developing new features, improving performance, and reducing costs.

## **Phases of Dominant Design**

- Fluid Phase

In the early stages of an industry, multiple designs and technological approaches coexist, competing for market acceptance. This phase is characterized by high levels of innovation and experimentation as firms explore various configurations and features. There is uncertainty about the technology and its market and is hence characterised by high levels of experimentations.

- Transitional Phase

A transitional phase occurs as market preferences begin to consolidate around certain features or configurations. Some designs start to gain more traction, and firms may begin to align their products more closely with these emerging preferences.

- Specific Phase

The specific phase marks the establishment of a dominant design. One configuration or set of features emerges as the preferred choice among producers and consumers. This design becomes the benchmark for future developments, guiding the direction of industry innovation and competition. There is more focus on incremental innovations to improve components and focus is placed on process innovations to produce them efficiently and effectively.

## **Factors affecting Dominant Design**

- Regulatory and Standard Compliance

The design meets relevant industry standards and regulatory requirements, ensuring it can be widely adopted without legal or regulatory hurdles. Furthermore, it adheres to safety and security standards, providing confidence to users and regulatory bodies.

- Industry Support and Ecosystem

Support from major industry players, including manufacturers, suppliers, and service providers, helps drive the adoption of the design. The presence of a robust

ecosystem of complementary products and services enhances the value of the design and encourages broader adoption.

- Network Effects

The value of the design increases as more people adopts it, creating a self-reinforcing cycle. This can be due to compatibility, shared resources, or the ability to connect with a larger user base. Products that work well with existing systems, devices, or standards are more likely to be adopted widely.

- Market demand and consumer preferences

The design aligns well with consumer needs and preferences, addressing key pain points and delivering desirable benefits. User-friendly designs that are easy to understand and operate tend to gain quicker acceptance and adoption.

## WEEK 3

### **Disruptive Innovation**

Disruptive innovation is a term coined by Clayton Christensen in his book "The Innovator's Dilemma" to describe a process by which a smaller company with fewer resources successfully challenges established incumbent businesses. The disruption occurs when the smaller company targets overlooked segments of the market, offering a product or service that is often cheaper, simpler, or more convenient. Over time, this innovation improves and captures more market share, eventually displacing the established competitors. The following are the characteristics of the disruptive innovation:

- Initial Target Market

Disruptive innovations often start by targeting a niche market that is overlooked or underserved by the incumbents. These markets typically value different attributes than those valued by the mainstream market, such as lower cost or simpler solutions.

- Performance Trajectory

Initially, the performance of the disruptive innovation may not meet the standards of mainstream customers. However, it meets the needs of the niche market, which values affordability, or simplicity over high performance.

- Improvement over time

Over time, the disruptive innovation improves and starts to attract a broader audience. As it enhances its performance and features, it begins to appeal to mainstream customers, often at a lower price point than the established products.

- Incumbent response

Established companies often ignore or dismiss disruptive innovations in the early stages because they do not initially meet the needs of their most profitable customers. By the time incumbents recognize the threat, the disruptive innovation may have gained a significant market foothold.

There are 2 major types of Disruptive innovation, these are:

- Low End Disruption

Low-end disruptions target customers who are overserved by existing products or services. These innovations initially offer lower performance or quality but are more affordable and accessible to a broader market segment. Over time, they improve in performance and capture market share from higher-end products. Examples include budget airlines disrupting traditional carriers and discount retailers challenging premium brands.

Low-end disruption occurs when a new product or service enters the market, typically targeting customers who are overserved by existing offerings.

- New Market Disruption

New-market disruptions create entirely new markets or cater to underserved customer segments. These innovations often address unmet needs or introduce novel solutions that appeal to non-consumers or niche markets. Over time, they expand their reach and compete with established players. Examples include electric vehicles disrupting the automotive industry and mobile banking providing financial services to previously unbanked populations.

New-market disruption occurs when a product or service enters a market that is currently unserved or underserved by existing offerings. Unlike low-end disruption, which targets overserved customers with simpler, more affordable alternatives, new-market disruption involves creating entirely new markets or catering to previously overlooked customer segments.

### **Value Chain & Value Network**

The value chain is a concept used to describe the full range of activities involved in delivering a product or service to customers, from the initial conception to its ultimate consumption or use. It encompasses all the processes and activities that add value at each stage of production, distribution, and delivery. The value chain concept helps organizations understand how they can create and capture value by optimizing their operations and leveraging their strengths in different areas.

Industry value chains refer to the interconnected set of activities and processes that are specific to a particular industry. They encompass all the stages involved in bringing a product or service from its conception to its consumption or use within a specific sector or market. Industry value chains provide a framework for understanding how value is created, exchanged, and distributed among the various stakeholders within an industry.

A value network is a broader and more dynamic concept than a traditional value chain. While a value chain focuses primarily on the sequential flow of activities within a single company or industry, a value network encompasses the interconnected set of relationships, interactions, and exchanges among multiple organizations, individuals, and other entities involved in delivering value to customers.

Disruptive innovators and value networks are closely interconnected, with disruptive innovations often catalysing changes within value networks and value networks providing a fertile ground for disruptive innovations to emerge and propagate. Following are some relationships:

- Disruptive innovators as Value Network Participants

Disruptive innovators are often active participants within value networks, contributing new ideas, technologies, business models, and capabilities that challenge the status quo and drive innovation across the network. They may collaborate with other network participants, such as suppliers, partners, customers, and competitors, to co-create value and address emerging opportunities or challenges.

- Disruptive Innovation within Value Network

Disruptive innovations can emerge from within value networks, fuelled by interactions and collaborations among network participants. These innovations may result from the combination of diverse resources, knowledge, and expertise available within the network, leading to breakthroughs in products, services, processes, or business models that disrupt existing markets or create entirely new ones.

- Disruption of Traditional Value Chains

Disruptive innovators often challenge traditional value chains by introducing alternative approaches to value creation, delivery, and capture. They may leverage digital platforms, network effects, open innovation ecosystems, and other disruptive strategies to bypass or reconfigure established value chains, creating new pathways for value creation and exchange within the network.

### **Innovator's Dilemma**

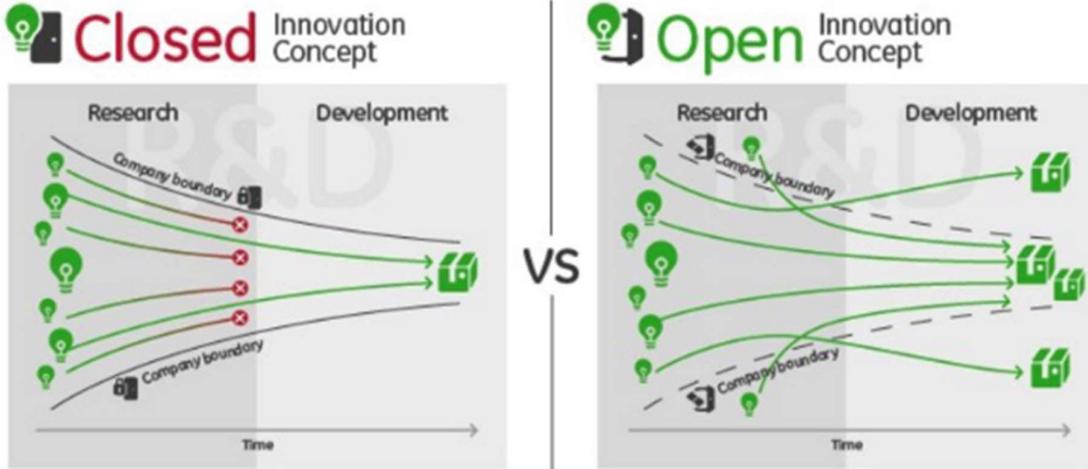
It refers to the challenge faced by successful companies when disruptive innovations emerge in the market. The dilemma arises from the tension between sustaining existing business models and pursuing new, potentially disruptive opportunities.

Established companies often focus on sustaining innovations that improve existing products, processes, or services to meet the needs of their most profitable customers. These incremental improvements help companies maintain their competitive advantage and market leadership in the short term. Disruptive innovations, on the other hand, typically originate from new or less established entrants in the market. These innovations may initially target niche or low-end segments that are underserved by existing products or technologies. While they may not initially meet the performance standards of mainstream customers, disruptive innovations have the potential to improve rapidly and eventually challenge incumbent firms.

The Innovator's Dilemma arises when successful companies face a choice between investing in sustaining innovations to reinforce their existing business models or pursuing disruptive innovations that may cannibalize their existing products or markets. Despite recognizing the potential of disruptive technologies, incumbents often hesitate to embrace them due to concerns about profitability, cannibalization, and the uncertainty of future returns. Failure to address disruptive innovations can have significant consequences for incumbent firms. Over time, disruptive entrants may gain market share and competitive advantage, eroding the dominance of established players. Incumbents may find themselves trapped in a cycle of incremental improvements, unable to respond effectively to disruptive threats until it's too late to recover. Christensen suggests that companies can navigate the Innovator's Dilemma by adopting a dual strategy that balances investments in both sustaining and disruptive innovations. This involves allocating resources to explore and experiment with emerging technologies and business models while continuing to support core businesses. By creating separate organizational structures, processes, and metrics for disruptive initiatives, companies can mitigate the risks associated with disruptive innovation and position themselves for long-term success.

The ambidexterity strategy is an approach that involves simultaneously pursuing both exploration and exploitation activities within an organization. It recognizes the need for balancing innovation and efficiency to achieve long-term success in dynamic and competitive environments. Exploration involves activities aimed at discovering and experimenting with new ideas, technologies, markets, and business models. It focuses on creating options for future growth and innovation by exploring new opportunities and challenging the status quo. Exploration activities may include research and development, prototyping, experimentation, market scanning, and strategic partnerships. Exploitation involves activities aimed at maximizing the value of existing resources, capabilities, and assets to generate short-term returns and maintain operational efficiency. It focuses on refining, optimizing, and scaling existing products, processes, and business models to capture value from current opportunities and sustain competitive advantage. Exploitation activities may include production, marketing, sales, process optimization, and cost reduction efforts. The ambidexterity strategy recognizes

the tension between exploration and exploitation and aims to balance these competing priorities effectively. While exploration activities involve uncertainty, risk, and experimentation, exploitation activities emphasize stability, efficiency, and execution. Balancing these activities requires careful resource allocation, organizational design, and leadership to create synergies and mitigate trade-offs between short-term and long-term objectives. The innovation funnel is given below:



## Week 4

### Open Innovation

Open innovation is a paradigm that emphasizes the importance of leveraging external sources of knowledge, ideas, technologies, and resources to complement and enhance internal innovation efforts within an organization. Unlike traditional closed innovation models, which rely primarily on internal R&D and proprietary knowledge, open innovation encourages collaboration, co-creation, and knowledge sharing with external partners, including customers, suppliers, universities, research institutions, startups, and other stakeholders.

Open Innovation can be defined as a distributed innovation process based on purposively managed knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organization's business mode. There are 3 major types of open innovation:

- Outside-in process

Enriching the company's own knowledge base through the integration of suppliers, customers, and external knowledge sourcing. Also called as inbound open innovation. Inbound open innovation involves sourcing external ideas, technologies, and expertise to complement internal R&D efforts. This may include scouting for innovations from startups, research institutions, universities, and other external sources, as well as actively engaging with customers and users to gather feedback, insights, and suggestions for improvement.

- Inside-out process

Earning profits by bringing ideas to market, selling IP, and multiplying technology by transferring ideas to the outside environment. Also called as outbound open innovation. Outbound open innovation focuses on leveraging internal innovations and intellectual property to create value beyond the organization's boundaries. This may involve licensing, selling, or otherwise transferring proprietary technologies, patents, or know-how to external partners for commercialization, further development, or integration into their products or services.

- Coupled process.

Co-creation with (mainly) complementary partners through alliances, cooperation, and joint ventures during which give, and take is crucial for success. Also called as collaborative open innovation. Collaborative open innovation involves partnering with external organizations to co-create new products, services, or solutions. This may include joint research and development projects, technology co-development initiatives, strategic alliances, joint ventures, or consortia formed to address common challenges or opportunities.

There are many benefits of open innovation, such as:

- Open innovation enables organizations to tap into a broader pool of ideas, knowledge, and expertise beyond their internal capabilities.
- Open innovation enables organizations to reduce their risk and cost of development by using existing third party technology.
- Open innovation allows organizations to speed up the innovation process by leveraging external resources, capabilities, and technologies.
- Open innovation offers a cost-effective approach to innovation by sharing the burden of R&D investment and risk with external partners.
- Open innovation enables organizations to better align their offerings with customer needs and preferences by involving customers and users in the innovation process.
- Open innovation facilitates access to new markets, channels, and distribution networks through collaborations with external partners.
- Open innovation encourages a culture of collaboration, openness, and learning within organizations. By breaking down silos and fostering cross-functional and cross-organizational collaboration, organizations can promote knowledge sharing, creativity, and teamwork, creating a dynamic environment that fosters innovation and continuous improvement.
- Open innovation can be a source of competitive advantage and differentiation for organizations that effectively leverage external partnerships and collaborations.

Risks of open innovation include:

- Open innovation usually is accompanied by lack of control as there is no tight control over external resources as much as one might have for internal resources.
- Open innovation may expose organizations to the risk of losing control over their intellectual property (IP) assets, including patents, trade secrets, and proprietary technologies.
- Open innovation requires sharing sensitive information, data, and resources with external partners, which can pose security and data privacy risks.
- Collaborating with external partners, especially those with varying standards, capabilities, and practices, may introduce quality and reliability issues into the innovation process.
- Overreliance on external partners for critical resources, expertise, or technologies may create dependencies that can pose risks to organizational agility, autonomy, and resilience.
- Open innovation may expose organizations to the risk of competitive threats and imitation from rivals who may capitalize on shared knowledge, ideas, or technologies to develop similar or superior offerings.
- Embracing open innovation requires cultural and organizational change, including fostering a mindset of collaboration, openness, and risk-taking within the organization.

Resistance to change, internal politics, and turf wars may impede collaboration efforts and hinder the effectiveness of open innovation initiatives, requiring strong leadership, communication, and change management to overcome.

- Open innovation introduces uncertainty and complexity into the innovation process, as organizations navigate the complexities of collaborating with diverse stakeholders, managing multiple partnerships, and integrating external contributions into their internal processes and systems.

A few examples of open innovation are:

- LEGO Ideas is an online platform where LEGO enthusiasts can submit their own ideas for new LEGO sets. Users vote on the submissions, and if an idea receives enough votes, LEGO considers it for production. This crowdsourcing approach allows LEGO to tap into the creativity of its fan community, resulting in unique and innovative product offerings.
- Innocentive is an open innovation platform that connects organizations with a global network of problem solvers to tackle complex challenges and find innovative solutions. Companies post "challenges" on the platform, offering monetary rewards for solutions submitted by solvers. Innocentive has facilitated successful collaborations between organizations and solvers across various industries, including pharmaceuticals, biotechnology, and consumer goods.
- Mozilla Firefox, an open-source web browser developed by the Mozilla Foundation, is a prime example of open innovation in the software industry. Mozilla engages with a global community of developers, contributors, and users who collaborate on the development, testing, and improvement of the Firefox browser and related projects. This collaborative approach has led to continuous innovation, rapid iteration, and widespread adoption of Firefox as a popular alternative to proprietary browsers.
- P&G's Connect + Develop program is a strategic initiative that seeks to accelerate innovation by partnering with external innovators, suppliers, startups, and academic institutions. Through this open innovation approach, P&G collaborates with thousands of external partners worldwide to co-create new products, technologies, and business models. Examples include the development of the Swiffer cleaning system and the Olay Regenerist skincare line.
- General Electric's open innovation efforts involve partnerships with startups, universities, and research institutions to drive innovation in areas such as healthcare, energy, aviation, and manufacturing. GE collaborates with external partners through initiatives such as GE Ventures, GE Licensing, and GE Research Centres, fostering a culture of innovation and entrepreneurship both within and outside the organization.

### Distributed Innovation

Distributed innovation refers to the process of harnessing the collective intelligence, creativity, and resources of a distributed network of individuals, organizations, and communities to generate, develop, and commercialize new ideas, technologies, and solutions. Unlike traditional centralized innovation models, which rely on internal R&D departments or innovation labs within organizations, distributed innovation leverages external collaborators, often across geographical, organizational, and disciplinary boundaries. The following are the characteristic traits of Distributed Innovation:

- Distributed innovation involves collaboration and co-creation among diverse stakeholders who form interconnected networks or communities that collaborate on innovation projects, share knowledge, and leverage complementary expertise and resources.

- Distributed innovation emphasizes openness, transparency, and accessibility in the innovation process, allowing participants to contribute ideas, insights, and feedback openly. By sharing information, data, and resources freely within the network, distributed innovation fosters a culture of collaboration, trust, and collective problem-solving.
- Distributed innovation decentralizes decision-making and empowers participants to take ownership of innovation projects and initiatives. Rather than relying on top-down control or hierarchy, distributed networks often operate on principles of self-organization, autonomy, and distributed leadership, allowing ideas to emerge and evolve organically from within the network.
- Distributed innovation promotes the development of modular, interoperable, and reusable solutions that can be adapted, combined, and customized to address diverse needs and contexts. By breaking down complex problems into smaller components or modules, distributed networks enable distributed teams to work independently on specific tasks while ensuring compatibility and integration across the ecosystem.
- Distributed innovation facilitates distributed value creation, where the benefits and rewards of innovation are shared among participants based on their contributions. This may include financial incentives, intellectual property rights, recognition, and opportunities for collaboration, fostering a sense of ownership, reciprocity, and mutual benefit within the network.

There are multiple approaches to distributed innovation. These include:

- Product platforms
- Web APIs
- Crowdsourcing innovation
- Open Data
- Open-source software
- User innovation
- Platform ecosystem
- Accelerators, investment, and others.

### **Approach to Distributed Innovation #1 – Product Platforms**

Product platforms serve as an effective approach to distributed innovation by providing a common foundation upon which multiple products, services, and innovations can be developed. This approach enables organizations to leverage shared resources, technologies, and components to facilitate collaboration, modularity, and scalability across a distributed network of innovators. Some ways in which companies can provide IT product platforms:

- Making source code available allowing the external innovators to modify the software for their own needs.
- Provide toolkits in the form of softwares and documentations which allows external innovators to write software based on the toolkit.
- Provide plug-ins and add on support in software which allows the external innovators to customize the software without access to source codes.
- Provide a complete product platform for external innovation which allows external innovators to write rich and varied applications on the platform.
- Provide live data/functionality via an Application Programming Interface (APIs) which allows the external innovators to build new services using the data.

A few benefits of Product platform are:

- Product platforms foster the creation of innovation ecosystems, where multiple stakeholders, including partners, suppliers, developers, and customers, can collaborate and contribute to the platform's evolution. Platforms often support open innovation by providing APIs, development kits, and other tools that enable external partners to develop complementary products or services, enhancing the diversity and richness of innovations.
- By building on a common foundation, organizations can accelerate the development and launch of new products, reducing time-to-market and gaining a competitive edge.
- Reusing core components and technologies across multiple products reduces development and production costs, leading to significant cost savings and higher profitability.
- The modular design of product platforms allows for flexibility in product development, enabling teams to independently work on different components or features without disrupting the overall system.
- Product platforms are designed to scale, supporting a wide range of products or services from the same core base. This scalability allows organizations to expand their offerings and enter new markets more easily.
- By distributing innovation efforts across a network of collaborators, product platforms help mitigate risks associated with development, as challenges in one module do not necessarily impact the entire system.
- Platforms enable organizations to optimize resource allocation by focusing efforts on high-impact areas and leveraging external expertise for specialized components or technologies.

## Web APIs

Web APIs (Application Programming Interfaces) are sets of rules and protocols for building and interacting with software applications over the internet. They enable different software systems to communicate with each other, allowing for the integration of various functionalities and services into applications. A Web API is an interface that allows developers to interact with a web service or application by sending requests and receiving responses over the web, typically using the HTTP protocol. The primary purpose of Web APIs is to enable the integration and interaction between different software systems, allowing them to share data and functionalities. There are 3 distinct API business models. These are:

- 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.

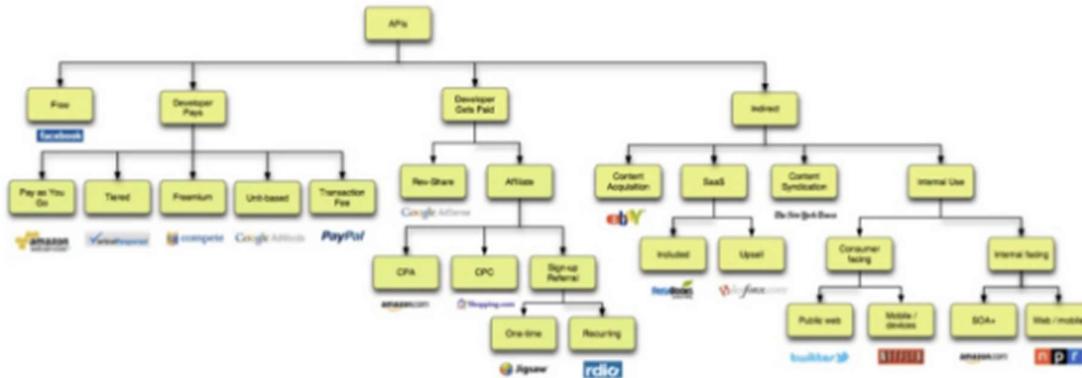
- API enhancing existing product.

Most 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.

# API Business Models, 2013



## WEEK 5

### Crowdsourcing

Crowdsourcing is a key approach within the broader concept of open innovation, where organizations leverage the collective intelligence, skills, and creativity of a large, diverse group of people to solve problems, generate ideas, and develop new products or services. This method taps into the power of the crowd, often utilizing online platforms to gather contributions from a wide range of participants.

Crowdsourcing involves outsourcing tasks, problems, or projects to a large group of people, often through an open call over the internet. Participants may include customers, employees, freelancers, experts, and the public. The primary goal of crowdsourcing is to gather a wide array of ideas, solutions, or contributions from a diverse group, harnessing their collective expertise and creativity to achieve outcomes that might not be possible through traditional internal efforts alone. 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. It always entails mutual benefit.

Some benefits of Crowdsourcing are as follows:

- Crowdsourcing taps into a wide range of viewpoints, skills, and experiences, leading to more innovative and diverse solutions.
- It can be more cost-effective than traditional R&D processes, as it often involves lower upfront costs and utilizes external resources.
- Crowdsourcing can accelerate the innovation process by parallelizing efforts and scaling up quickly, leveraging the contributions of many individuals simultaneously.
- Engaging with a broader community can foster a sense of inclusion and loyalty among participants, whether they are customers, employees, or other stakeholders.
- Organizations can access a global pool of talent, including individuals with specialized skills and knowledge that might not be available internally.

Some risks/challenges of Crowdsourcing are as follows:

- Ensuring the quality and reliability of contributions can be challenging, requiring effective mechanisms for evaluation and selection.

- Managing IP rights and ensuring that contributions are legally protected can be complex, particularly when dealing with a large, distributed group.
- Organizing and managing a crowdsourcing initiative requires careful planning, clear communication, and efficient coordination to be successful.
- Keeping participants motivated and providing appropriate incentives is crucial to maintaining engagement and ensuring valuable contributions.

The process of crowdsourcing is divided into 8 steps. These are:

- Company has a problem.
- Company broadcasts the problem online.
- Online crowd is asked to give solutions.
- Crowd submits solutions.
- Crowd vets' solutions.
- Company rewards winning solvers.
- Company owns winning solutions.
- Company profits.

There are different types of crowdsourcing. These are given below:

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

## Open Data

Open data refers to data that is freely available for anyone to access, use, modify, and share. It is typically released by governments, organizations, and institutions to promote transparency, innovation, and public engagement. Open data is characterized by its accessibility and lack of restrictions, enabling widespread use and collaboration. Open data is data that can be freely used, reused, and redistributed by anyone, subject to the requirement to

attribute and share alike. It is available online and can be accessed by anyone without any financial, legal, or technical barriers.

There is huge value in open data. These are:

- Economic value through increasing efficiency. A pathway to the creation of new products and services. Allows cost efficiency while ensuring better products.
- Big data is gradually replacing human decision making through a data driven approach.
- Open data brings in new opportunities through the creation of new products and services.
- Open data is self-reinforcing. The benefits of open data will increase as individuals perceive the advantages and help to improve the accuracy and detail of the information available.

There are multiple types of open data such as:

- Government Data: Includes data on public spending, health, education, transportation, and other public services. Examples include census data, crime statistics, and environmental data.
- Scientific Data: Research data that is openly shared to promote scientific collaboration and innovation. Examples include genomic data, climate data, and research publications.
- Corporate Data: Some companies release non-sensitive data to foster innovation and transparency. Examples include financial data, supply chain data, and product usage statistics.
- Cultural Data: Data related to cultural heritage, such as digital collections from museums, libraries, and archives. Examples include historical documents, artworks, and audiovisual recordings.

There are multiple benefits of open data such as:

- Transparency and Accountability: Open data promotes government and corporate transparency, enabling citizens to hold institutions accountable for their actions and decisions.
- Innovation and Economic Growth: Open data can drive innovation and economic growth by providing raw materials for new products, services, and business models. Entrepreneurs and developers can create applications and services based on open data.
- Research and Development: Open data facilitates scientific research and collaboration by providing researchers with access to large datasets. This can accelerate discoveries and foster cross-disciplinary studies.
- Public Engagement: Open data empowers citizens to engage with and contribute to societal issues, fostering a more informed and participatory society. For example, open data can be used to create applications that help citizens monitor air quality or track public spending.
- Improved Services: Access to open data can help improve public services by enabling data-driven decision-making and policy development.

There are multiple risks/challenges as well! These are:

- Data Quality and Standardization: Ensuring the accuracy, completeness, and consistency of open data is crucial. Standardization of data formats and metadata is necessary to make data interoperable and usable.

- Privacy and Security: Open data initiatives must consider privacy and security concerns, especially when dealing with personal or sensitive information. Anonymization and data protection measures are essential.
- Sustainability: Maintaining and updating open data repositories requires ongoing resources and commitment from data providers.
- Digital Divide: Ensuring that open data is accessible to all segments of the population, including those with limited digital literacy or internet access, is important for inclusivity.

### **Free and Open Source Softwares**

It refers to software that is both freely available for use and distributed with its source code. This allows users to view, modify, and distribute the software. The principles behind FOSS foster collaboration, transparency, and innovation. As defined by the Free Software Foundation (FSF), free software provides users with the freedom to run, study, change, and distribute the software and its source code. The emphasis is on freedom rather than price. Defined by the Open-Source Initiative (OSI), open-source software is distributed with a license that allows anyone to access, modify, and share the source code. Open source focuses on the practical benefits of sharing code and collaborative development.

Free software refers to software that grants users the freedom to run, study, modify, and distribute it. The term "free" in this context emphasizes freedom rather than cost. The Free Software Foundation (FSF) defines free software through four essential freedoms:

- Freedom to run the program.
- Freedom to study and modify the program.
- Freedom to redistribute copies.
- Freedom to distribute modified versions.

Copyleft is a word play of 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.

Open-Source Software on the other hand, focusses more on the aspect of providing access to source code than the rights of the users. To be classified as a OSS, the software must be:

- Freely redistributable.
- Source code must be available for free or reasonable reproduction cost.
- Modifications and derived works must be allowed and be distributable under same terms.
- Can protect the integrity of author's source code if source code patches are allowed.
- No discrimination against people or 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.

## 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** (changes to 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)

## Open source hosting sites

- Offer hosting, version control, issue tracking, wikis, download support etc
- Some support code reviews etc
- Examples:
  - Github (>420 million repositories)
  - Sourceforge (>500k projects)
  - Google Code (250k projects) (closed down Jan 2016)

### Importance of Free and Open-Source Software:

- OSS allows companies to innovate their infrastructure and services rapidly.
- OSS eliminates the need for expensive licensing fees, making it accessible to individuals, startups, educational institutions, and organizations with limited budgets. This democratization of technology enables more people to experiment, innovate, and contribute.
- Open-source projects benefit from the contributions of a diverse global community. This collective intelligence leads to more robust, secure, and innovative software as contributors bring varied perspectives and expertise.
- The transparency of OSS allows for thorough peer review, which can enhance the quality and security of the software. Users and developers can inspect the code, identify vulnerabilities, and suggest improvements.
- Users can modify OSS to meet their specific needs, fostering a culture of innovation through customization. This flexibility is particularly valuable for niche applications or emerging fields where proprietary solutions may not be available.
- OSS enables new entrants to compete with established players by providing high-quality, low-cost alternatives. This disruption can drive innovation across entire industries.
- Companies can build innovative business models around OSS, such as offering customized solutions, support services, and complementary products. Examples include Red Hat's enterprise support for Linux and GitHub's collaboration platform for developers.

Challenges involved in using FOSS in products and services are:

- FOSS components may not always integrate seamlessly with existing proprietary systems or with each other, leading to potential compatibility issues.
- Managing dependencies and ensuring compatibility between different FOSS components can be complex, especially as software ecosystems evolve.
- Unlike proprietary software, which often comes with professional support services, FOSS typically relies on community support. This can be a drawback for businesses that require guaranteed, timely assistance.
- The quality of FOSS projects can vary widely. Some projects are highly polished and well-maintained, while others may be less reliable or lack essential features.
- Documentation for some FOSS projects may be incomplete, outdated, or difficult to understand, making it challenging for new users to get started or troubleshoot issues.
- FOSS projects are released under various licenses (GPL, MIT, Apache, etc.), each with its own terms and conditions. Understanding and complying with these licenses can be complex.
- Ensuring compliance with all applicable licenses is critical to avoid legal issues. This includes proper attribution, adherence to distribution requirements, and avoiding the mixing of incompatible licenses.

## WEEK 6

### User Innovation

Producer innovation refers to the development of new products, services, or processes by firms or organizations that intend to sell them to customers. This type of innovation is typically driven by the producers themselves, who invest resources into research and development (R&D) to create offerings that meet market demands and enhance their competitive advantage.

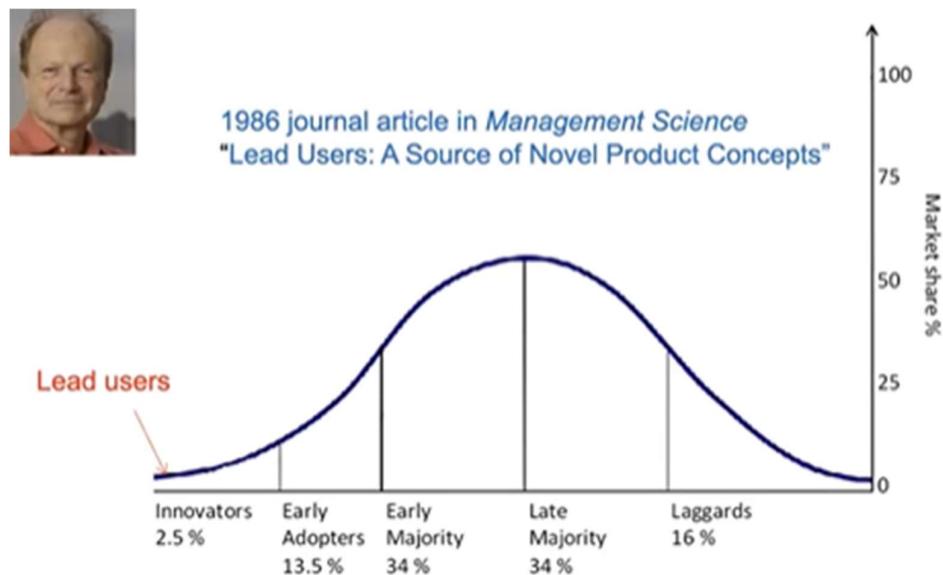
User innovation refers to the development of new products, services, or processes by end-users rather than by firms. Users innovate to fulfill their own needs when existing solutions are insufficient or unavailable. This type of innovation is typically characterized by the active involvement of users who directly benefit from the innovations they create. A few characteristic traits of user innovation are:

- Need driven - Users innovate out of necessity or to improve their own experience, driven by unmet needs or specific problems they encounter. These innovations are often highly customized and tailored to the user's specific context.
- User expertise - Users who innovate often possess deep domain knowledge and practical experience, enabling them to identify gaps and create effective solutions. They may not necessarily have formal R&D resources but leverage their expertise and creativity.
- Community and collaboration - User innovation is often supported by communities where individuals share ideas, collaborate on solutions, and build upon each other's work. Open-source software and maker communities are prime examples of collaborative user innovation.

Following are the reasons why user innovation is important:

- User innovation addresses specific needs and preferences that may not be met by existing products or services. Users have firsthand knowledge of their own requirements and can develop highly customized solutions to fit their unique contexts.

- Users often innovate out of necessity, responding quickly to challenges or shortcomings they encounter in their daily lives. This agility enables rapid problem-solving and the creation of innovative solutions in real-time.
- User innovators come from diverse backgrounds and possess varied expertise, contributing a wide range of perspectives to the innovation process. This diversity leads to creative solutions and fosters a rich ecosystem of ideas.
- User innovation can be more cost-effective than traditional R&D conducted by companies. Users innovate with limited resources, leveraging existing tools and materials to create effective solutions without the need for large investments.
- User innovation often occurs within communities or networks where individuals share ideas, collaborate on projects, and provide feedback to one another. This collaborative environment fosters collective problem-solving and knowledge exchange.
- User innovation is closely aligned with principles of open source and open science, promoting transparency, collaboration, and the sharing of knowledge and resources. This ethos accelerates the pace of innovation and fosters a culture of openness and accessibility.
- User innovations can disrupt existing markets and industries by introducing novel solutions that challenge traditional approaches. These disruptions can lead to increased competition, improved consumer choice, and overall market dynamism.
- User innovation can have significant social impact, particularly in areas such as healthcare, education, and environmental sustainability. Innovations developed by users can improve quality of life, increase access to essential services, and address pressing societal challenges.



Lead users are a specific group of users who experience needs or problems that will be widespread in the future. Lead users are often at the forefront of innovation within their respective fields or industries. A few characteristics of lead users are:

- They face the needs that will be general in the market, months or years before the general marketplace realises the need.
- Will benefit significantly by obtaining a solution to those needs.
- They spend resources trying to solve that need.
- Are at the leading edge of trends and very knowledgeable about existing products and services.

Following are the examples of User innovation:

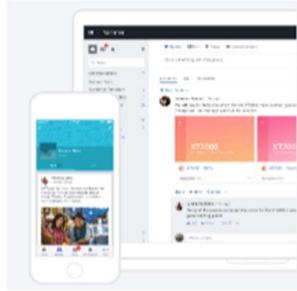
### Example of user innovation: Geni to Yammer



<https://www.geni.com/>

- Powerful Genealogy Tools to Help You Grow Your Tree
- Find Your Ancestors, Connect to New Relatives

The University of Sydney



<https://www.yammer.com/>

- A private social network for your company.
- To share files, discuss projects, and get work done faster
- Discuss ideas, share updates, and crowdsource answers from coworkers around the globe.

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### Example of user innovation: Yammer



David Sacks

[http://www.socialetech.com/interview\\_with\\_david\\_sacks\\_geni\\_and\\_yammer/s-0017613.html](http://www.socialetech.com/interview_with_david_sacks_geni_and_yammer/s-0017613.html) (Mar 24)

<https://www.yammer.com/>

- Yammer started as an internal productivity tool at Geni. We built the tool to help people stay connected, and we've been using it internally for six months.
- We have about 30 employees at Geni and have about 20,000 messages on Yammer.
- It's been incredibly successful at Geni and is the centre of the company's culture. We decided to spin it out into a separate company so that other companies can also use the product. About a month ago, we spun it out and premiered it at TechCrunch50, as you know, and won that event.
- Microsoft bought Yammer for \$1.2 billion in 2012
- Yammer is now used by more than 200,000 companies (source: yammer.com)

### Example of User Innovation: Slack

Game Neverending



flickr

Find your inspiration



Glitch Is Dead, Long Live Glitch!

Art & Code from the Game Released Into Public Domain

[Glitchthegame.com](http://Glitchthegame.com)



[Slack is your digital HQ](#)

The Slack team story | TechCrunch



## Example of user innovation: Slack



Stewart  
Butterfield

<https://www.npr.org/2018/07/27/633164558/slack-flickr-stewart-butterfield>

- In the early 2000s, Stewart tried to build a weird, massively **multiplayer online game**, Game Neverending, but the venture failed.
- Instead, he and his co-founders used the technology they had developed to create the photo-sharing site Flickr.
- After Yahoo acquired Flickr in 2005, Butterfield returned to the online game idea, Glitch, only to fail again.
- They had developed a tool for team communication that they used to coordinate their work on the game and realized that it could also be helpful for other teams.
- The **office messaging platform Slack rose** from the ashes of that second failure — In 2019, Slack went public through a direct listing on the New York Stock Exchange, with a valuation of over \$20 B.

## Example: Lego Ideas



<https://ideas.lego.com/#all>

The screenshot shows the LEGO Ideas website. At the top, there's a call to action: "IT'S YOUR TIME TO SHINE!". Below it, a description encourages users to unleash their creativity and become a master builder. A large image of a detailed LEGO model of a medieval-style building is shown. On the left, there's a "SUBMIT IDEA" button and a timeline indicating the process: "60 days" to reach 100 supporters, which takes "+12 months". As supporters increase to 1000, it takes "+6 months". At 5000 supporters, it takes "+3 months". Finally, reaching 10,000 supporters leads to an "Expert review" and the title "BECOME A LEGO FAN DESIGNER".

## Example of user innovation: Apache web server

- In 1994, the most popular web server was “httpd” by Rob McCool at NCSA (same place as Mosaic – most popular web browser at the time)
- This was available as open source
- Many httpd users (webmasters) modified the server code for their own sites
- Rob McCool left NCSA in mid 1994
- Eight httpd users emailed each other to discuss using each others changes
- In 1995, they created a common code base
- By 1996, it was the world’s most used web server
- It’s still one of the most used today today

## Example of user innovation: MySQL

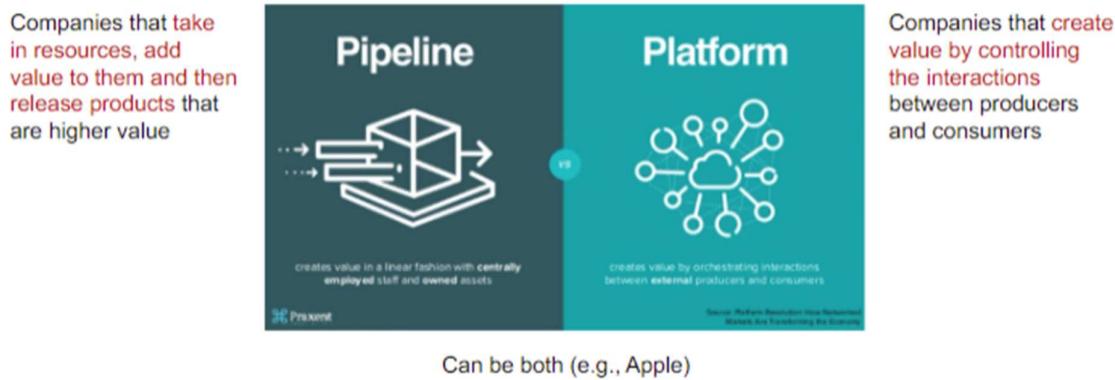


- We started out with the intention of using the mSQL database system to connect to our tables using our own fast low-level (ISAM) routines. However, after some testing, we came to the conclusion that mSQL was not fast enough or flexible enough for our needs. This resulted in a new SQL interface to our database but with almost the same API interface as mSQL. This API was designed to enable third-party code that was written for use with mSQL to be ported easily for use with MySQL.
- MySQL is named after co-founder Monty Widenius's daughter, My.
- MySQL was bought by Sun Microsystems for \$1 billion in 2008

## Platform Ecosystems

Platform ecosystems, also known as multi-sided platforms or two-sided markets, are interconnected networks of products, services, and users facilitated by a central platform. These ecosystems typically consist of three main components: the platform provider, producers, and consumers. More specifically:

- The platform provider creates and operates the central platform that connects producers and consumers. This entity establishes the infrastructure, rules, and protocols that govern interactions within the ecosystem. Platform providers may offer a range of services to participants, including matchmaking, payment processing, data analytics, and communication tools. Examples of platform providers include technology companies like Amazon (with its marketplace platform), Airbnb (with its accommodation rental platform), and Uber (with its ride-sharing platform).
- Producers are entities that create or supply products, services, or content that are offered through the platform. They may include sellers, developers, content creators, service providers, or any other contributors to the ecosystem. Producers benefit from access to the platform's user base and infrastructure, which enable them to reach a wider audience, monetize their offerings, and scale their businesses. Examples of producers include merchants selling goods on e-commerce platforms, app developers creating software for app stores, and content creators publishing videos on social media platforms.
- Consumers are individuals or entities that use or consume the products, services, or content available on the platform. They benefit from the convenience, choice, and value provided by the platform ecosystem. Consumers may engage with the platform in various ways, such as purchasing goods, accessing content, booking services, or interacting with other users. Examples of consumers include shoppers buying products online, travellers booking accommodations through a booking platform, and passengers requesting rides from a ride-sharing app.



Pipeline focus, also known as the traditional or linear business model, emphasizes the sequential flow of value from producers to consumers through a linear supply chain or distribution channel. Value is created through a series of sequential activities, starting with raw material sourcing, production, distribution, and ending with consumption by end-users. Producers control the entire value chain and are responsible for developing, manufacturing, marketing, and selling products or services. Value flows in a one-way direction from producers to consumers, following a predefined path dictated by the pipeline. Consumers have limited involvement in the value creation process beyond purchasing and consuming the final product or service.

Platform focus, on the other hand, revolves around creating and facilitating interactions between multiple parties within a digital ecosystem. Value is created not by the platform itself but by the interactions and transactions facilitated among users (producers and consumers) within the ecosystem. The platform provides the infrastructure, rules, and tools that enable users to connect, transact, and exchange value with each other. Platforms typically operate as two-sided markets, bringing together distinct user groups (e.g., buyers and sellers, service providers and customers) and facilitating transactions between them. Value is generated through network effects, where the presence and activities of one user group enhance the value proposition for the other group. Unlike pipeline-focused models, ownership and control are distributed among multiple participants within the platform ecosystem. Users have a stake in the success of the platform and contribute to its growth through their participation and interactions.

## Strategy: From Pipeline focus to Platform focus

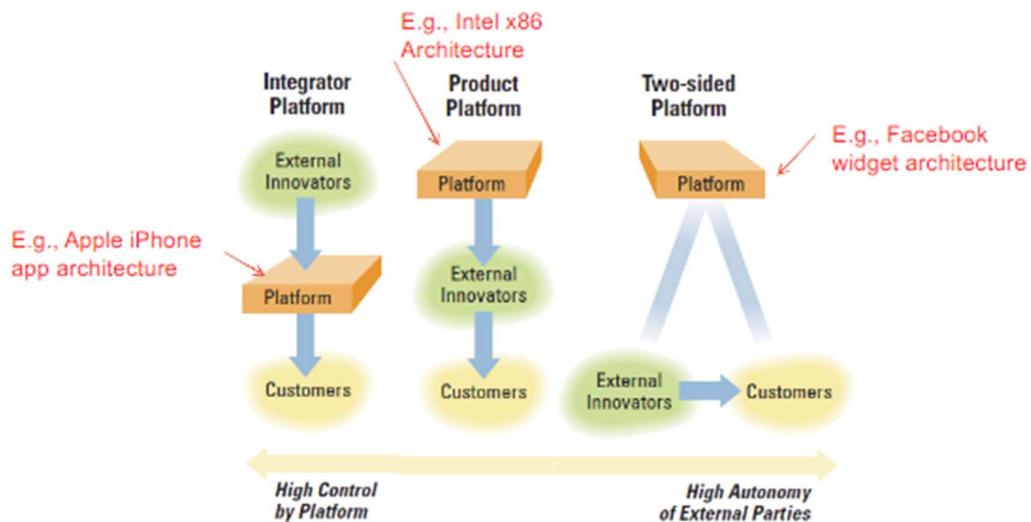
1. **From resource control to resource automation**
  - The main asset for platforms is the network of producers and consumers
2. **From internal optimisation to external interaction**
  - Platforms focus on facilitating interactions in the network
3. **From a focus on customer value to a focus on ecosystem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

## 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

These measures tell you whether you have a competitive edge or not.

There are different forms of platform businesses as well. These are:



- **Integrator Platform**

Integrator platforms, also known as aggregation platforms, focus on aggregating and integrating multiple products, services, or content from different sources into a single unified experience for users. These platforms act as intermediaries or aggregators, bringing together diverse offerings and presenting them in a cohesive manner. Examples include Amazon and Netflix. Amazon is an integrator platform that aggregates products from millions of sellers, offering a unified marketplace experience for buyers. Netflix aggregates and integrates a vast library of movies and TV shows from different studios and producers, providing users with a unified streaming experience.

- **Product Platform**

Product platforms focus on providing a core product or service that serves as a foundation for third-party developers or partners to build complementary products, services, or applications. These platforms offer tools, APIs, and infrastructure that enable developers to extend or enhance the functionality of the core product. Examples include Salesforce and iOS. Salesforce is a product platform that provides a core customer relationship management (CRM) software, allowing developers to build and

integrate custom apps and solutions using Salesforce's APIs and platform services. Apple's iOS is a product platform that powers iPhones and iPads, providing developers with tools and resources to create apps and services that run on the iOS operating system.

- Two-Sided Platform

Two-sided platforms, also known as multi-sided platforms, facilitate interactions and transactions between two or more distinct user groups, creating value by enabling exchanges or connections between them. These platforms act as intermediaries or matchmakers, bringing together different user groups and facilitating transactions or interactions that benefit all parties involved. Examples include Uber and Airbnb. Uber is a two-sided platform that connects riders with drivers, facilitating transactions for transportation services. It benefits from network effects, as more riders attract more drivers, and vice versa. Airbnb is a two-sided platform that connects travellers with hosts offering accommodations, facilitating transactions for short-term rentals. It benefits from network effects, as more hosts attract more travellers, and vice versa.

### 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

## WEEK 7

### Unicorn Companies

A Unicorn company is to describe a privately held startup company that has achieved a valuation of \$1 billion or more. The term was coined by venture capitalist Aileen Lee in 2013 to represent the rarity of such successful ventures. A few characteristic traits of Unicorn companies are:

- The primary characteristic of a unicorn is its valuation, which must be \$1 billion or more.
- Unicorns are privately held companies, meaning they have not yet gone public through an initial public offering (IPO). Their shares are owned by founders, employees, and private investors.
- Unicorns are often associated with innovation and disruption within their respective industries. They leverage technology and new business models to create significant value and often challenge established industry norms.
- Unicorns tend to exhibit rapid growth in terms of user base, revenue, and market presence. This growth is typically fuelled by significant capital investment and a scalable business model.

- Many unicorns are technology companies, operating in sectors such as software, fintech, e-commerce, biotechnology, and artificial intelligence. However, unicorns can be found across various industries.

A few examples of Unicorn companies are Uber, Airbnb, SpaceX, and Stripe. The reason for the many unicorn companies now is due to various factors such as:

- Compelling product offerings that are easier to adopt.
- They have a dominant design.
- Presence of competitive later stage capital.
- Presence of vibrant public markets.
- Inventions of new technologies.
- Frequent observations of disruptions.

There are 5 primary business models among Unicorns. These are:

- E-Commerce Companies

E-commerce companies focus on selling goods and services online. They leverage digital platforms to facilitate transactions between buyers and sellers, offering a wide range of products and often providing features like easy payment options, delivery services, and customer reviews. For example, Amazon and Alibaba. Initially an online bookstore, Amazon has expanded into a global marketplace offering a vast array of products. Whereas Alibaba, a Chinese e-commerce giant that facilitates business-to-business (B2B), business-to-consumer (B2C), and consumer-to-consumer (C2C) transactions.

- Audience Companies

Audience companies generate revenue by attracting large audiences through content, services, or platforms and monetizing this audience through advertising, subscriptions, or sales of premium content. For example, Facebook and Netflix. Facebook is a social media platform that generates significant revenue through targeted advertising. Whereas Netflix is a streaming service that offers a subscription model for accessing movies and TV shows.

- Enterprise Software Companies

Enterprise software companies provide specialized software solutions designed to meet the needs of businesses and organizations. These solutions often address specific business functions such as customer relationship management (CRM), human resources, and supply chain management. For example, Salesforce and SAP. Salesforce is a leading provider of CRM software that helps businesses manage customer relationships, sales, and marketing. Whereas SAP offers enterprise resource planning (ERP) software to help businesses integrate and manage their core processes.

- Software as a Service

Software as a Service (SaaS) companies deliver software applications over the internet as a service, typically through a subscription model. This approach eliminates the need for customers to install and maintain software on their own computers or servers. For example, Slack and Zoom. Slack is a collaboration and communication platform for teams that is delivered entirely through the cloud. Whereas Zoom is a video conferencing platform that provides cloud-based video, audio, and chat services.

- Consumer Electronics/Internet of Things

Consumer Electronics/Internet of Things (IoT) companies develop smart devices and connected products that enhance consumer convenience, efficiency, and quality of life. These products often integrate with other devices and services, creating

a connected ecosystem. For example, Tesla and Nest. Tesla develops electric vehicles with advanced connectivity features, autonomous driving capabilities, and over-the-air software updates. Whereas Nest creates smart home products like thermostats, cameras, and smoke detectors that integrate into a connected home ecosystem.

### **Creating a Start-up**

The economy is in a state of constant change, and this is driven by innovation. Entrepreneurs are the drivers of this innovation. There are different forms of innovation. It can be in terms of products, organisations, or even new markets. A company's size and structure have a big impact on its ability to innovate. Some structures might be conducive to innovation through fostering creativity and experimentation in their culture. But a few structures focus on enhancing their efficiency of product development while there are those which target both. Traditionally, large companies have in-house R&D for driving innovation, but the trend is moving outward toward open innovation. Here, large companies can be disadvantageous because managerial control is lost during open innovation. Small firms are often more flexible and entrepreneurial. Innovation favours agility and small companies are more agile than big companies.

Traditional approach to creating start-ups:

- Start-ups are treated as small versions of a large company.
- Most businesses need a business plan to start.
- Business plan is needed for investment from the bank or the venture capital.
- The business plan will identify business opportunities, problem to be solved, planned solution to the problem, and the forecast for income, profit, costs, etc.
- The constituents of a traditional business plan have:
  - Executive summary
  - Description of product/service
  - Industry analysis
  - Customer analysis
  - Competitor analysis
  - Marketing and sales plan
  - Operations and HR plans
  - Financial plans

To create a start-up, one needs to not think of start-up ideas but look for problems and then solve them. These ideas might be something the founders themselves want and they can build themselves. Many innovations start with user innovation. Following are some tips by Paul Graham on how to get start-up ideas:

- Address real problems and not made-up problems.
- Build something a small number of people want a lot rather than something a lot of people want a little.
- Be at the leading edge of a field. Live in the future and then build what's missing.
- Do not think up ideas but notice them!
- Live in the future and build what seems interesting.

There are 3 key principles that one needs to adhere to, to develop a business model for the start up. These are:

- Customer development – Include hypothesis driven experiments with customers, what they want? Bring in the customers, ask them what they want!

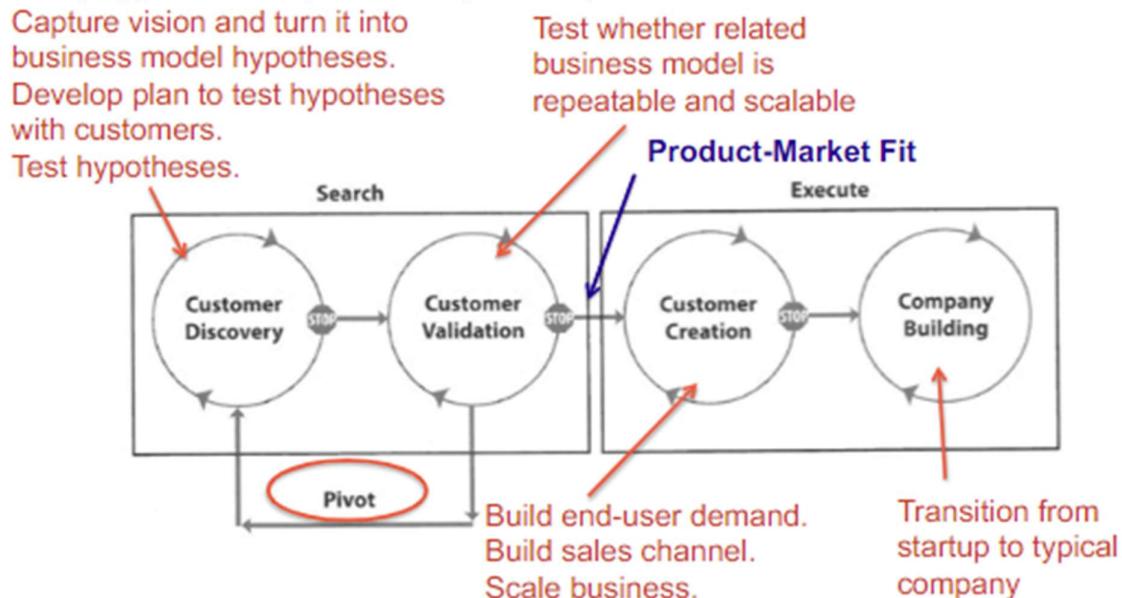
- Business Model Canvas – Sketch out your hypothesis.
- Agile Software Development – Be quick, and responsive to any idea.

## Customer Development

There are 9 deadly sins of the new product introduction model for startups:

- Assuming you know what, the customer wants.
- Not having a agile model of development but waterfall model.
- Focus only on the launch date.
- Placing emphasis on the execution instead of the hypothesis, testing, learning, and iteration.
- Traditional business plans assume no trial and no errors.
- Confusing traditional job titles with what the startup needs to accomplish.
- Sales and marketing execute a plan.
- Presumption of success leading to premature scaling of the company.
- Management by crisis leads to a death spiral.

Instead, use a customer development process wherein the startups can focus on developing products using customer inputs. The process is as follows:



## 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



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

The following is the customer development manifesto:

Rule 1. There are no facts inside your building, so get outside

Rule 2. Pair Customer Development with Agile Development

Rule 3. Failure is an integral part of the search

Rule 4. Make continuous iterations and pivots

Rule 5. No business plan survives first contact with customers so use a business model canvas (more soon)

Rule 6. Design experiments and test to validate your hypotheses

Rule 7. Agree on market type. It changes everything

- Bringing a new product into an existing market

- Bringing a new product into a new market

- Bringing a new product into an existing market and trying to:

  - Re-segment that market as a low-cost entrant

  - Re-segment that market as a niche entrant

  - Cloning a business model that's successful in another country

Rule 8. Startup metrics differ from those in existing companies

Rule 9. Fast decision-making, cycle time, speed and tempo

Rule 10. It's all about passion

Rule 11. Startup job titles are very different from a large company

Rule 12. Preserve all cash until needed. Then spend

Rule 13. Communicate and share learning

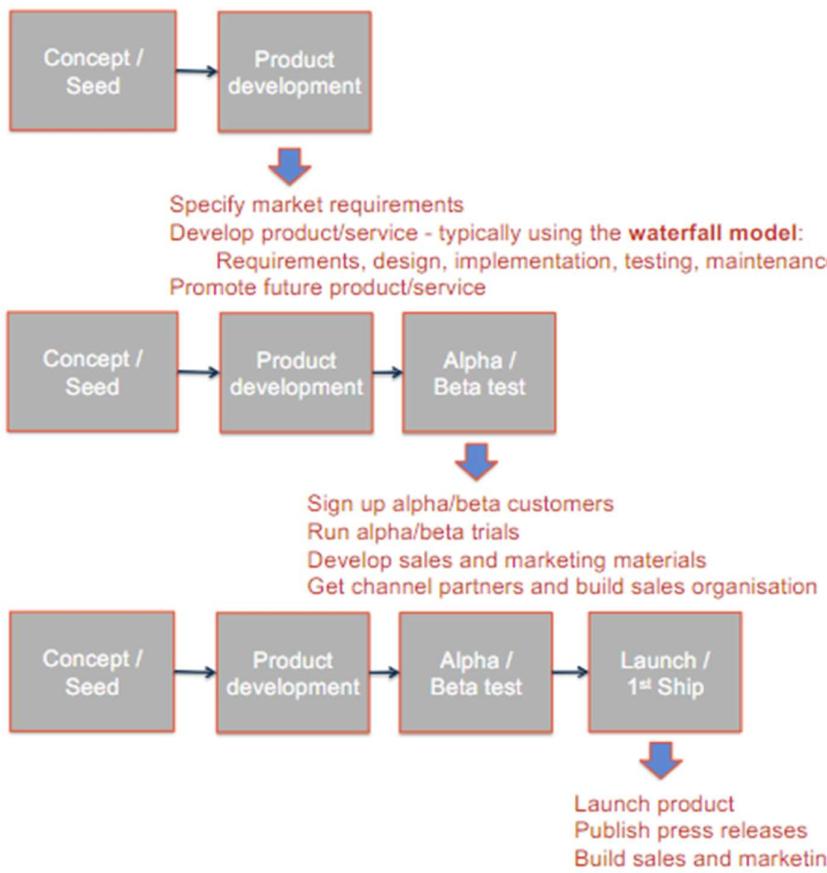
Rule 14. Customer development success begins with buy-in

### Project Management for Innovation

In innovation projects, the feasibility of the idea maybe unknown, product or process concepts may be vague, target customers may be unknown, and even the way to make revenue may not be known. Companies using traditional project management approaches for these have usually met with failure. The following is the traditional product introduction model. And this is usually met with failure.

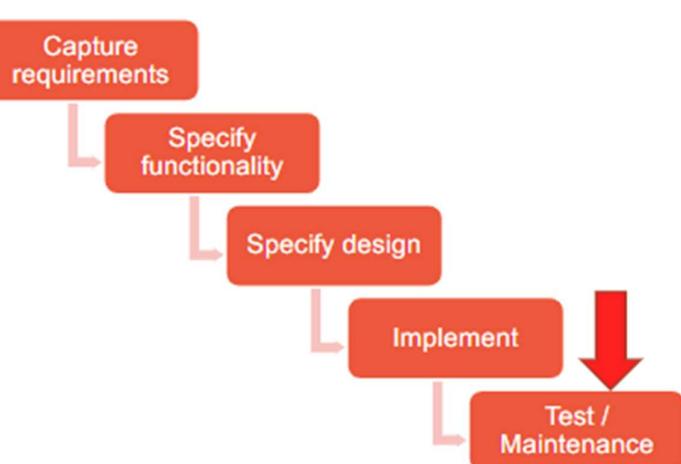
New Product Introduction model:





The problem with this approach is as follows:

- 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



To tackle this, we use the Agile Development Methodology. Agile methodology is an iterative, incremental, and evolutionary development process. It is efficient and encourages face-to-face communication. Through very short feedback loop and adoption cycle, the method focuses on a customer centric approach while emphasizing on quality. A few concepts to be known under Agile process are:

- 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.
- Daily meetings
 

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 build upon the previous version by adding user-visible functionality.
- 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".

The following are the Agile principles:

1	Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.	7	Working software is the primary measure of progress.
2	Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.	8	Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
3	Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.	9	Continuous attention to technical excellence and good design enhances agility.
4	Business people and developers must work together daily throughout the project.	10	Simplicity— the art of maximizing the amount of work not done—is essential.
5	Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.	11	The best architectures, requirements, and designs emerge from self-organizing teams.
6	The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.	12	At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

There are 3 common forms of Agile Development:

	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

- Scrum  
Scrum is a framework for Agile project management that emphasizes iterative progress, collaboration, and accountability. It is widely used for managing complex projects and involves predefined roles, events, and artifacts.
- Kanban  
Kanban is a visual workflow management method designed to help teams visualize their work, limit work-in-progress (WIP), and optimize efficiency. It focuses on continuous delivery without predefined roles or time-boxed iterations.
- Lean Development  
Lean Development is an approach derived from Lean manufacturing principles, focusing on delivering value to the customer by eliminating waste, optimizing processes, and fostering a culture of continuous improvement.

**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.

### The Lean Start-Up

A Lean Startup is an approach to building and managing startups aimed at shortening product development cycles and rapidly discovering if a proposed business model is viable. This methodology, introduced and popularized by Eric Ries in his book "The Lean Startup," advocates for a systematic, scientific approach to creating and managing successful startups in an environment of extreme uncertainty. In short, learn faster, code faster, and measure faster. Here are the key principles and concepts of a Lean Startup:

- Build measure learn loop - This iterative cycle is at the heart of the Lean Startup methodology. Startups create a minimum viable product (MVP), measure how it performs in the market, and learn from the results to make informed decisions about product development.

- Minimum Viable Product - The MVP is a simplified version of the product that includes only the essential features necessary to test the core business hypothesis. The goal is to validate learning quickly and inexpensively.
- Validated learning - This concept emphasizes learning through iterative product releases and real customer feedback rather than through long-term, theoretical planning. Each iteration aims to validate assumptions about the product, market, and customers.
- Pivot or Persevere - After each iteration, the startup must decide whether to pivot (make a fundamental change to the product or business model) or persevere (continue refining and improving the current product based on feedback).
- Continuous Deployment - Lean Startups often use continuous deployment practices to release new features and updates quickly and regularly. This allows for faster testing and iteration based on user feedback.
- Innovation Accounting - A method of measuring progress in uncertain conditions, innovation accounting involves setting up metrics that reflect the growth and learning of the startup, rather than traditional financial metrics alone.

### Product-Market Fit Pyramid for Lean Product Process



Product-Market Fit is the degree to which a product satisfies a strong market demand. It is the step between customer validation and customer creation.

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

Lean	Traditional
<b>Strategy</b> Business Model Hypothesis-driven	Business Plan Implementation-driven
<b>New-Product Process</b> Customer Development Get out of the office and test hypotheses	Product Management Prepare offering for market following a linear, step-by-step plan
<b>Engineering</b> Agile Development Build the product iteratively and incrementally	Agile or Waterfall Development Build the product iteratively, or fully specify the product before building it
<b>Organization</b> Customer and Agile Development Teams Hire for learning, nimbleness, and speed	Departments by Function Hire for experience and ability to execute
<b>Financial Reporting</b> Metrics That Matter Customer acquisition cost, lifetime customer value, churn, virulence	Accounting Income statement, balance sheet, cash flow statement
<b>Failure</b> Expected Fix by iterating on ideas and pivoting away from ones that don't work	Exception Fix by firing executives
<b>Speed</b> Rapid Operates on good-enough data	Measured Operates on complete data

Steve Blank (2013)

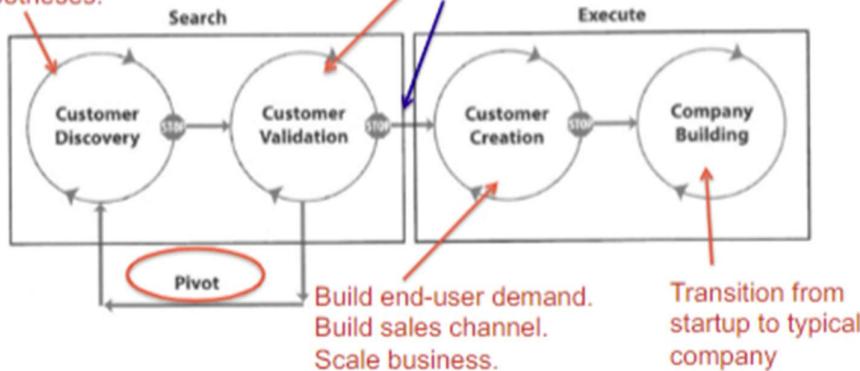
The University of Sydney

## Week 8

### The 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



As seen, the customer development process has 4 distinct steps. These are:

- Customer discovery

Objective: Validate the problem and understand customer needs.

It has 4 phases, these are:

- Phase 1 – Forming Hypothesis

- Objective: Develop initial assumptions about the problem, customer needs, and potential market segments.
- Identify Assumptions: Begin by identifying the core assumptions about your business idea. These include assumptions about who your

customers are, what their problems are, and how your product can solve these problems.

- Create Hypothesis - Formulate hypotheses related to the problem your product aims to solve, the customer segments affected by this problem, and the value proposition your product offers. These hypotheses should be clear, testable statements.
- State the problem and solution Hypothesis.
- Develop a hypothesis for the business model canvas.
- Phase 2 – Testing the Problem
  - Objective: Validate the existence of the problem and understand its significance to potential customers.
  - Get out of the building - Engage with potential customers through interviews, surveys, or focus groups. Ask open-ended questions to understand their pain points, challenges, and how they currently solve the problem. Collect and analyse the data from these interactions to see if your assumptions about the problem hold true. Look for patterns and common themes that indicate the problem is significant and widespread.
  - Build prototype or wireframe - Based on the feedback, refine your understanding of the problem. Update your problem hypothesis to better reflect the real issues customers face. Create a wireframe or prototype of the product based on customer input.
  - Test your understanding of customers' problems or need – Test the usefulness of the solution through beta testing. Make sure that the solution has input from the customer to understand and make sure to solve the problem of the customer.
- Phase 3 – Testing the Solution
  - Objective: Validate that your proposed solution effectively addresses the problem identified in the previous phase.
  - Develop the Minimum Viability Product - Create an MVP that embodies the core features necessary to solve the validated problem. The MVP should be simple and cost-effective, focusing on delivering value to the customer.
  - Test your understanding of the customers' agreement that you have the solution - Share your MVP with the same or a new set of potential customers. Gather feedback on its usability, effectiveness, and how well it addresses their problem.
  - Test whether your solution matches with the customer - Use the feedback to make necessary adjustments to the MVP. This may involve tweaking features, improving the user experience, or even rethinking the solution approach.
- Phase 4 – Verify or Pivot
  - Objective: Decide whether to proceed with the current business model or make significant changes based on customer feedback.
  - Do people agree you are solving a high value problem or need? - Review all the feedback from the solution testing phase. Determine if customers find the MVP valuable and if it solves their problem effectively.
  - Do you understand your business model enough to start test selling? - Look at key performance indicators (KPIs) such as customer satisfaction, willingness to pay, and engagement levels. These metrics will help determine the viability of your solution.

- Is it big enough to be a business? - If the feedback is positive and your solution meets customer needs, you can verify your business model and proceed to the next stages of development. If the feedback indicates that the solution does not adequately address the problem or if customers are not interested, you may need to pivot. This involves making significant changes to the product, customer segment, or business model based on the insights gained.
- Customer validation
 

Objective: Validate the business model by testing product-market fit.

It also has 4 phases. These are:

  - Phase 1 – Get ready and sell.
    - Objective: Prepare to sell the product to early adopters and begin initial sales efforts.
    - Prepare sales team - Develop all necessary sales materials, including product demonstrations, pitch decks, brochures, and any other collateral that will help communicate the product's value proposition to potential customers. Train your sales team on the product, its features, benefits, and the customer pain points it addresses. Ensure they are ready to handle objections and answer questions effectively.
    - Acquire/activate customers - Identify and target early adopters who are most likely to experience the problem your product solves and who are willing to try new solutions. Begin reaching out to early adopters through various channels such as cold calling, emails, and networking. The goal is to get the product in front of potential customers and start the sales conversation.
    - Build high fidelity MVP - The high-fidelity MVP is used to validate the product's effectiveness and usability in real-world scenarios, providing a clearer indication of how the final product will perform in the market.
    - Develop sales collaterals - Sales collaterals are essential for educating prospects, answering their questions, and persuading them to purchase the product. They provide the sales team with tools to effectively convey the product's strengths and differentiate it from competitors.
    - Develop sales roadmap - The sales roadmap guides the sales team in a structured manner, ensuring a consistent and scalable approach to acquiring customers. It helps in aligning sales efforts with overall business objectives and enables continuous improvement.
  - Phase 2 – Test sell.
    - Objective: Validate that customers are willing to buy the product and understand their buying behaviour.
    - Get out of the building and sell to evangelists and early adopters - Engage in direct sales efforts to test whether early adopters are willing to purchase the product. This might involve offering trial periods, discounts, or other incentives to encourage adoption. Gather detailed feedback from customers who buy or show interest in the product. Understand their motivations for purchasing, any reservations they have, and their overall experience with the sales process. Analyse the sales data to identify patterns, such as common objections, the length of the sales cycle, and the conversion rates. Use this data to refine your sales approach and product offering. Based on the feedback and data, iterate

- on your sales process, messaging, and possibly the product itself to better meet customer needs and expectations.
- Phase 3 – Develop positioning.
    - Objective: Define the product's market positioning and develop a compelling value proposition.
    - Develop corporate and product positioning - Effective positioning helps to clearly differentiate the company and its products from competitors, making it easier for customers to understand the unique value offered. It involves creating a compelling narrative that resonates with target audiences and drives demand.
    - Based on customer feedback, how should we describe what we do? - Using customer feedback to shape the product description ensures that the messaging is relevant, clear, and compelling. It helps in better communicating the value proposition and addressing the pain points of potential customers effectively.
    - Based on the feedback from the test sales, refine your value proposition to clearly articulate the unique benefits and advantages of your product over competitors. Develop a consistent messaging framework that communicates the product's value proposition, key features, and benefits in a way that resonates with your target audience. Identify and emphasize the key differentiators that set your product apart from competitors. These should be aspects of your product that address specific customer pain points or offer unique value. Create marketing materials that effectively convey your positioning and value proposition. This may include website content, case studies, white papers, and promotional videos.
  - Phase 4 – Develop sales roadmap.
    - Objective: Create a scalable and repeatable sales process to reach a broader market.
    - Develop a detailed sales process roadmap that outlines each step of the sales journey, from lead generation to closing deals and post-sale support. Establish key sales metrics and performance indicators to track the effectiveness of your sales efforts. These might include lead conversion rates, customer acquisition cost (CAC), and customer lifetime value (CLTV). Based on the validated sales process, begin scaling your sales efforts to reach a broader audience. This may involve hiring additional sales personnel, expanding into new markets, and increasing marketing activities. Continuously monitor and analyse sales performance. Use the insights gained to refine the sales process, improve sales training, and adjust marketing strategies as needed.
    - Are you ready to scale marketing and sales? - Determining readiness to scale marketing and sales is crucial for ensuring that the company can handle increased demand without compromising on quality or customer satisfaction. It involves ensuring that the necessary resources, processes, and infrastructure are in place to support growth.
  - Customer creation
 

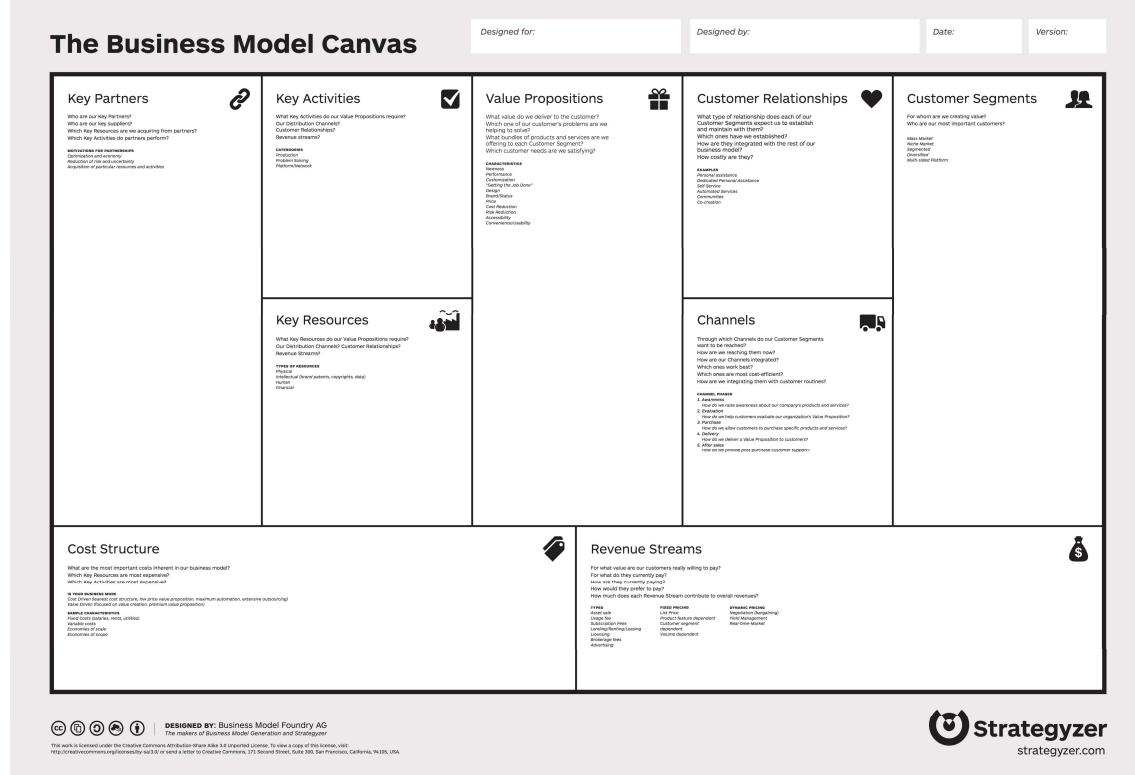
Objective: Create and drive demand for the product.

    - Marketing Strategy: Develop and implement marketing strategies to reach a broader audience beyond early adopters. This may include content marketing, social media, advertising, and more.

- Scaling Sales: Build and scale the sales team and processes to handle increased customer demand. Develop sales channels and partnerships as needed.
- Product Iteration: Continue to refine and improve the product based on ongoing customer feedback and market trends.
- Company Building
  - Objective: Transition from a startup to a scalable business.
    - Organizational Development: Build out the company's organizational structure to support growth. This includes hiring key personnel, establishing departments, and defining roles and responsibilities.
    - Operational Processes: Develop scalable operational processes and systems to support business functions such as production, customer support, and finance.
    - Performance Metrics: Implement metrics and key performance indicators (KPIs) to monitor the company's performance and ensure alignment with strategic goals.
    - Continuous Improvement: Foster a culture of continuous improvement and innovation to maintain competitiveness and adapt to changing market conditions.

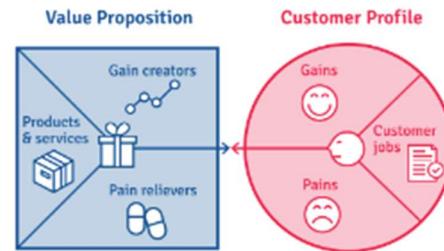
## Value Proposition Canvas

The Value Proposition Canvas is a strategic tool used to design, test, and refine a company's value proposition to ensure it aligns closely with customers' needs and desires. The Value Proposition Canvas helps businesses create products and services that precisely address the specific needs and problems of their target customers. It is a part of the broader Business Model Canvas framework as shown below:



## 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.



The Value Proposition Canvas consists of two main sections: the Customer Profile and the Value Map. These sections interact to help businesses understand and align their value proposition with customer needs. More information is as follows:

- **Customer Profile**

The Customer Profile is a detailed description of a specific customer segment. It is divided into three components:

- **Customer Jobs**

- Classified into Functional (The practical tasks or problems the customer needs to address (e.g., commuting to work, managing finances)), Social (The social aspects or tasks that involve interaction with others (e.g., networking, maintaining a social image)), and Emotional jobs (The emotional needs or desires (e.g., feeling secure, achieving happiness)).

### 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.

- Pains
  - The negative experiences, risks, or obstacles that customers encounter while trying to get their jobs done. This includes frustrations, challenges, and undesirable outcomes (e.g., high costs, time-consuming processes, negative emotions).

## 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.

Undesired outcomes, problems and characteristics	Pains are functional (e.g. a solution doesn't work or doesn't work well, or has adverse side effects), social ("I look bad doing this"), emotional ("I feel bad every time I do this"), or ancillary ("it's annoying to do it"). This may involve undesired characteristics customers do not like (e.g. the user interface is ugly).
Obstacles	These are things that prevent customers 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").
Risks (undesired potential outcomes)	What could go wrong and have important negative consequences (e.g. "I might lose credibility when using this type of solution" or "A security breach would be disastrous for us").

- Gains
  - The positive outcomes or benefits that customers desire. This includes functional utility, social gains, positive emotions, and cost savings (e.g., improved efficiency, social recognition, emotional satisfaction).

## 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.

Required Gains	These are gains without which a solution wouldn't work. For example, the most basic expectation from a smartphone is that we can make a call with it.
Expected Gains	These are relatively basic gains that we expect from a solution, even if it could work without them. For example, we expect phones to be well-designed and look good since Apple launched the iPhone.
Desired Gains	These gains go beyond what we expect from a solution, 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.
Unexpected Gains	These are gains that go beyond customer expectations and desires. They wouldn't even come up with 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.

- Value Map  
The Value Map describes how the company's products and services create value for the customer. It is divided into three components:
  - Products and Services
    - A list of all the products and services the company offers to help the customer get their jobs done.

## Product Offering

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

Types of Product Offering:

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

- o Pain relievers
  - How the products and services alleviate customer pains. This includes ways to reduce or eliminate negative experiences, risks, and obstacles (e.g., providing cost-effective solutions, simplifying processes).

## 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.**
  - o Gain creators.
    - How the products and services generate customer gains. This includes ways to create desired outcomes and benefits, enhancing customer satisfaction and value (e.g., adding new features, improving performance, providing a superior user experience).

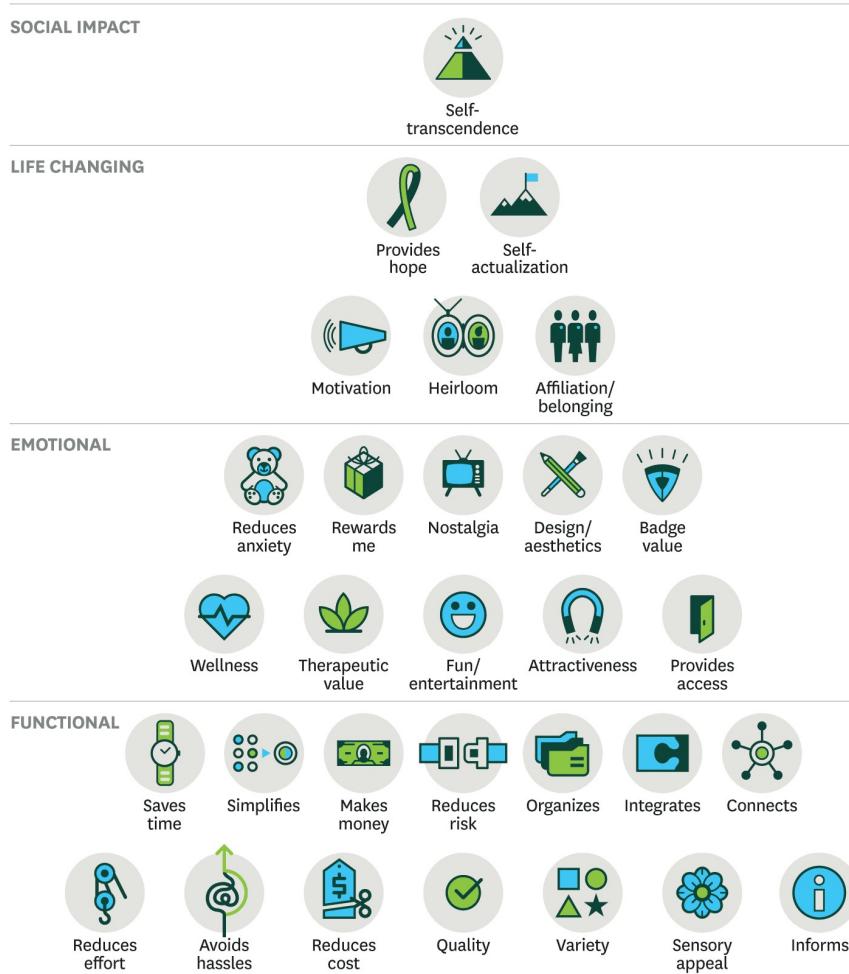
## Gain Creators

- 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.

## Value Proposition Pyramid

### The Elements of Value Pyramid

Products and services deliver fundamental elements of value that address four kinds of needs: functional, emotional, life changing, and social impact. In general, the more elements provided, the greater customers' loyalty and the higher the company's sustained revenue growth.



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## 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

Value Proposition	Definition	Example
Reduces anxiety	Helping people worry less and feel more secure	Discover allows cardholders to instantly freeze and unfreeze their accounts without canceling their cards.
Rewards me	Providing benefits for being a loyal customer	Starwood has earned strong customer loyalty among frequent travellers through a robust rewards program.
Nostalgia	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.
Design & aesthetics	Providing an appealing form or design	Apple's attention to design has helped differentiate its computers, smartphones and other products from those of competitors.
Badge value	Representing achieved status or aspirations	Prada's understated luxury clothing and accessories are designed to be recognized by fashionistas.
Wellness	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.
Therapeutic value	Providing therapeutic value or well-being	Dr. Scholl's products aim to soothe a broad range of foot conditions.
Fun & entertainment	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.
Attractiveness	Helping people feel more attractive	Victoria's Secret created bold retail designs in an undergarment industry that had been quiet and discreet.
Provides access	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.

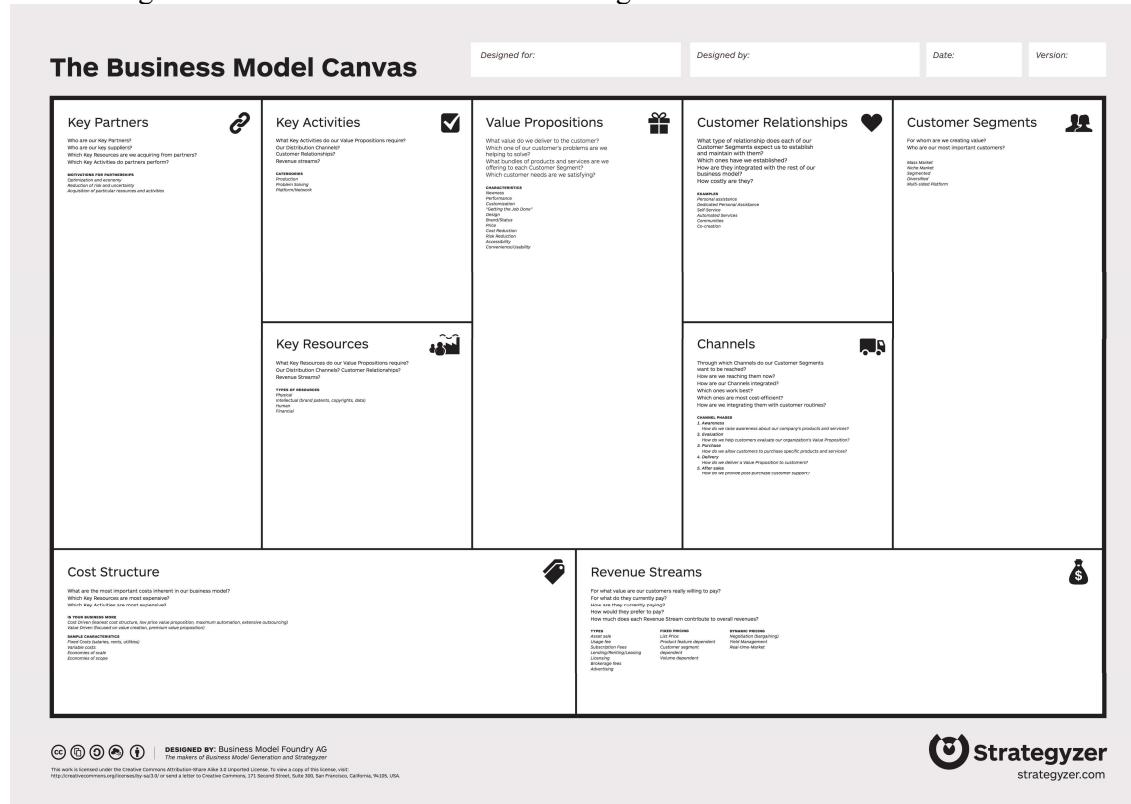
## Social Impact

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

## WEEK 9

### Business Model Canvas

The Business Model Canvas (BMC) is a strategic management tool developed by Alexander Osterwalder and Yves Pigneur. It provides a visual framework for developing, describing, and analysing a business model. The canvas is designed to help organizations understand and align their business activities by illustrating potential trade-offs and aligning their strategies. The canvas looks like the following:



The components are as follows:

- Customer Segments - The different groups of people or organizations a business aims to reach and serve.

### Block 1: Customer Segments

- **The Customer Segment building block defines the different groups of customers (e.g. people or organisations) the company aims to reach and serve with its products.**
- Customers comprise the heart of any business model. Without profitable customers, no company can survive for long.
- To better satisfy customers, a company may **group them into distinct segments with common needs, common behaviours or other attributes.**
- A business model may define one or several large or small Customer Segments
- An organisation must consciously decide which segments to serve and which segments to ignore

- 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

Mass Market	Business models focussed on <b>mass markets don't distinguish between different customer segments</b> . The Value Propositions, Distribution Channels, and Customer Relationships all focus on one <b>large group of customers with broadly similar needs and problems</b> . This type of business model is often found in the consumer electronics and automotive sector.
Niche Market	Business models targeting niche markets cater to specific, specialised Customer Segments. The Value Propositions, Distribution Channels, and Customer Relationships are all tailored to the specific requirements of a new niche market. Such business models are often found in <b>supplier-buyer relationships</b> , where the supplier depend heavily on purchases from the buyer. Examples include Qualcomm which depend heavily on purchases from smartphone makers for its system-on-chips (Snapdragon).
Segmented	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 – all of whom had similar but varying needs. As such, Apple offers each segment with slightly different Value Propositions with its MacBook Air, MacBook Pro and iMac/iMac Pro.
Diversified	An organization with a <b>diversified customer business model</b> serves two or more unrelated Customer Segments with very different needs and problems. 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 powerful IT infrastructure.
Multi-sided platforms (or multi-sided markets)	Some organisations serve <b>two or more interdependent Customer Segments</b> . 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.

- Value Proposition - The collection of products and services that create value for a specific customer segment.

## 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)?

- Channels - The means by which a company delivers its value proposition to its customer segments.

### 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

There are online and offline channels. Online channels include:

- Web: This includes 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 raise awareness about our company's product offering?	How do we help customers to purchase specific products and services?	How do we allow customers to purchase specific product offerings?	How do we deliver a Value Proposition to customers?	How do we provide post-purchase customer support?

- Customer Relationships - The types of relationships a company establishes with specific customer segments.

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

- Revenue Streams - The ways a company makes money from each customer segment.

## 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

Asset Sale	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.
Usage Fee	This Revenue Stream is generated by <u>the use of a particular service</u> . The more a service is used, the more the customer pays. A <u>cloud computing</u> platform may charge customers based on the number of minutes which a virtual machine is being run. A scooter ride-sharing 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).
Subscription Fee	This Revenue Stream is generated by <u>continuous access to a service</u> . A <u>SaaS</u> platform like Asana sells its members monthly or yearly subscriptions in exchange for access and usage of its project management tool.
Lending, Renting or Leasing	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 rent cars by the hour.
Licensing	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.
Transaction or Brokerage Fees	This Revenue Stream derives from <u>intermediation services performed between or on behalf of two or more parties</u> . Trips, for example, generate revenue by taking a percentage of the value of the transaction executed between the merchant and the buyer.
Advertising	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.

- Key Activities - The most important actions a company must take to operate successfully.

## 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**.
- Key Resources - The critical assets needed to deliver the value proposition, reach markets, maintain relationships, and earn revenues.

## 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 crucial in <b>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, and 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 and 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 cash, debt or stock options for hiring key employees.

- Key Partnerships - The network of suppliers and partners that help the business model function.

## 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
- Cost Structure - All costs incurred to operate a business model.

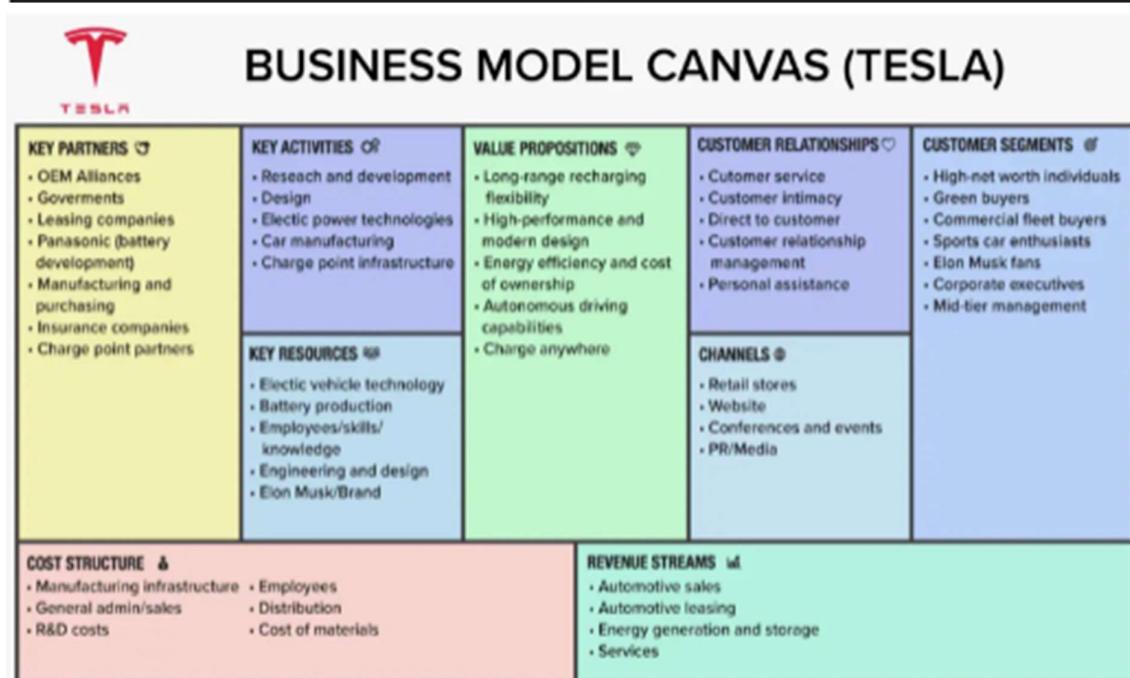
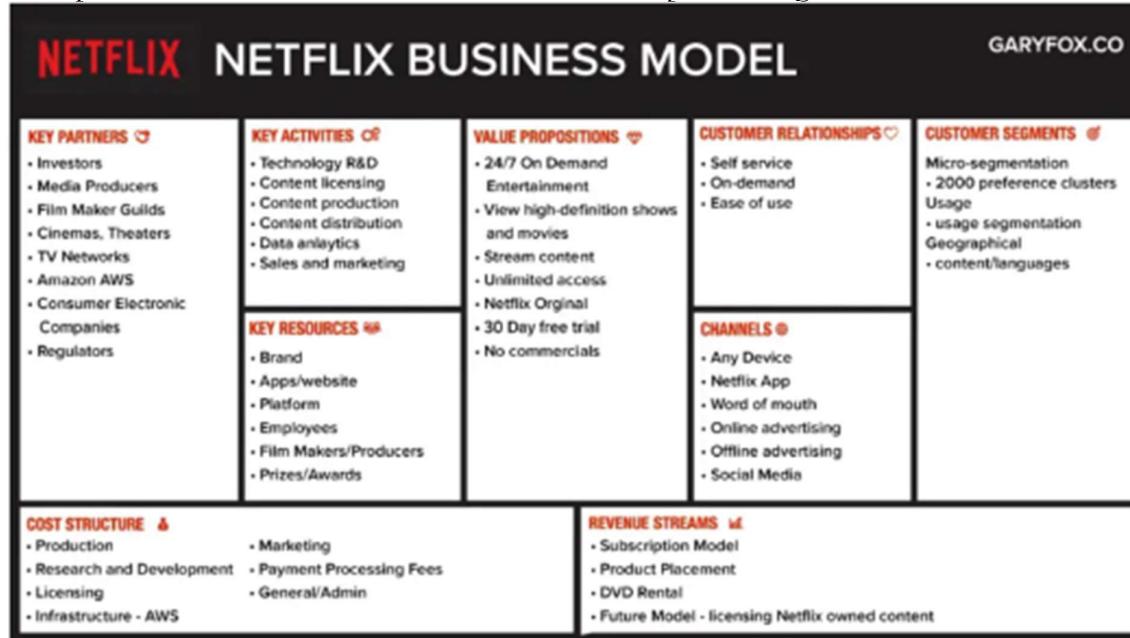
## Block 9: Cost Structure

- **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

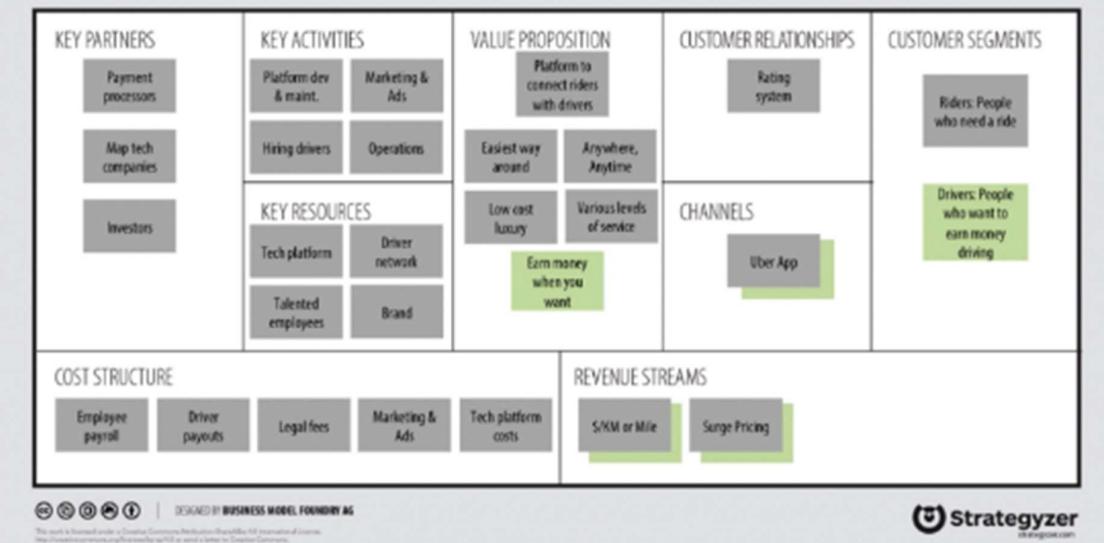
<b>Fixed Costs</b>	Costs that <u>remain the same despite the volume of goods or services produced</u> . Examples include <u>salaries, rent, and physical manufacturing facilities</u> . Some businesses, such as manufacturing companies, are characterised by a high proportion of fixed costs.
<b>Variable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

Examples of Business Canvas Models of different companies are given below:



## BUSINESS MODEL CANVAS

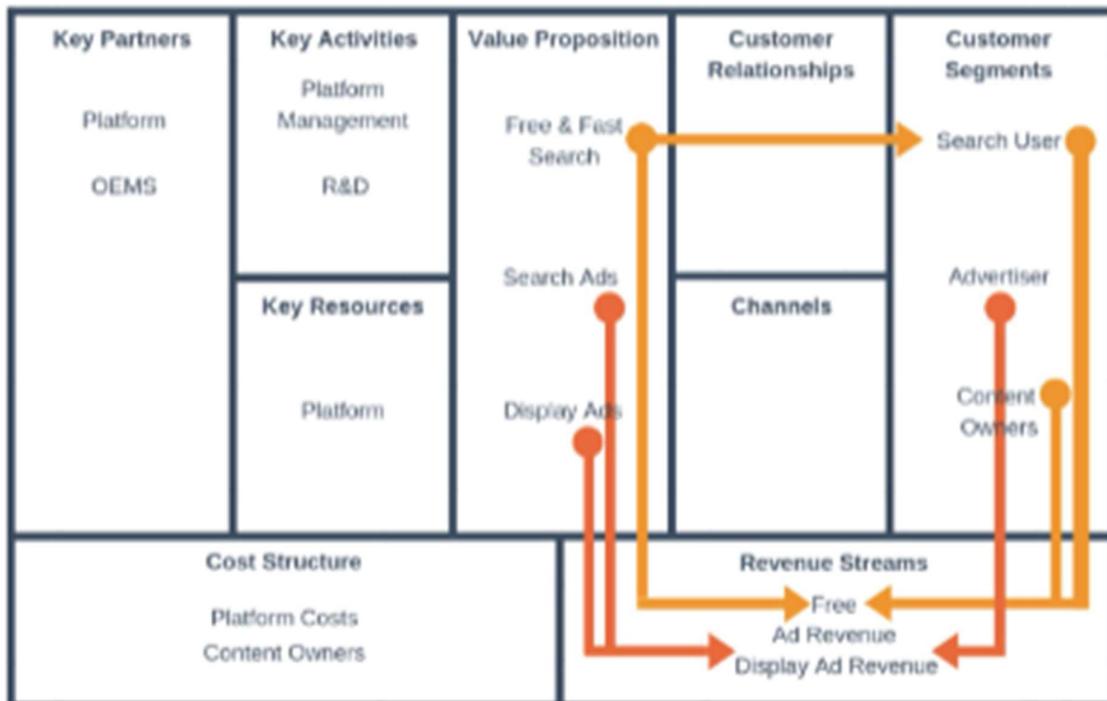
# UBER



## BMC Amazon

<b>Key Partners</b> -shipping companies such as UPS, FedEx, and DHL which provide shipping services for Amazon's fulfillment process to ensure timely arrival of products  -major retail companies such as Nike, Best Buy, and Calvin Klein who want to increase their sales by selling on Amazon, consequently increasing Amazon's market presence as well	<b>Key Activities</b> -quick fulfillment processes -just-in-time delivery and shipping systems allowing for Amazon Prime to deliver orders within 1-2 days  -R&D to streamline and improve efficiency of fulfillment centers and other projects (e.g. Amazon Grab & Go stores) to lower costs	<b>Value Propositions</b> <b>Ecommerce:</b> To provide an online shopping platform that offers and quickly delivers any item, to any person, anywhere, at any time.  <b>Amazon Web Services:</b> To provide cloud services, infrastructure, and data storage to business clients in an agile, flexible, scalable, and secure form.	<b>Customer Relationships</b> -best-in-class fulfillment systems allowing customers to receive their orders within 1-2 days -“customer first” service mindset regardless of customer segment  -online/phone communication channels and built-in support channels on Amazon hardware	<b>Customer Segments</b> <b>Business Clients:</b> -operate as retailers on Amazon's websites -require cloud services and infrastructure -advertise on Amazon  <b>Retail Clients:</b> -purchase products listed on Amazon -purchase Amazon's subscription services (Prime)
<b>Cost Structure</b> -cost-optimization strategy -well scaled and efficient fulfillment center and process allows for optimized costs -large investment and fixed costs from expanding Amazon Prime to international markets and building new fulfillment centers – capital investment is a key strategy for Amazon -comparatively lower costs for managing and upkeeping AWS servers -variable costs from stocking products that are ‘fulfilled’ (sold) by Amazon	<b>Revenue Streams</b> -low margin revenue streams from retail ecommerce sales and fulfillment -ecommerce and fulfillment are low-margin due to costs related to warehousing and upkeeping fulfillment centers -high margin revenue streams from AWS, advertising, and subscription services -low upkeep and variable costs allow AWS, advertising, and subscription services to be the primary profit driver for Amazon, despite being a significantly smaller revenue stream			

## Business Model Canvas: Google



### Capital Raising

Raising capital for IT innovation is crucial for several reasons, as it enables businesses to develop, implement, and scale new technologies that drive competitive advantage and growth. Here are the primary reasons why raising capital is essential for IT innovation:

- Research and Development
 

Funding is required to explore new technologies and conduct thorough R&D to ensure the feasibility and viability of innovative IT solutions. Furthermore, creating prototypes or initial versions of the technology often involves significant costs in terms of resources and expertise.
- Infrastructure and Equipment
 

IT innovation often necessitates the acquisition of specialized hardware, software, and tools that are expensive but crucial for development and testing. Reliable and scalable infrastructure is essential for developing and deploying innovative IT solutions, especially in cloud computing environments.
- Talent Acquisition
 

Innovating in IT often requires highly skilled professionals, such as software developers, data scientists, and cybersecurity experts, who command high salaries. Continuous learning and development programs for existing staff to keep up with the latest technological trends and methodologies.
- Product Development and Testing
 

Creating innovative IT products and services involves multiple stages of development, rigorous testing, and iterations, which require substantial financial investment. Ensuring that the product meets high standards of quality and security involves extensive testing and validation processes.

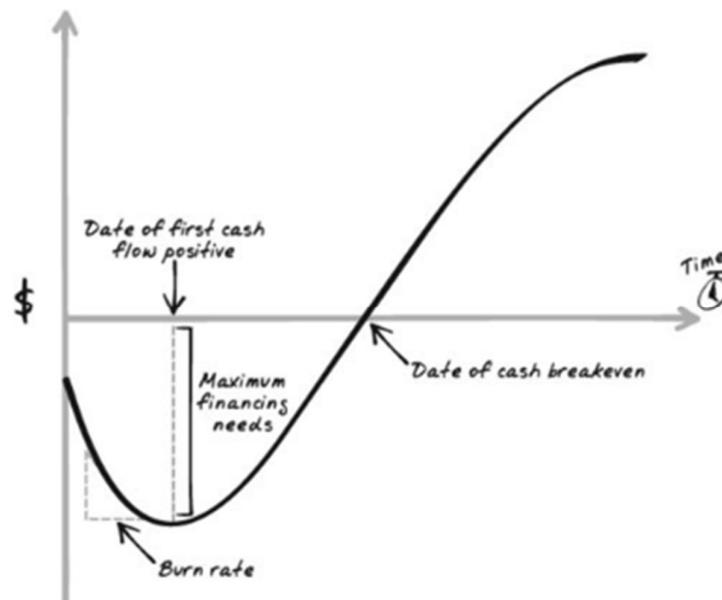
- Marketing and Sales

Raising awareness about the new IT innovation and convincing potential customers requires significant investment in marketing and sales efforts. Establishing a strong brand presence and reputation in the market through various channels, including digital marketing, events, and partnerships.

- Scaling Operations

Transitioning from prototype to mass production involves significant capital to scale manufacturing and operational capacities. Entering new markets and expanding globally requires substantial financial resources for establishing local presence, partnerships, and compliance with local regulations.

### The Valley of Death



The "Valley of Death" refers to a critical phase in the life cycle of a startup or a new technology development project where it faces significant financial and operational challenges. This period is characterized by a gap between initial research and development efforts and the point at which the project starts generating sustainable revenue. During this phase, many startups or projects struggle to secure sufficient funding and resources, leading to a high risk of failure. The main causes of the valley of death are:

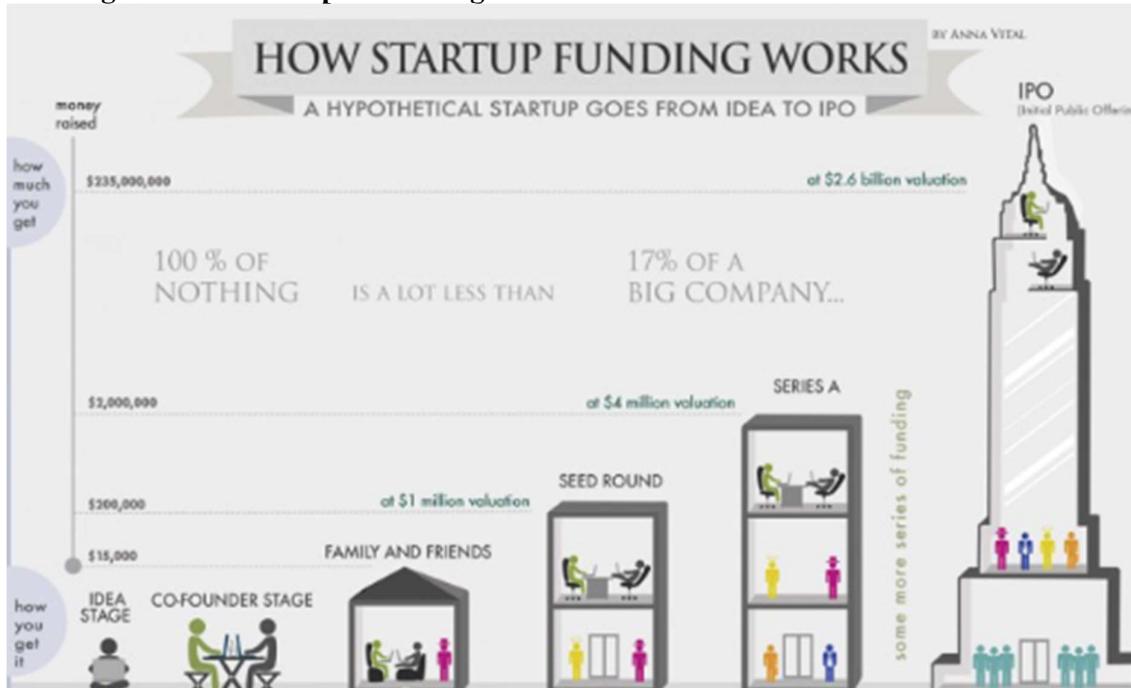
- Inadequate initial funding - Insufficient initial capital to carry the project through the development and early commercialization stages.
- Prolonged Development Time - Extended periods required to develop, test, and refine the product or technology, delaying revenue generation.
- Market uncertainties - Unclear market demand, customer acceptance, and competitive pressures that hinder the ability to secure early sales.
- Operational Challenges - High operational costs, including salaries, manufacturing, and marketing expenses, with limited incoming revenue to offset these costs.

Strategies to survive the valley of death:

- Adopting a lean startup approach to minimize expenses, focusing on essential activities, and reducing burn rate.
- Securing incremental funding through angel investors, venture capitalists, government grants, and other sources to bridge the funding gap.

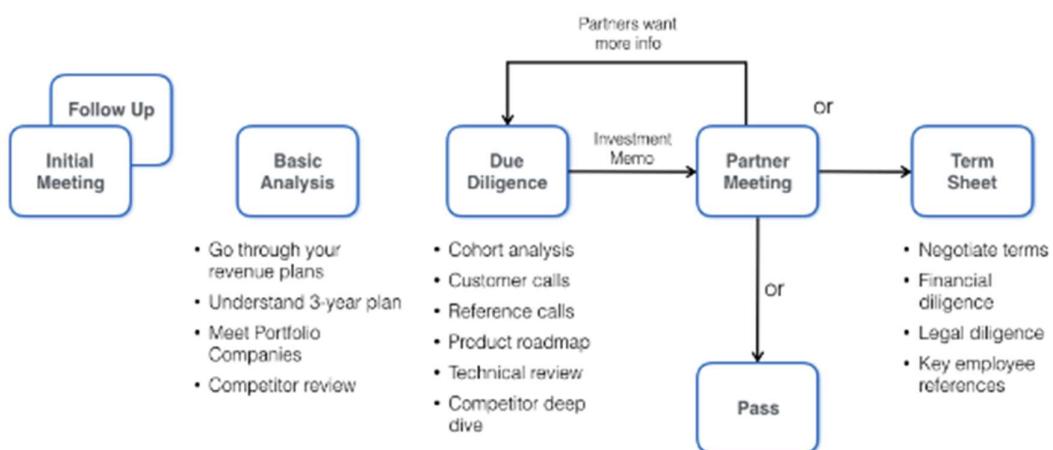
- Forming alliances with larger companies, research institutions, or other startups to share resources, knowledge, and market access.
- Engaging with early adopters to gather feedback, validate the product, and iterate quickly to improve market fit and accelerate revenue generation.
- Exploring alternative or interim revenue streams, such as consulting services, licensing technology, or offering pilot programs to generate cash flow.
- Clearly communicating the value proposition and progress to potential investors, partners, and customers to build confidence and attract support.

## Funding Rounds and Capital Raising Process



## Raising capital from investors

How does the process look like?



Venture capital (VC) refers to a type of private equity financing that is provided by venture capital firms or individual investors to startups and small businesses with high growth potential. These investments are usually made in exchange for equity, or ownership stake, in the companies. Venture capital is an essential source of funding for new businesses that may not have access to traditional forms of financing, such as bank loans, due to their higher risk profiles. A few characteristic traits of this are:

- Venture capital is typically provided in exchange for equity in the company. This means that venture capitalists (VCs) become partial owners of the business.
- VCs invest in startups and early-stage companies that have the potential for significant growth but also come with substantial risks, including the possibility of total loss of investment.
- VCs often take an active role in the companies they invest in. This can include providing strategic guidance, mentoring, and leveraging their networks to help the company grow.
- Venture capital is usually invested in stages, such as seed funding, early-stage funding (Series A), and later-stage funding (Series B, C, etc.), based on the company's progress and needs.

The following are the stages of venture capital investment:

- Seed Funding - The initial capital used to start a business, covering early costs like research and development, product development, and initial market testing.
- Series A - The first significant round of funding used to optimize the product or service, expand the team, and scale the business. This round helps the company to prove its business model and start generating revenue.
- Series B, C, and beyond - Subsequent rounds of funding aimed at further scaling the business, expanding into new markets, and increasing market share. Each round typically involves larger amounts of capital and aims to solidify the company's position and growth trajectory.

Following are the benefits of Venture Capital Investment:

- Provides startups with the necessary funds to develop their products, scale their operations, and enter new markets.
- VCs often bring valuable industry experience, strategic advice, and business acumen, helping startups navigate challenges and seize opportunities.
- VCs can provide access to a broad network of potential customers, partners, suppliers, and other investors, which can accelerate business growth.
- Securing venture capital can enhance a startup's credibility and reputation, making it easier to attract additional investment, talent, and customers.

Following are the drawbacks of Venture Capital Investment:

- Founders must give up a portion of ownership in their company, which can reduce their control over business decisions.
- VCs typically seek high returns on their investments, which can create pressure on startups to achieve rapid growth and profitability.
- Differences in vision and strategy between founders and VCs can lead to conflicts and disagreements.

A few examples of Venture Capital Firms are Sequoia Capital (Apple, Google, Airbnb), Andreessen Horowitz (Facebook, Twitter, Slack), and Benchmark capital (eBay, Uber, Twitter).

## Pitch Format - Continued

Introduction	<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>
What is the problem/ opportunity	<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>
What is your market	<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>
Who you are	<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>
Business Model and Growth	<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>
How and why you can win	<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



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

### Venture Capital



[About | Cicada Innovations](#)



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

### Strategic Investors



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

- Angel Investors

Angel investors are high-net-worth individuals who provide capital to startups and early-stage companies in exchange for equity ownership or convertible debt. They often invest their own personal funds and typically get involved at the very early stages of a company's development.

- Venture Capital

Venture capital (VC) is a form of private equity financing provided by venture capital firms to startups and small businesses with high growth potential. VC firms pool funds from various investors to invest in early-stage and emerging companies.

- Strategic Investors

Strategic investors are companies or investment arms of corporations that invest in startups or smaller businesses for strategic reasons, such as gaining access to new technologies, products, or markets, rather than purely for financial returns.

- Incubators  
Incubators are programs or organizations that provide startups with resources, support, and services to help them grow and succeed. They typically focus on nurturing startups in the early stages of development, often from the idea or prototype stage through to the early revenue-generating stage.
- Accelerators  
Accelerators are fixed-term, cohort-based programs that offer intensive support and mentorship to startups over a short period, typically ranging from a few months to a year. Accelerators aim to help startups rapidly accelerate their growth, refine their business models, and prepare for further funding or market entry.

## WEEK 10

### **Organisational Culture**

Organizational culture refers to the shared values, beliefs, norms, attitudes, and behaviours that characterize an organization and guide the actions of its members. It represents the "personality" of the organization and influences how people interact, make decisions, and work together towards common goals.

Organizational structure refers to the framework or system of relationships and hierarchies that defines how tasks are divided, roles are assigned, and responsibilities are allocated within an organization. It establishes the formal lines of authority, communication channels, and reporting relationships that guide decision-making and coordination of activities across different levels and functions of the organization. Organizational structure defines the overall shape and design of the organization and influences its culture, efficiency, and effectiveness.

### **Organisational culture: “Scientific Management” (Taylorism)**



Frederick Winslow Taylor  
Mechanical engineer  
Efficiency expert  
Management consultant  
1856-1915

“In the past, the man was first.  
In the future, the system will be first.” (1911)

- Standardise work into separate tasks
- Scientifically study each task
- Continually measure performance of task
- Compensate workers based on performance

There are several tools that are used to supplement organisations, these are:

- Gantt Charts - A Gantt chart is a visual tool used in project management to plan, schedule, and track tasks and activities over time. It provides a graphical representation of a project's timeline, showing the start and end dates of each task, as well as their dependencies and durations. A Gantt chart offers a clear and concise way to visualize project progress, allocate resources, and monitor deadlines.

Taylorism was designed for repetitive work with known functions. It is not suitable for creative work with multiple unknowns. Hence it can only be used for established companies which hold a dominant position in the market and not startups. What is required for startups, is a culture for generation of new ideas. A few tips to create a culture for new idea generation are:

- Liquid Networks – Having a diversity of expertise and its ideas bouncing between different expertise can trigger a 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 may lead to stagnation and hence cause a lost opportunity.
- Leadership support - Leadership sets the tone by openly advocating for innovation, allocating resources, and rewarding innovative efforts.
- Foster psychological safety - Cultivate psychological safety by encouraging participation, active listening, and promoting diversity of perspectives.
- Establish collaboration - Foster collaboration through cross-functional teams, networking opportunities, and the use of collaboration tools.
- Provide structure and support - Provide structure and support with training programs, idea management systems, and mentorship.
- Encourage experimentations - Encourage experimentation by embracing failure, providing autonomy, and promoting an iterative approach.
- Celebrate success and learn from failures - Celebrate successes and learn from failures through public recognition and post-mortems to drive continuous improvement.

### Company Structure supporting Innovation.

#### Size and structural dimensions of companies

- Large companies might be disadvantaged in innovation because...
  - R&D efficiency may decrease due to loss of **managerial control**
  - Large companies can have more **bureaucratic inertia**
  - More commitments tie companies to current technologies, e.g., Learning effects (see Week 3)
- Small firms are often more flexible and entrepreneurial
  - Can change direction quickly based on changing circumstances or new observations
- Many big companies have found ways of “feeling small”
  - Break the overall company into several subunits
  - Can utilise different cultures and controls in different units
  - E.g. “skunk works” teams for doing new product development
- Ambidexterity strategy (week 3 recap): The **ability of a firm to simultaneously explore and exploit**, enabling the firm to adapt over time

## 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



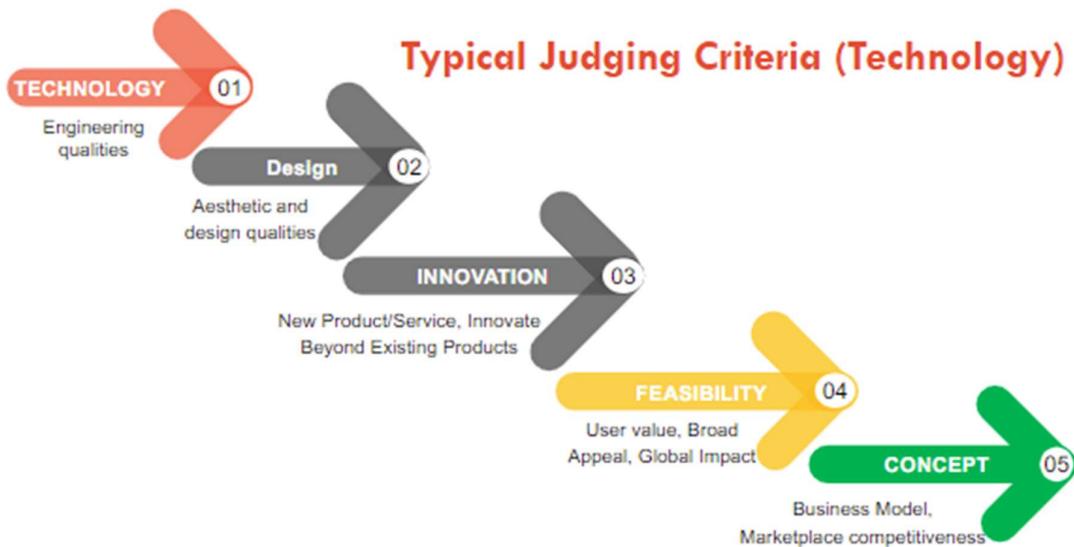
## Mechanistic vs Organic Structures

- **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)

## Judging IT Innovations



### Judging Panel



## WEEK 11

### Innovation Ecosystem

An innovation system refers to the network of institutions, organizations, policies, and processes that collectively influence the development, diffusion, and use of new technologies and innovations within a specific context, such as a country, region, or sector. It encompasses the interactions among various stakeholders, including businesses, research institutions, government agencies, and consumers, which facilitate or hinder innovation activities. There are 3 main components to an Innovation System:

- Innovation Activities

Innovation activities encompass all processes involved in generating, developing, and implementing new ideas, products, services, and technologies. This includes research and development (R&D), product design, prototyping, testing, and commercialization efforts. These activities are the core of the innovation system, driving the creation of new value and advancements in technology. They involve the transformation of knowledge into practical applications that can benefit society and the economy.

- Networks

Networks refer to the connections and relationships among various stakeholders within the innovation system. This includes collaborations between businesses,

universities, research institutions, government agencies, and non-profit organizations. Networks facilitate the flow of information, resources, and expertise necessary for innovation. Effective networks enhance the innovation process by enabling knowledge sharing, fostering collaboration, and leveraging diverse perspectives and skills. They help overcome barriers to innovation by pooling resources and facilitating joint problem-solving efforts.

- Framework conditions

Framework conditions are the external factors and environment that influence the innovation system. These include government policies, regulatory frameworks, economic conditions, intellectual property rights, education and training systems, and cultural attitudes towards innovation. A supportive framework creates a conducive environment for innovation by providing the necessary infrastructure, incentives, and legal protections. It ensures that innovators have access to the resources and conditions they need to succeed, such as funding, skilled labour, and market opportunities.

These components collectively function to produce and diffuse innovations that have economic, social, and/or environmental value. Factors that lead to a successful innovation ecosystem are:

- Strong research driven universities (with endowments)
- Globally experienced repeat entrepreneurs.
- Sophisticated risk capital
- Social capital
- Knowledge Sharing
- Tolerance for risk-taking
- Creative destruction
- Constructive failure
- Positive aggregate returns
- Supportive Government Policy

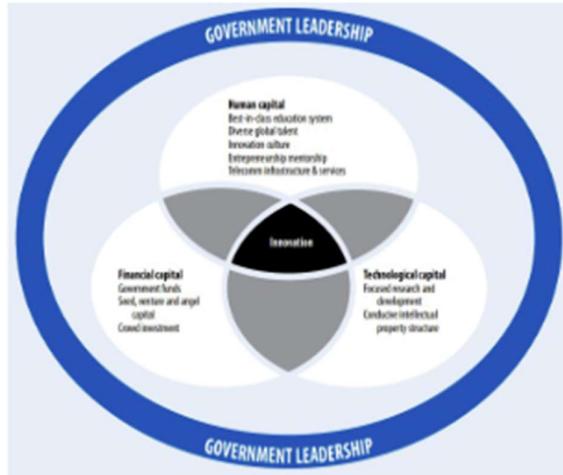
A few other cities which are like the Silicon Valley of USA:

### **San Francisco and the Bay Area**

- **Access to capital:** Leading venture capital firms that provide early-stage funding to startups. The region has a robust network of angel investors and seed funds.
- **Skilled workforce and research capacity:** A highly educated workforce, with many graduates from the region's top universities, including Stanford and UC Berkeley. The region also attracts talent from around the world, with many immigrants.
- **Culture:** A long history of creating new industries, from semiconductors to social media, constantly looking for new opportunities to disrupt traditional business models.

## 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.



## Beijing and Shanghai

- **Huge domestic market:** China has a huge and rapidly growing domestic market, with over 1.41 billion people - a massive opportunity for companies in the technology sector, especially those that cater to consumer needs.
- Access to capital, Highly skilled workforce, Government support, Strong research institutions

## Australian Startup Ecosystem

The Australian startup ecosystem has seen significant growth and development over the past decade, emerging as a vibrant and dynamic environment for innovation and entrepreneurship. Several factors contribute to the strengths and challenges of this ecosystem.

Strengths of the Australian startup ecosystem:

- Supportive Government Policies

The Australian government has implemented various initiatives to support startups, including tax incentives, grants, and funding programs. Policies like the R&D Tax Incentive and the Entrepreneurs' Programme provide financial support and resources to startups.

- Access to Capital

Australia has a growing venture capital landscape, with both domestic and international investors showing increased interest. Various venture capital firms, angel investors, and crowdfunding platforms provide startups with access to early-stage and growth capital.

- Thriving Startup Hubs

Major cities like Sydney, Melbourne, Brisbane, and Perth serve as significant startup hubs, offering vibrant communities, co-working spaces, accelerators, and incubators. These hubs provide a supportive environment for networking, mentorship, and collaboration.

- Strong Talent Pool
 

Australia has a highly educated workforce with strong technical and entrepreneurial skills. Universities and educational institutions play a crucial role in nurturing talent through specialized programs and courses in entrepreneurship and innovation.
- Robust infrastructure
 

The country boasts a reliable and advanced infrastructure, including high-speed internet, modern transportation, and cutting-edge research facilities. This infrastructure supports the operational needs of startups.
- Collaborative Ecosystem
 

The Australian startup ecosystem is characterized by strong collaboration between startups, corporates, universities, and research institutions. Initiatives like industry partnerships, innovation labs, and collaborative research projects foster a culture of innovation.

#### Challenges of Australian Startup Ecosystem:

- Market Size and Isolation
 

The relatively small domestic market can limit the growth potential for startups compared to larger markets like the US or Europe. Additionally, Australia's geographical isolation can pose challenges for global expansion and access to international markets.
- Access to Later Stage Funding
 

While early-stage funding is increasingly available, access to later-stage funding remains a challenge for some startups. This can hinder their ability to scale and compete on a global level.
- Regulatory Hurdles
 

Navigating the regulatory environment can be complex and time-consuming for startups. Issues related to compliance, intellectual property, and industry-specific regulations can pose significant challenges.
- Cultural Attitudes towards risks
 

The Australian cultural attitude towards risk and failure can sometimes be conservative. Encouraging a mindset that embraces failure as a learning experience is crucial for fostering a more dynamic entrepreneurial culture.
- Talent retention
 

Retaining top talent can be a challenge, as highly skilled individuals often seek opportunities in larger, more established markets abroad. Offering competitive incentives and career development opportunities is essential to retain talent.

#### Some of Sydney's innovation ecosystem

- Co-working spaces: eg
  - [Fishburners](https://fishburners.org/), <https://fishburners.org/>
  - [BlueChilli](https://www.bluechilli.com/), <https://www.bluechilli.com/>
  - [Stone & Chalk](https://www.stoneandchalk.com.au/), <https://www.stoneandchalk.com.au/>
  - [Sydney Startup Hub - Investment NSW](#)
- Collaborative ecosystem
  - building a diverse and inclusive community of operators, founders and partners, powering early-stage entrepreneurs to learn and grow.

## Some of Sydney's innovation ecosystem

- Government programs: e.g. [R&D Tax Incentives](#)
- Universities
- Government-funded research organisations, e.g.
  - [CSIRO](#) (including [Data61](#)) <https://www.csiro.au/>
- Established companies doing software/hardware development (Atlassian, Google, Canon, Optiver, Dolby, Freelancer, Canva, etc.)
- Hackerspaces, etc

## Industry innovation – We are boosting innovation in Australian businesses and building competitive industries.

### Business innovation grants and initiatives

Our department administers programs and initiatives that support research, entrepreneurship and commercialisation.

#### Boosting Female Founders (BFF) Initiative →

We help women entrepreneurs grow their startups in national and international markets through the BFF Initiative.

#### Business Research and Innovation Initiative (BRII) →

BRII grants encourage businesses to develop innovative solutions to government challenges.

#### Cooperative Research Centres (CRC) Grants →

CRC Grants support medium to long-term collaborative research for up to 10 years.

#### Cooperative Research Centres (CRC) Projects grants →

CRC Project grants support short-term collaborative research for up to 3 years.

#### Entrepreneurs' Programme →

The Entrepreneurs' Programme gives businesses access to advice and grant funding.

#### Industry Growth Centres →

Industry growth centres are driving innovation, productivity and competitiveness in 6 key growth industry sectors.

#### Research and Development (R&D) Tax Incentive →

The R&D Tax Incentive stimulates business investment in R&D through tax offsets.

#### Venture capital →

We provide venture capital tax benefits to encourage investment in innovative early-stage businesses.

## 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.



## Case studies

### Roborace

- The world's first driverless electric racing car.
- "I passionately believe that the future of cars is about software; driverless, electric and connected and Roborace will help to make that a reality."
  - Denis Sverdlov, CEO of Roborace
- RoboRace holds first ever autonomous race, making engineers the rock stars



<https://www.engadget.com/2018/07/17/roborace-is-still-pursuing-its-driverless-race-car/>

### Example: The Personal Computer – The IBM PC

- Developed in < 1 year in a "skunkworks" project at IBM's Boca Raton Florida facility.
- Had rapid development cycle because of use of "off the shelf" parts for disk drives, processors, memory, operating system etc.
  - Processor was from Intel
  - Operating system from Microsoft
- IBM published the bus (connects internal components of a computer) and BIOS (basic input/output system) specifications:
  - This was to drive generation of add-ons...
  - ... but also enabled competitors to make "compatible" PCs

### The IBM PC

On August 12, 1981, IBM introduced the IBM Personal Computer. This wasn't the first PC, but it did create the standards that in many ways have dominated personal computing for most of the past 42 years, including an open architecture, an Intel architecture processor, and a Microsoft operating system.



The first IBM PC (the 5150 released in 1981)

## The IBM PC

- 1981: First IBM PC released
- 1982: First roughly IBM compatible PC released (Columbia's MPC)
  - Used many of the same components as the IBM PC (but higher specification)
  - Used the published bus interfaces and wrote own BIOS
- By the end of 1982, Eagle Computer and Compaq had released compatible PCs
- With companies able to make their own PCs including BIOSes and being able to license the OS from Microsoft, IBM had many competitors producing similar products at lower cost
- By 1986, IBM compatible PCs had >50% of market share
- By 1990, IBM lost its lead in PC sales
- Despite losing on PC sales, IBM realised the opportunity of the scale of the market and was successful in licensing patents related to various components of the PC

## 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

## The difficulty of displacing a dominant design: The NeXT vs. the IBM PC



- 1985: Steve Jobs resigned from Apple
- Formed NeXT with 5 other ex-Apple staff
- Made a powerful computer with high processing, memory and graphics.
- 1988: The NeXT Computer was released.
- Far more technologically advanced than IBM Compatibles and Macs of the time.
- Poor sales.
- Could not compete with the installed base and complementary product value of IBM-compatible PCs.
- 1993: Stopped hardware production; focused on software (their Unix-based NeXTStep operating system).
- 1996: Apple bought NeXT.
- Steve Jobs became interim CEO and later CEO.
- NeXTStep later became Mac OS X

## Case Study – Cognitive Computing

### Section 2.2



#### Maximize the value of your organization's physical space

Understand how people move in a physical space, whether it's an office or a store. Use the spatial analysis feature to create apps that can count people in a room, trace paths, understand dwell times in front of a retail display, and determine wait times in queues. Build solutions that enable occupancy management and social distancing, [face mask compliance](#), optimize in-store and office layouts, and accelerate the checkout process. Run the service across multiple cameras and sites.

[Learn more about this capability >](#)

<https://www.microsoft.com/cognitive-services/en-us/computer-vision-api> (Mar'24)

## Cognitive Services

- There are many cognitive services available, recently, that lets you use powerful cognitive services, such as computer vision and language processing
- For example, Microsoft Cognitive Services let you build apps with powerful algorithms using just a few lines of code. They work across devices and platforms such as iOS, Android, and Windows, keep improving, and are easy to set up.
- Google's CloudPlatform lets you run your application using the same technology and tools used at Google

## CLOUD VISION API

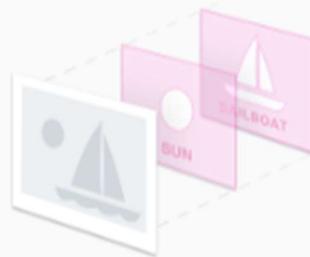
Derive insight from images with our powerful Cloud Vision API

TRY IT FREE

VIEW DOCUMENTATION

### Powerful Image Analysis

Google Cloud Vision API enables developers to understand the content of an image by encapsulating **powerful machine learning models** in an easy to use REST API. It quickly classifies images into thousands of categories (e.g., 'sailboat', 'iron', 'Eiffel Tower'), detects individual objects and faces within images, and finds and reads printed words contained within images. You can build metadata on your image catalog, moderate offensive content, or enable new marketing scenarios through image sentiment analysis. **Analyze images uploaded in the request** or integrate with your image storage on Google Cloud Storage.



## Cognitive computing

- To **simulate human thought processes** in a computerized model.
- Using self-learning algorithms that use data mining, pattern recognition and natural language processing, the computer can mimic the way the human brain works.



## Example of open innovation: Innovation at Xerox PARC

- Chesbrough studied Xerox Palo Alto Research Center (PARC) for R&D

IBM Open Innovation Community:  
<https://www.ibm.com/opensource/innovation/> (Mar'24)

Parker, G., Petropoulos, G., Van Alstyne, M. W., & West, J. (2024). Driving Open Innovation Through Open Platforms.  
Chesbrough, H. (2024). Open Innovation in Large Companies.  
<https://scholar.google.com/citations?user=1-kDZhIAAAQ&hl=en&oi=sa>

### Xerox's Business Model, and Project Evaluation Errors



Source: Chesbrough (2009) -

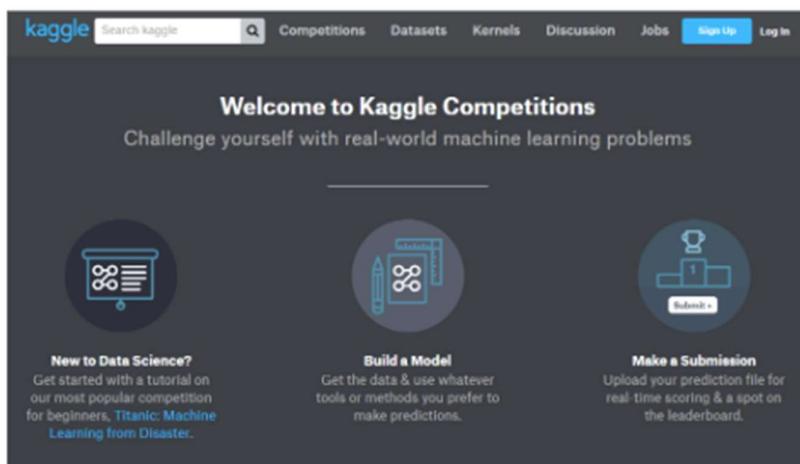
## Example: Topcoder

- **Create a Project** - Choose the project type that best matches your requirements, and use the interactive guide to tell us about your vision and requirements.
- **Get Expert Assistance** - A project manager is assigned to you to handle all logistics—from launching crowdsourcing competitions to delivering your feedback on deliverables.
- **Review Submissions** - You can review and provide feedback on all deliverables—and often have multiple options to consider. We keep you abreast of progress the whole way.
- **Pay for Results** - We sell outcomes, not contracts for services. With Topcoder you pay only for the solution that meets your requirements, not the hours to create it.



<https://www.topcoder.com/>

## Case Study – Kaggle – Big data competitions



## Kaggle story

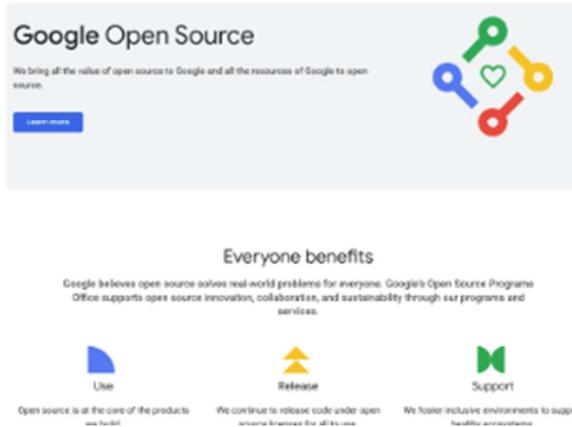
- In 2010, **Kaggle** was founded as a platform for predictive modelling and analytics competitions on which companies and researchers post their data and statisticians and data miners from all over the world compete to produce the best models. This crowdsourcing approach relies on the fact that there are countless strategies that can be applied to any predictive modelling task and it is impossible to know at the outset which technique or analyst will be most effective. Kaggle also hosts recruiting competitions in which data scientists compete for a chance to interview at leading data science companies like Facebook, Winton Capital, and Walmart.
- In April 2015, Kaggle released the first version of their Scripts product onto their platform. Scripts allows users to write, run, and publicly share their code on Kaggle.
- In January 2016, Kaggle released their Datasets product, making a selection of public datasets available on Kaggle. Each datasets has Scripts enabled, as well as a dedicated forum, allowing for conversation and collaboration between data scientists and the work they are doing on each dataset.
- On 8 March 2017, Google announced that they were acquiring Kaggle.<sup>[2]</sup> They will join the Google Cloud team and continue to be a distinct brand.<sup>[3]</sup>

## Example: Facebook and Open Source

- Accelerates innovation in the world. Users can build apps more quickly and Facebook can benefit from the improvements that others make to their code.
- If the company knows something will be open from the start, it just builds it better so that it can be more accessible and dependable because it's going to be used in the outside world.
- Open source provides opportunities to share challenges. It attracts the interest of people who want to work on these challenges, and as a result it helps improve the quality of the company's staff.

### Google Open Source

- "Open source makes it possible for us to work together." —Google OSPO Founder Chris DiBona
- A key part of OSPO's mission is helping Google-led projects thrive and grow. Some of Google's most notable open-source projects were released in 2008, including Android



## Example: Apple and Swift programming language

- Apple is among the most closed tech companies, yet it is doing open source with its **Swift** programming language
- Swift is open source, and they want you to help make it the best general-purpose programming language available everywhere.
- The success of a software platform is proportional to the number of developers that use it.
- Apple wants to attract the best developers in the world to create new apps and desktop applications that showcase its latest iPhones, Apple Watches and MacBook devices.



<http://www.computerweekly.com/news/450296755/Why-Apple-is-going-open-source-developers-with-Swift>  
<https://swift.org/>

## Example: Microsoft and .Net

- Microsoft is porting its server-side .NET stack to Linux and Mac OS X, and is making more of that stack available as open source. With its engineers involved in more than 2,000 open source projects, you'd have to agree that open source has more than a foothold at Microsoft these days.
- Microsoft also wants to bring technologies to Linux, in large part because of Azure.
- Running a cloud platform gives Microsoft an interest in Linux that goes far beyond the open source contributions the Windows Server team has been making to the Linux kernel
- As of September 2015, more than 20 percent of the virtual machines running on Azure IaaS (Infrastructure as a service) were Linux.
  - "As we pursue our vision of the fabric and the cloud anywhere, that is as much a story about supporting Linux workloads as it is Windows workloads," says lead architect for Windows Server, Jeffery Snover.



<http://www.zdnet.com/article/microsoft-to-open-source-more-of-net-and-bring-it-to-linux-mac-os-x/>

## Open-source lab model (e.g. Amplab at UC Berkeley)

- Berkeley Lab: Multi-year collaborative effort at UC Berkeley
- Sponsors: Amazon, Google, IBM, SAP + 19 more
- Open Source Software developed:
  - Spark (cluster computing framework), Mesos, Tachyon, GraphX, MLBase
- Companies formed:
  - Mesosphere (\$122.25M invested), Databricks (\$47M invested), Tachyon Networks (\$17M invested)



<https://amplab.cs.berkeley.edu/>

## Amplab: benefits to participants



- What do the companies get:
  - Deep knowledge of technology as it is developed
  - Influence technology direction and outcome
  - Protection from disruption by other companies
  - Access to university talent pool
- What does the university get:
  - Clear focus for computer science research
  - Additional income to fund activities
  - Close interaction with market needs
  - Incubation of new businesses
  - Stronger innovation ecosystem

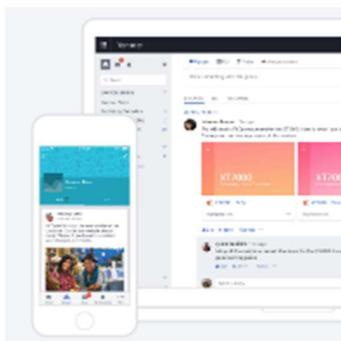
## Example of user innovation: Geni to Yammer



<https://www.geni.com/>

- Powerful Genealogy Tools to Help You Grow Your Tree
- Find Your Ancestors, Connect to New Relatives

The University of Sydney



<https://www.yammer.com/>

- A private social network for your company.
- To share files, discuss projects, and get work done faster
- Discuss ideas, share updates, and crowdsource answers from coworkers around the globe.

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## Example of user innovation: Yammer



David Sacks

[http://www.socaltech.com/interview\\_with\\_david\\_sacks\\_geni\\_and\\_yammer.aspx-0017613.html](http://www.socaltech.com/interview_with_david_sacks_geni_and_yammer.aspx-0017613.html) (Mar'24)

<https://www.yammer.com/>

- Yammer started as an internal productivity tool at Geni. We built the tool to help people stay connected, and we've been using it internally for six months.
- We have about 30 employees at Geni and have about 20,000 messages on Yammer.
- It's been incredibly successful at Geni and is the centre of the company's culture. We decided to spin it out into a separate company so that other companies can also use the product. About a month ago, we spun it out and premiered it at TechCrunch50, as you know, and won that event.
- Microsoft bought Yammer for \$1.2 billion in 2012
- Yammer is now used by more than 200,000 companies (source: [yammer.com](http://yammer.com))

## Example of user innovation: Slack



Stewart  
Butterfield

<https://www.npr.org/2018/07/27/633164558/slack-flickr-stewart-butterfield>

- In the early 2000s, Stewart tried to build a weird, massively **multiplayer online game**, Game Neverending, but the venture failed.
- Instead, he and his co-founders used the technology they had developed to create the photo-sharing site Flickr.
- After Yahoo acquired Flickr in 2005, Butterfield returned to the online game idea, Glitch, only to fail again.
- They had developed a tool for team communication that they used to coordinate their work on the game and realized that it could also be helpful for other teams.
- The **office messaging platform Slack rose** from the ashes of that second failure — In 2019, Slack went public through a direct listing on the New York Stock Exchange, with a valuation of over \$20 B.

[http://www.slate.com/articles/business/how\\_failure\\_breeds\\_success/2014/05/stewart\\_butterfield\\_flickr\\_and\\_slack\\_how\\_he\\_snatched\\_victory\\_from\\_the\\_jaws.html](http://www.slate.com/articles/business/how_failure_breeds_success/2014/05/stewart_butterfield_flickr_and_slack_how_he_snatched_victory_from_the_jaws.html)

## Example: Lego Ideas



<https://ideas.lego.com/#all>

The screenshot shows the LEGO Ideas website. On the left, there's a large image of a LEGO Voltron toy. To the right, there's a call-to-action button "IT'S YOUR TIME TO SHINE!" with a "SUBMIT IDEA" button below it. A circular image of a detailed LEGO model of a medieval-style building is shown. Below these, there's a section titled "BECOME A LEGO FAN DESIGNER" with a description of the process: "The journey of becoming a LEGO Fan designer is incredibly challenging and requires a serious brick-built concept, solid planning, a loadful of determination, as well as a healthy amount of patience." To the right, there's a timeline of milestones: "60 days" (Submit Idea), "100 Supporters" (1-3 months), "1000 Supporters" (4-6 months), "5000 Supporters" (6-12 months), "10000 Supporters" (Expert review), and finally "BECOME A LEGO IDEAS DESIGNER".

## Example of user innovation: Apache web server

- In 1994, the most popular web server was “httpd” by Rob McCool at NCSA (same place as Mosaic – most popular web browser at the time)
- This was available as open source
- Many httpd users (webmasters) modified the server code for their own sites
- Rob McCool left NCSA in mid 1994
- Eight httpd users emailed each other to discuss using each others changes
- In 1995, they created a common code base
- By 1996, it was the world’s most used web server
- It’s still one of the most used today

## Example of user innovation: MySQL



- We started out with the intention of using the mSQL database system to connect to our tables using our own fast low-level (ISAM) routines. However, after some testing, we came to the conclusion that **mSQL was not fast enough or flexible enough for our needs**. This resulted in a new SQL interface to our database but with almost the same API interface as mSQL. This **API was designed to enable third-party code** that was written for use with mSQL to be ported easily for use with MySQL.
- MySQL is named after co-founder Monty Widenius's daughter, My.
- MySQL was bought by Sun Microsystems for \$1 billion in 2008

## Platform Ecosystems

## Apple iPhone...

- Back in 2007, the five major mobile-phone manufacturers – Nokia, Samsung, Motorola, Sony Ericsson, and LG – collectively controlled 90% of the industry's global profits. That year, Apple's iPhone burst onto the scene and began gobbling up market share.
- By 2015 the iPhone singlehandedly generated 92% of global profits, while all but one of the former incumbents (former companies) made no profit at all.

Marshall W. Van AlstyneGeoffrey G. ParkerSangeet Paul Choudary, "Pipelines, Platforms, and the New Rules of Strategy", Harvard Business Review, April 2016  
<https://hbr.org/2016/04/pipelines-platforms-and-the-new-rules-of-strategy> (Mar'24)

## 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 2015, the company's App Store had offered 1.4 million apps and had cumulatively generated \$25 billion for developers.
- 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.

## Classic stories: How can a couple of people beat and displace major global corporations?



- What the Google founders recognised about search on the Web was that information about **LINKS** could be added to the algorithms.
- Links are **another kind of indexing** altogether. Web page authors link to related material and often to very carefully and consciously selected related material. This link information could be wrapped into the search algorithms to improve retrieval accuracy.
- Altavista – known for its efficient search and crawling.... But lost focus on portal/features

## Classic stories: How can a couple of people beat and displace major global corporations?



- The brilliance of Mark Zuckerberg was his **willingness to allow Facebook to go wherever the market wanted it**. Farmville and other social games - why not? Different ways to find potential friends - go for it.
- The **founders kept pushing the technology to do anything users wanted**.
- And looking within the comments for what would be the next application - the next promotion - the next revision that would lead to more uses, more users and more growth.

## Paytm: Payment startup in India

Expensive to build payment infrastructure and scale acquisition of users

### Paytm's annual loss doubles to \$549M

Manish Singh | 09:00 / 104 pm AEST • September 10, 2018



Paytm: Funding losses with capital from investors

"Running a payments business in India is not cheap. Just ask Paytm, one of India's largest payment companies, reported a net loss of US\$549 million..."

"During the same period, the company's revenue rose to \$448 million from \$423 million in the year before."

"Paytm has raised over \$2 billion from investors including Softbank, Alibaba and Berkshire Hathaway."

## Rethink Robotics: Warehouse Automation Startup in Boston

### Rethink Robotics closes after acquisition plans fall through

Brian Heater @bheater / 8:35 am AEST • October 5, 2018

Comment



Crashing and failing in the Valley of Death: High costs of running hardware and robotics startups

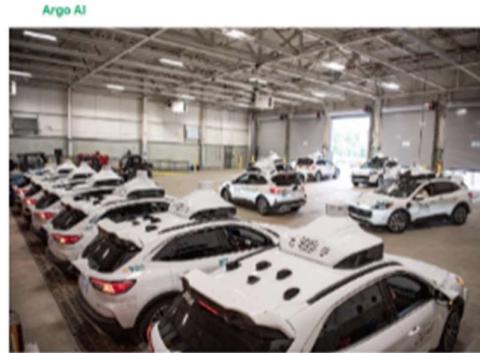
"If hardware is hard, robotics are next to impossible"

"... raised nearly \$150 million, but that wasn't enough for it to continue its path".

I've said it right here on these very pages: If hardware is hard, robotics are next to impossible. That truism is not better exemplified by this week's closure of Rethink Robotics. A well-respected name in automation, the Boston-based company produced a pair of robotics that have become mainstays in research facilities and warehouse

## Example: Argo AI, An Autonomous Vehicle (AV) Unicorn in US

- Autonomous tech developer Argo AI, backed by Volkswagen and Ford, is shutting down.
- "... The start-up had been engaged in research and development of driver-assist systems as well as level 4 autonomous driving technology since 2016".
- "... The decision is seen as being tied to growing losses for its two main automotive backers at a precarious time in the industry, collectively amounting to billions".



[Remembering the startups we lost in 2022 \(Apr 24\)](#)  
[Here's Why Argo AI Is Shutting Down \(Apr 24\)](#)

### Example: DAQRI, AR (Augmented Reality) Startup in Los Angeles, CA

- Crashing and failing in the Valley of Death
- "Daqri was an AR (augmented reality) startup that shut down operations in 2019 and sold its assets to Snap. The AR startup ran out of money despite managing to raise \$275 million from two private equity rounds led by Tarsadia Investments ..."



[From Raising \\$275M to Shutting Down: The Collapse of Daqri \(Apr 24\)](#)

## Anything is possible nowadays: Still reporting massive losses even after becoming a publicly-listed company

### *Uber Posts \$5.2 Billion Loss and Slowest Ever Growth Rate*



Uber said its loss totaled \$5.2 billion, the biggest quarterly loss since it began disclosing limited financial

#### "Growth at all costs": Reporting massive losses till this day

"Uber set two dubious quarterly records on Thursday as it reported its results: Its largest-ever loss, exceeding \$5 billion, and its slowest-ever revenue growth"

"The ride-hailing industry has faced scrutiny in recent months for the way its businesses burn money with no imminent likelihood of profits. Companies must constantly spend freely for incentives to attract passengers and drivers and to fend off competition"

"Revenue grew to \$3.1 billion, up 14 per cent from a year ago"

**Uber raised \$24.76B in funding over 24 rounds.**

### **Example: Amazon**

#### A slow J-curve... worth the wait

- When Amazon was founded in 1994, it operated at a loss for several years as it invested heavily in infrastructure, technology, and expanding its product offerings.
- Its revenues grew rapidly, and the company eventually achieved profitability in 2001.
- Amazon has a market capitalisation of over \$1 trillion as of 2021.



AMZN 97.20 -0.9499 -0.97% : Amazon.com Inc - MSN Money (Apr'24)

### **Case Study: Culture and innovation in a Digital Age**

- "At some point, the concept or the idea that made you successful is going to run out of gas. So, you need new capability to go after new concepts". ("Creative Destruction")
- **The only thing that's going to enable you to keep building new capabilities and trying out new concepts long before they are conventional wisdom is culture.** Culture so that you can continue to cultivate new capabilities and new concepts.
- When I became CEO, we were already a 40-year-old company, and I felt that it was very important for us to make culture a first-class, explicit conversation so that we could then reinvent ourselves and invent new things."



## Cultural change in Microsoft

- **Annual Microsoft Hackathon** – which the company calls the “largest private hackathon in the world” – encouraged employees from different business areas to work together on projects
  - Before the hackathon, separate Windows offices were siloed and in constant competition. The hackathon helped create the fast-moving, collaborative organisation needed to compete in today’s digital-first world.
- **Fewer, bigger bets** – doubled down on future technologies by investing in cloud and AI
- **Partner-positive thinking** – understanding that fast-moving and specialist partners can deliver expertise and innovation to specific challenges that a larger, legacy organisation might struggle to produce

## Case Study: Lockheed Martin Skunk works

- SKUNK WORKS APPROACH (1940s)
- No mission is impossible. Lockheed Martin Skunk Works is committed to quickly **developing disruptive solutions** to ensure our nation has an absolute advantage.
- What sets Skunk Works apart is its unique approach, which founder Kelly Johnson created. This approach is still evidenced today by the **small empowered teams, streamlined processes and the culture that values the lessons learned when you are bold enough to attempt something that hasn't been done before**.



<https://www.lockheedmartin.com/en-us/who-we-are/business-areas/aeronautics/skunkworks.html>  
(Apr'24)



Kelly Johnson, Engineer

## Skunk works – Kelly's 14 rules & practices

- **1.** The Skunk Works® manager must be delegated practically complete control of his program in all aspects. He should report to a division president or higher.
- **3.** The number of people having any connection with the project must be restricted in an almost vicious manner. Use a small number of good people (10% to 25% compared to the so-called normal systems).
- **4.** A very simple drawing and drawing release system with great flexibility for making changes must be provided.
- **11.** Funding a program must be timely so that the contractor doesn't have to keep running to the bank to support government projects.
- **14.** Because only a few people will be used in engineering and most other areas, ways must be provided to reward good performance and not based on the number of personnel supervised.

## Case Study – Apple – One organisation, different cultures

- 1980: Apple was producing the Apple II personal computer at reasonably high volumes for technical users
- Steve Jobs (CEO) wanted a new type of computer to be:
  - Very intuitive to use
  - Self-contained
  - Usable by everyone, not just technical people
- The corporate structure wasn't appropriate for the new product:
  - Apple's corporate environment had been structured for sound and efficient manufacturing
  - Wanted new group to have different culture and more flexibility



### Apple's Renegade Team

- Jobs started a new product development group specifically to develop Macintosh with **renegade culture** (being consciously and intentionally different from the mainstream and its practices (and products, in this case))
- After seeing a prototype of a mouse and desktop icons during a visit to Xerox PARC, Jobs was convinced that all computers would one day operate on such a model.
- Couldn't get the top management at Apple to agree
- **Hijacked a team working on another project**, took the best ideas from Xerox and elsewhere, and added some of his own.
- The result was a renegade team at Apple, hidden away in a building off the main campus, that was tasked with creating the first Macintosh.



### Apple – change in culture – are they still innovative?



<https://www.forbes.com/sites/gregpetro/2019/06/07/at-its-core-apple-is-no-longer-innovative/#1fef24f1196d> (Apr '24)

- Apple is **no longer innovative across any category**.
- Apple fails to bring anything new in smartphones, apps, smart devices, or even their retail stores. And until they find a way to do so, we will continue to watch this company unravel.
- Are they leading in:
  - The Folding Phone?
  - AI and Smart Technology?
  - Retail Stores
  - Apple Watch
  - Apple as a service

## Case Study: Google – Keeping benefits of a small company in a large company



Eric Schmidt,  
Google CEO  
(until April  
2011)

- “One of the things that we've tried very hard to avoid at Google is the sort of divisional structure and the business unit structure that prevents collaboration across units. It's difficult. So, I understand why people want to build business units and have their presidents.
- But by doing that, you cut down the informal ties that drive so much collaboration in an open culture. If people in the organisation understand the company's values, they should be able to self-organise to work on the most interesting problems.
- And if they haven't, or are unable to do that, you haven't talked to them about what's important. You haven't built a shared value culture.”

### Google's “20% time”

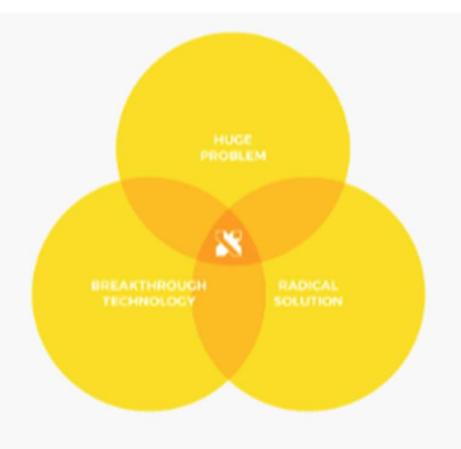
- “We encourage our employees, in addition to their regular projects, to spend 20% of their time working on what they think will most benefit Google. This empowers them to be more creative and innovative. Many of our significant advances have happened in this manner.”
- Huge 20% of products include the development of Google News, Gmail, and AdSense.
- Only about 10% of Googlers are using it, last time the company checked, but it doesn't matter, as long as *the idea* of it exists, according to Google HR boss Laszlo Bock in his new book, “Work Rules!” (2015)
- “In some ways, the idea of 20 per cent time is more important than the reality of it,” he writes. “It operates somewhat outside the lines of formal management oversight and always will because the most talented and creative people can't be forced to work.”



### Google's Solve for X

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

<https://x.company/> (Apr'24)



## Solve for X – a Moonshot factory

- We look for the intersection of a big problem, a radical solution, and breakthrough technology. We start with a large problem in the world that if solved could improve the lives of millions or even billions of people. Then we propose a radical solution that sounds impossible today, almost like science fiction. Lastly, we look for a technology breakthrough that exists today; this gives us the necessary hope that the solution we're looking for is possible, even if its final form is five to ten years away and obscured over the horizon.
- We tackle ideas that have the riskiness and ambition of early-stage research and approach them with the focus and speed of a startup. Our goal is to develop and de-risk these early-stage ideas and turn them into proven technologies that make a real impact in the world.
- X is a team of inventors and entrepreneurs from a wide variety of backgrounds. We're makers, engineers, and scientists with deep technical expertise who've come to X to bring our creations out of the lab and into the real world.

### 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.



### 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

## Microsoft Imagine Cup

The screenshot shows the Microsoft Imagine Cup website. At the top, there's a navigation bar with links like 'About', 'Alts Cupzone', 'Mentors', 'Events', 'Deadlines', 'FAQ', and 'Help'. Below the navigation is a large banner with the 'Imagine Cup' logo and the tagline 'Dream it. Build it. Live it.' It features several images of people working on projects. A purple button at the bottom left says 'Sign up for update'. To the right of the banner is a callout box for the '2023 Microsoft Imagine Cup World Championship'. It includes a small image of a trophy, a date 'May 23 at 6:00am PT', and a link 'Save the Date!'. Below the callout is a URL: <https://imaginecup.microsoft.com/en-us> (Apr '24).

## Microsoft ImagineCup



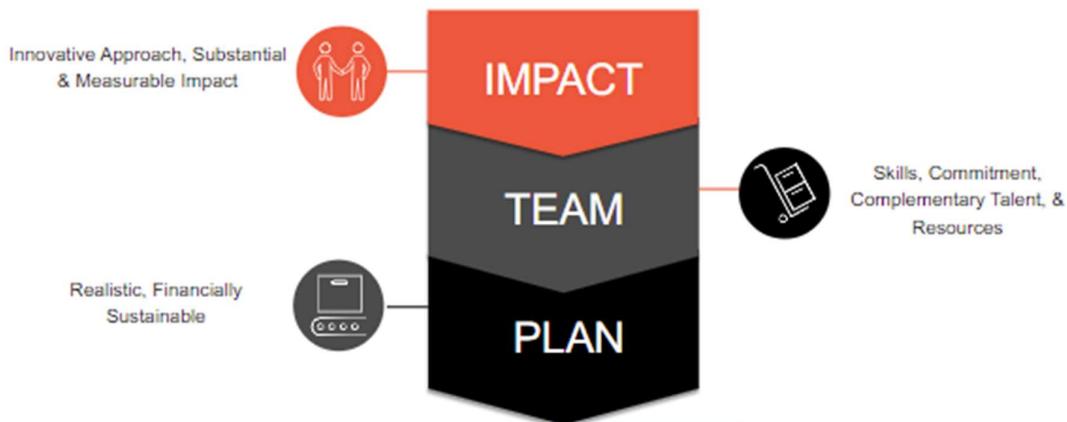
- For over 20 years, the Imagine Cup has been the world's **premier student technology competition**.
- Students from across the globe build amazing teams to bring their biggest, boldest ideas to life. Working with mentors and industry leaders, they get feedback to hone further and develop their projects.
- Imagine Cup National Finals competitions happen in dozens of countries worldwide.
- All World Finalist teams win an all-expenses paid trip to the World Finals, where they will compete with the best and brightest teams from across the globe for the title of World Champion, a \$100,000 cash prize and the chance to take home the Imagine Cup!

### 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%

- 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

### i3 Judging Criteria



### 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.

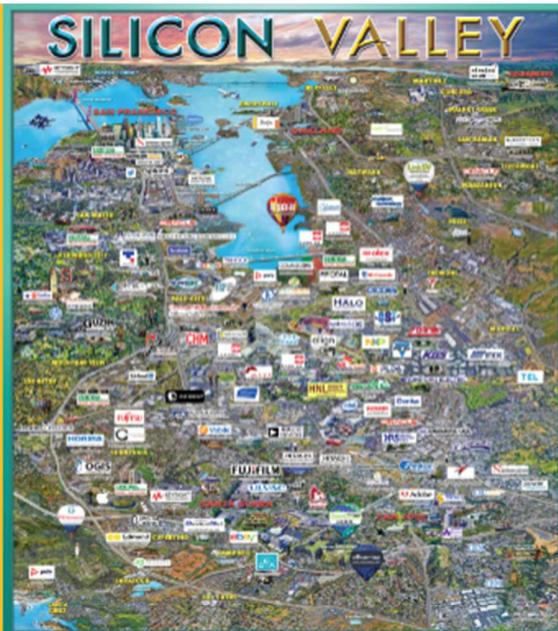
## CES Judging Criteria (from 2019)

- 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.

**Case Study:**  
Silicon Valley – Tech company density

**There are 342 tech billionaires around the world, and 84 of them live in Silicon Valley (2024)**

<https://www.forbes.com/sites/phoebeliu/2024/04/02/tech-billionaires-have-added-an-astonishing-750-billion-to-their-fortunes-over-the-past-year/?sh=1384b3af6d2b> (May 24)

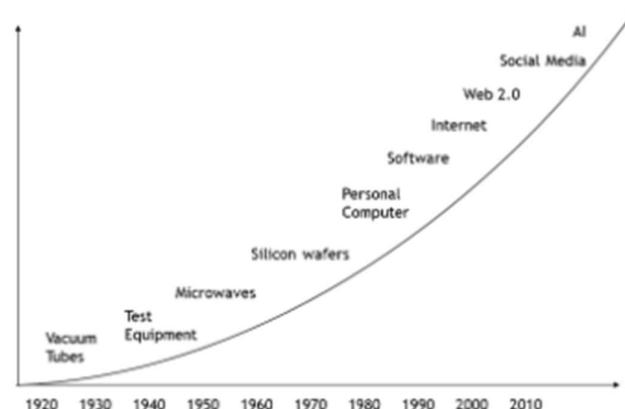


### Some of the companies built in Silicon Valley

- Adobe
- Airbnb
- AMD
- Apple
- Cisco
- eBay
- Google
- HP
- Intel
- Intuit
- Juniper Networks
- LSI Logic
- Nvidia
- Oracle
- PayPal
- SanDisk
- Symantec
- Uber
- Yahoo!

## Silicon Valley: Importance during phases of IT innovation history

- What factors lead to a successful innovation ecosystem?
- Silicon Valley as an example of a successful innovation ecosystem



## Factors that led to the emergence of Silicon Valley as a powerful tech ecosystem

(From Steve Blank):

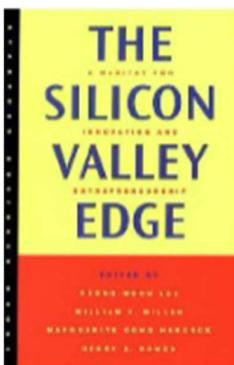
- "Cold War research in microwaves and electronics at Stanford University
- A Stanford Dean of Engineering who encouraged startup culture over pure academic research
- Cold War military and intelligence funding driving microwave and military products for the defence industry in the 1950s
- A single Bell Labs researcher decided to start his semiconductor company next to Stanford in the 1950s, which led to the wave of semiconductor startups in the 1960s/70s

## Factors that led to the emergence of Silicon Valley as a powerful tech ecosystem (Con)

(From Steve Blank):

- the emergence of Venture Capital as a professional industry,
- the personal computer revolution in the 1980s,
- the rise of the Internet in the 1990s and finally
- the wave of Internet commerce applications in the first decade of the 21st century.
- The flood of risk capital into startups at a size and scale unimaginable initially but in the middle of the 20<sup>th</sup> century would have seemed laughable."

## Silicon Valley: Importance of the innovation ecosystem



### The Silicon Valley Edge: A Habitat for Innovation and Entrepreneurship

By Lee, Miller, Hancock and Rowen (2000)

How does Silicon Valley work? Why here and not somewhere else? Although many accounts chronicle the story of Silicon Valley through the lives of important entrepreneurs or companies, these are insufficient to answer the compelling questions of how and why the Valley works. This book argues that the Valley's sustaining edge arises from factors that go beyond any individual or single company. Rather, the Silicon Valley edge stems from an entire environment, or habitat, honed for innovation and entrepreneurship.<sup>2</sup> This habitat has developed endogenously over time, co-evolving with generation after generation of new firms and new technologies.

## 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

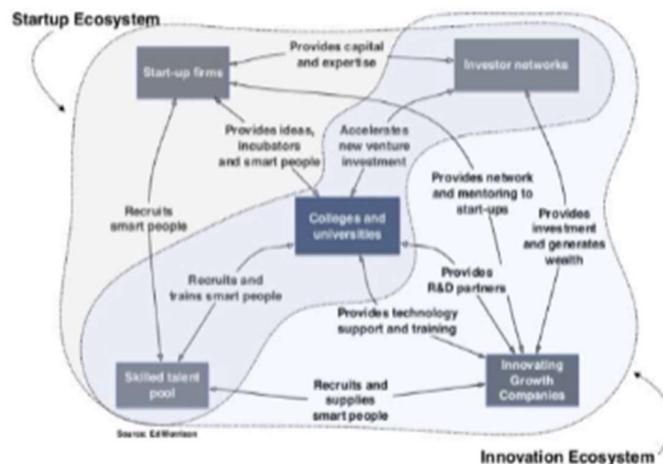


<http://stanford.edu>  
Stanford University



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

## University Operate Within Ecosystems



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

## Stanford Bio-X Interdisciplinary Initiatives Seed Grants Program (IIP) Seed Fund

- IIP awards are given to teams of faculty with **early-stage, high-risk ideas** that traditional sources could not fund.
- Stanford Bio-X awards approximately \$4 million every other year through two-year seed grants. **The current two-year grant level is \$200,000 per project.**
- The first seven rounds of IIP awards (starting in 2000) resulted in over **\$270 million** in external funding awarded to the university.
- **This tenfold return on investment by the IIP awards** has supported hundreds of graduate students and post-doctoral fellows, resulted in hundreds of publications and dozens of patents filed, and accelerated the pace of scientific discovery and innovation.



## 2. Globally experienced REPEAT entrepreneurs

Eg Elon Musk



Twitter



**PayPal**



**SPACEX**



**TESLA**



**THE BORING COMPANY**



### 3. Sophisticated Risk Capital



Sophisticated angel investors  
Eg Ron Conway

ANDREESSEN  
HOROWITZ  
Sophisticated venture capital



Sophisticated corporate investors

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



Sophisticated stock exchange

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."

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

### 5. Knowledge Sharing

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



## 5. Knowledge Sharing – Accelerator for startups

- Nearly 5000 startups so far (since 2005)
- >100 new startups per year
- Market cap of companies > \$80b
- Startup founders come back to mentor later founders
  - Community of > 3000 founders



<https://www.ycombinator.com/>



"Y Combinator is the best program for creating top-end entrepreneurs that has ever existed."

*Marc Andreessen*, General Partner, Andreessen Horowitz

## 5. Knowledge Sharing – Accelerator for startups

- Ycombinator startups include:
  - Reddit ([#7 most visited site in the world](#))
  - Dropbox (>500m users)
  - Airbnb (> \$30b valuation)
  - Scribd (>80m active readers)
  - Stripe (> \$5b valuation)
  - Docker
  - Pebble, etc.



## 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:



<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

## 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

### Questions

- What is the difference between Innovations and Inventions?

Inventions and innovations, while closely related, play distinct roles in technological and societal advancement. An invention is the creation of a new device, process, or method that did not exist before, resulting from original thinking and experimentation, such as Alexander Graham Bell's telephone or Thomas Edison's light bulb. Innovations, on the other hand, involve translating these inventions into practical, marketable applications that create value and meet consumer needs. Innovations often build on existing inventions to enhance or improve them, leading to products like smartphones, which evolved from basic mobile phones, or LED lighting, which improved upon traditional incandescent bulbs. While inventions mark the genesis of new ideas and unique creations, innovations are about the ongoing process of refining, applying, and commercializing these ideas to drive real-world impact and value. In essence, invention is about creating something new, while innovation is about making that new creation better and useful in practical terms.

- How is GPT different from other technologies?

GPTs are ubiquitous, spreading across multiple industries and sectors. Their use is not confined to a specific domain but permeates various aspects of the economy and daily life. In contrast, other technologies are specialized and limited to specific applications or industries. GPTs provide significant utility across diverse applications, enhancing productivity, efficiency, and capabilities in multiple areas whereas other technologies typically offer utility in more limited or niche applications. GPTs might be costly to develop and implement but their widespread use and continuous improvement often lead to cost reductions over time. GPTs serve as platforms for further innovation, enabling and encouraging the development of new technologies, products, and processes. GPTs often cause significant disruption by transforming industries, altering market dynamics, and changing societal behaviours. Similarly, other technologies can be disruptive, but their impact is usually more contained to specific industries or sectors. GPTs act as foundational technologies upon which other technologies and innovations are built. They often create the groundwork for entire new fields of study and economic activity. In contrast to which other technologies **are** generally not foundational but rather incremental or complementary, enhancing or expanding upon existing GPTs.

- Dominant Design and Technology Cycle

The dominant design and the technology cycle are two interrelated concepts that explain the evolution and stabilization of technologies within an industry. The adoption of a dominant design often benefits from network effects, where the value of the product increases as more people uses it. This increased value comes from enhanced

compatibility, the availability of complementary products, and reduced costs due to economies of scale. However, the industry can become path-dependent on the dominant design, making it difficult for alternative designs to gain traction even if they are technically superior. The entrenched ecosystem of complementary products, user familiarity, and established supply chains reinforces the dominant design. While the establishment of a dominant design can stifle radical innovation, it encourages incremental improvements within the established framework. Companies focus on refining the dominant design, developing new features, improving performance, and reducing costs. New technologies or innovations are introduced during the emergence phase. This stage is marked by significant research and development, experimentation, and initial market entry. Technologies in this phase are often unproven and may not yet have practical applications. During the growth phase, the technology gains traction and acceptance in the market. Adoption rates increase rapidly as the benefits of the technology become more apparent and it proves its viability. Investments and improvements accelerate, leading to widespread adoption. It is during this phase that a dominant design often emerges from competing alternatives, setting the standard for the industry. The technology reaches peak adoption and becomes standardized within the industry during the maturity phase. Market penetration stabilizes, and competition shifts to incremental improvements and cost efficiencies rather than radical innovation. The technology is well understood and widely used. The dominant design, established during the growth phase, guides these incremental improvements and optimizations. The decline phase occurs as the technology begins to lose relevance due to the emergence of newer innovations. Adoption rates decrease, and the market for the technology contracts. Companies may gradually phase out the old technology in favour of newer, more advanced solutions. This phase can trigger a new technology cycle, starting with the emergence of a new technology.

- What is the difference between proprietary software and open-source software?

<b>Proprietary Software</b>	<b>Open-source Software</b>
The source code is not available to the public. Users cannot view, modify, or distribute the source code. The software is typically distributed in a compiled, executable form.	The source code is freely available for anyone to view, modify, and distribute. This transparency allows users to understand how the software works, identify and fix bugs, and customize the software to their needs.
Distributed under restrictive licenses that limit how the software can be used, modified, and shared. Users usually must agree to an End User License Agreement (EULA) that imposes various restrictions.	Distributed under open licenses (such as the GPL, MIT, or Apache licenses) that allow for free use, modification, and redistribution of the software, often with few or no restrictions.
Often requires purchasing a license to use the software. This can include upfront costs, subscription fees, or usage-based charges. The cost can be significant, especially for enterprise solutions.	Generally available for free. There may be costs associated with implementation, customization, and support, but the software itself does not typically require a licensing fee.
Customization options are limited to what the vendor offers. Users cannot modify the source code, which restricts the ability to tailor the software to specific needs.	Highly customizable since the source code is accessible. Users can modify the software to suit their specific requirements and contribute improvements back to the community.

Security relies on the vendor's internal development practices and auditing processes. Vulnerabilities may be hidden from the public until they are patched by the vendor.	Security benefits from the transparency of the source code, allowing the community to identify and fix vulnerabilities quickly. However, it also depends on active community engagement and timely updates.
Developed by a single company or organization with controlled access to the codebase. Development priorities are set by the vendor, often driven by market demand and profit considerations.	Developed collaboratively by a community of contributors from around the world. Development priorities can be influenced by the needs and contributions of the community.

- What is the difference between established companies and start-ups?

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