



White House Office of American Innovation

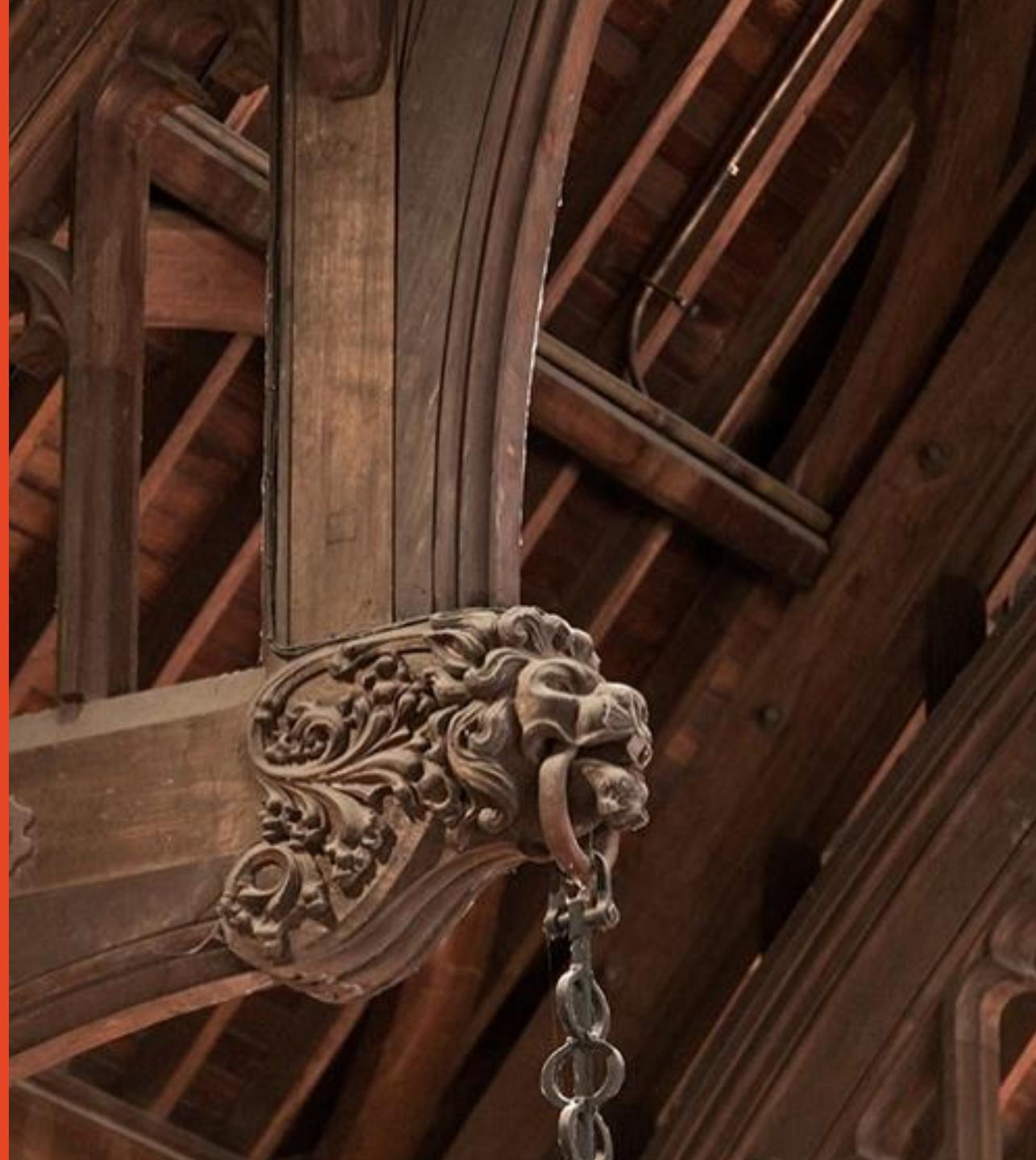
- Barack Obama more than any other president sought to apply Silicon Valley's disruptive methods to government in an effort to make it work better for the people it's supposed to serve.
- The White House has tapped Trump's son-in-law Jared Kushner to lead the newly christened White House Office of American Innovation, which will reportedly operate like an in-house management consultancy, bringing fresh business ideas to government.
- Heavyweight contributors include Apple CEO Tim Cook, Salesforce CEO Marc Benioff, and Bill Gates—a bipartisan, technocratic group with serious bona fides in the innovation and policy departments.
- <https://www.wired.com/2017/03/innovation-can-fix-government-sure-either-break/> (27th March)

INFO5992 Understanding IT Innovations

Week 5: Distributed Innovation

A/Prof Jinman Kim

Semester 1, 2017



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UoS Outline

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

Agenda

- Innovation System
- Distributed Innovation
- Individual Research Presentation Introduction
- Quiz

Innovation systems

So far... patterns

- ... of innovation adoption
- ... of innovation diffusion
- ... of technology improvement
- ... of emerging product categories
- ... of emerging product architectures
- ... of technology cycles
- ... of continual disruption of value networks
- ... of continual creation and destruction of companies
- ... of continual creation and destruction of industries

What is the **innovation system** that supports
these patterns of change?

Recap wk1: Innovation System

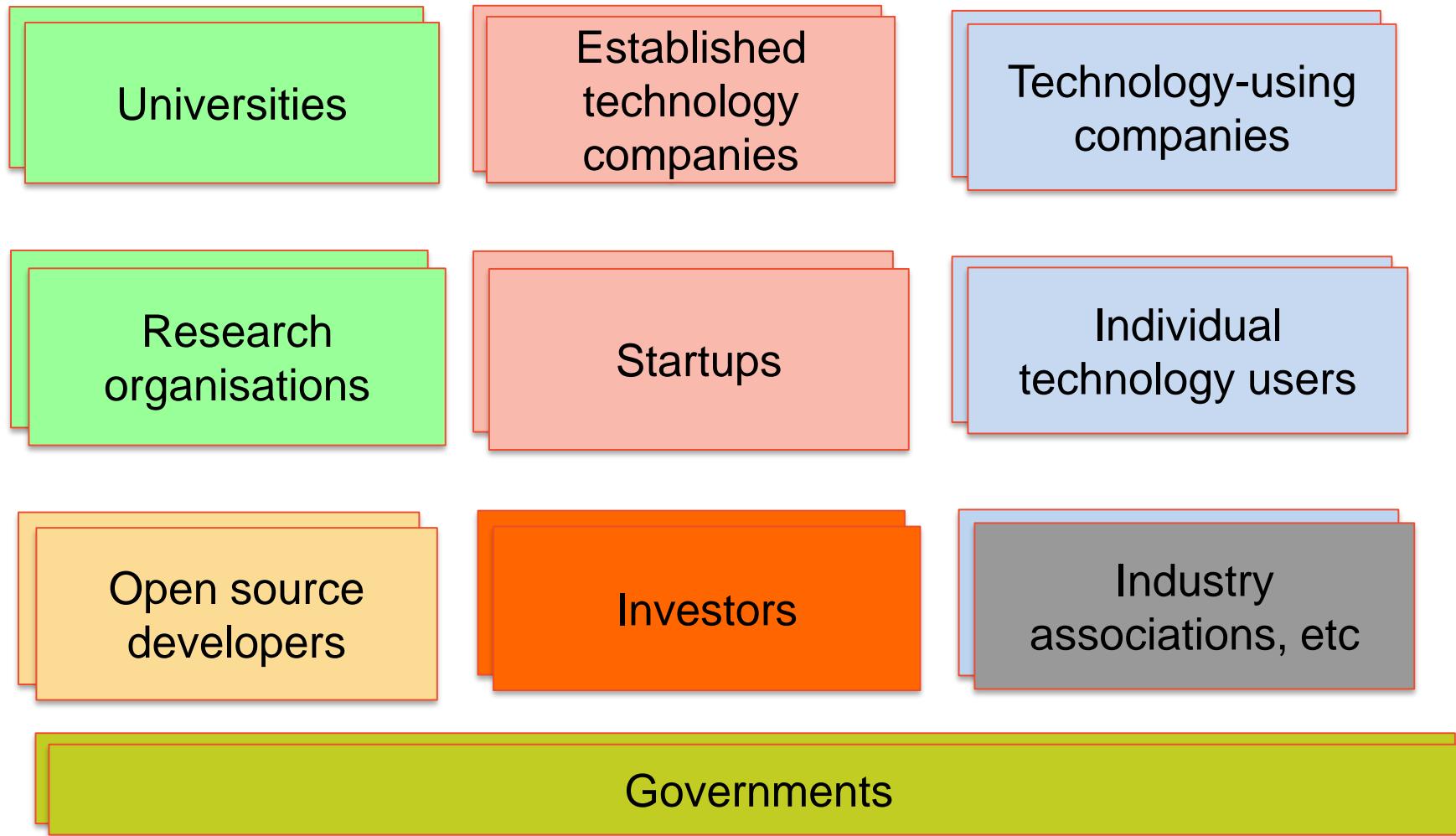
- We define an innovation system in this way:
- “*An innovation system is an open network of organisations that interact with each other and operate within framework conditions that regulate their activities and interactions.*
- *The three components of the innovation system —*
 - *networks,*
 - *innovation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

Australian Innovation System Report 2015

Recap week1: Innovation systems

- Governments understand the importance of innovation
 - Improving productivity, standard of living, health, education, etc
- So, create programs to support/encourage innovation

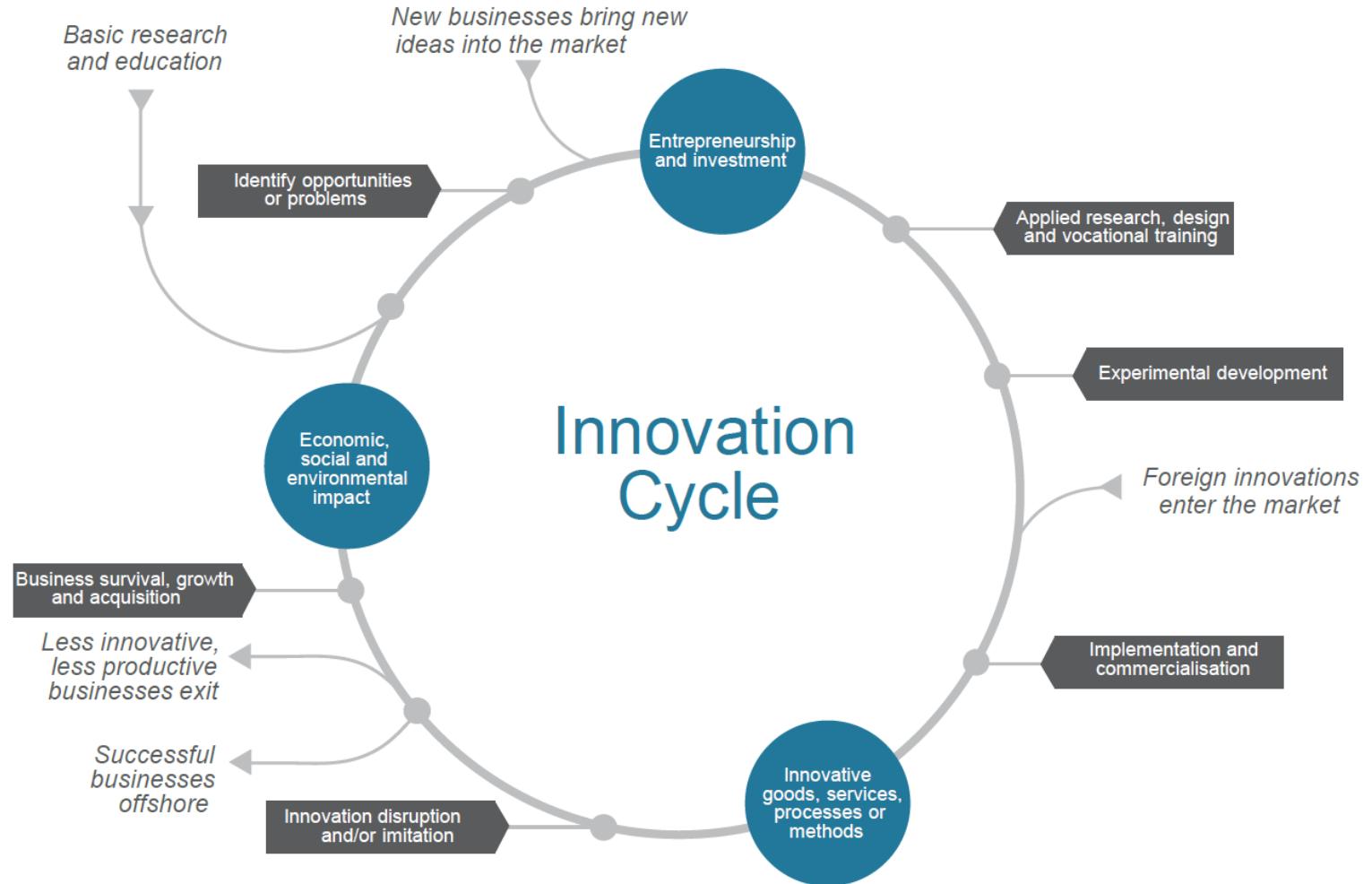
Revisit wk1: IT innovation ecosystem (some key parts)



The innovation system

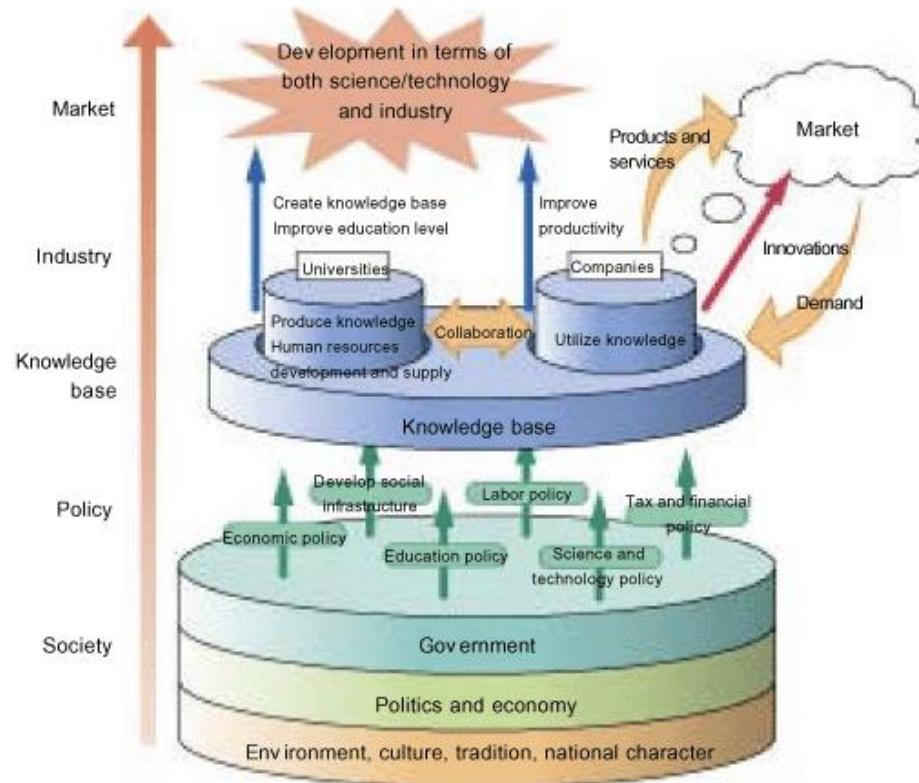
- Companies are continually innovating to stay competitive
- Entrepreneurs are continually looking for opportunities to change the way value is created and captured in the value network
- Companies are being created and being destroyed
- Industries are being created and being destroyed
- This doesn't happen in isolation – there is a **system (or eco-system)** in which innovation happens.
- For example:
 - The government invests in research and innovation programs
 - Angel investors and venture capitalists provide money which allows scaling
 - Companies partner with universities to get new ideas and technologies

Revisit wk1: Innovation Cycle



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

Innovation System: System model

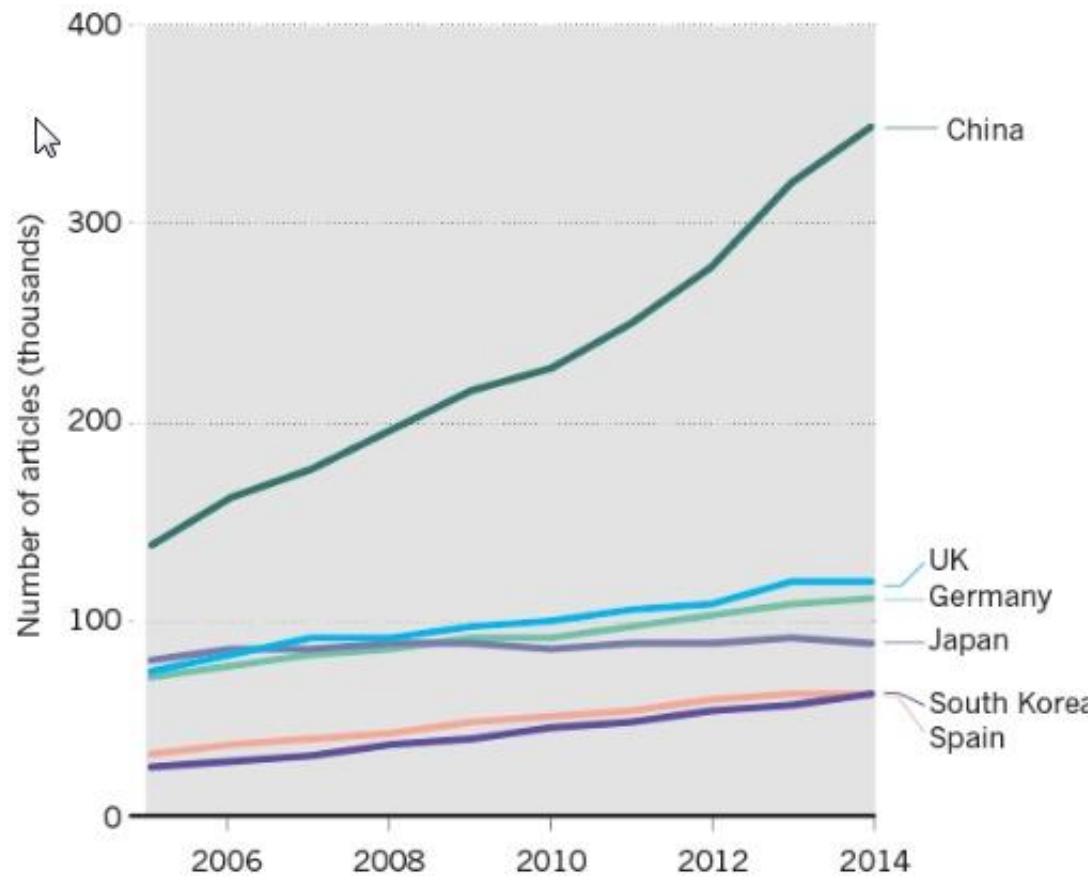


Source: Prepared by MEXT

Ministry of Education, Sports, Science and Technology, Japan

http://www.mext.go.jp/b_menu/hakusho/html/hpag200201/hpag200201_2_006.html

About Republic of Korea



Researchers per thousand people in employment, 2013



©nature

<http://www.nature.com/news/why-south-korea-is-the-world-s-biggest-investor-in-research-1.19997>.

Distributed Innovation

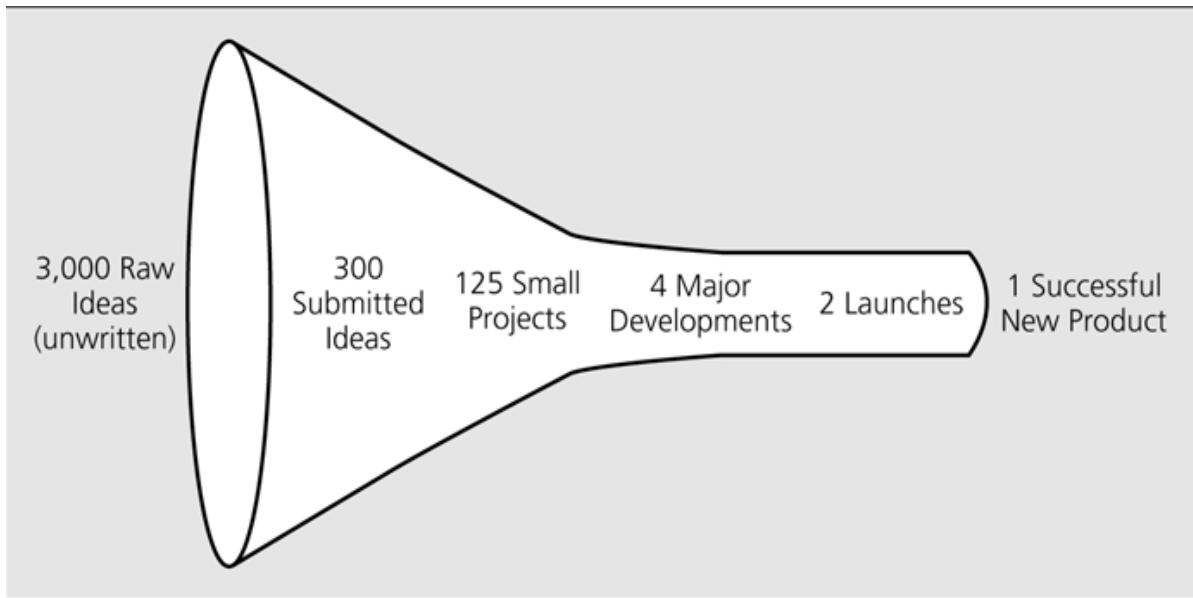
Evolution of innovation by companies: Traditional model

- Most R&D and other innovation done in-house
- Successful innovation required control
- Was used for most of the 20th century
- Some spreading of innovation through “spillovers”



Evolution of innovation by companies: Traditional model

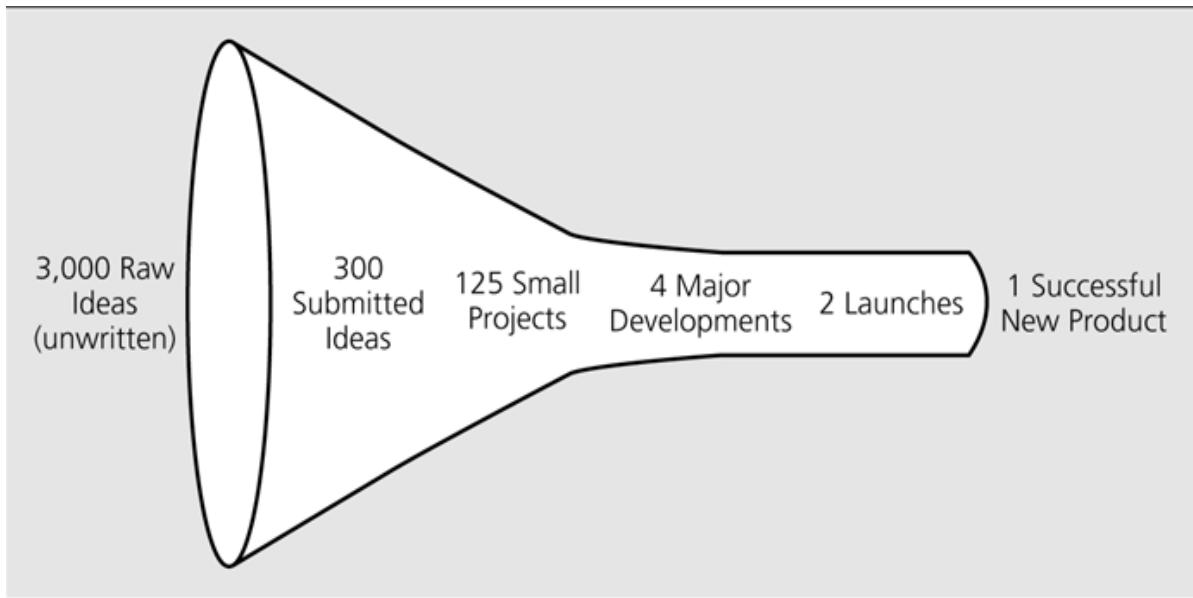
- Example of a traditional innovation funnel



Source – Schilling, 2013

Evolution of innovation by companies: Traditional model

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



Source – Schilling, 2013

Evolution of innovation by companies: Some trends in the late 20th century

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

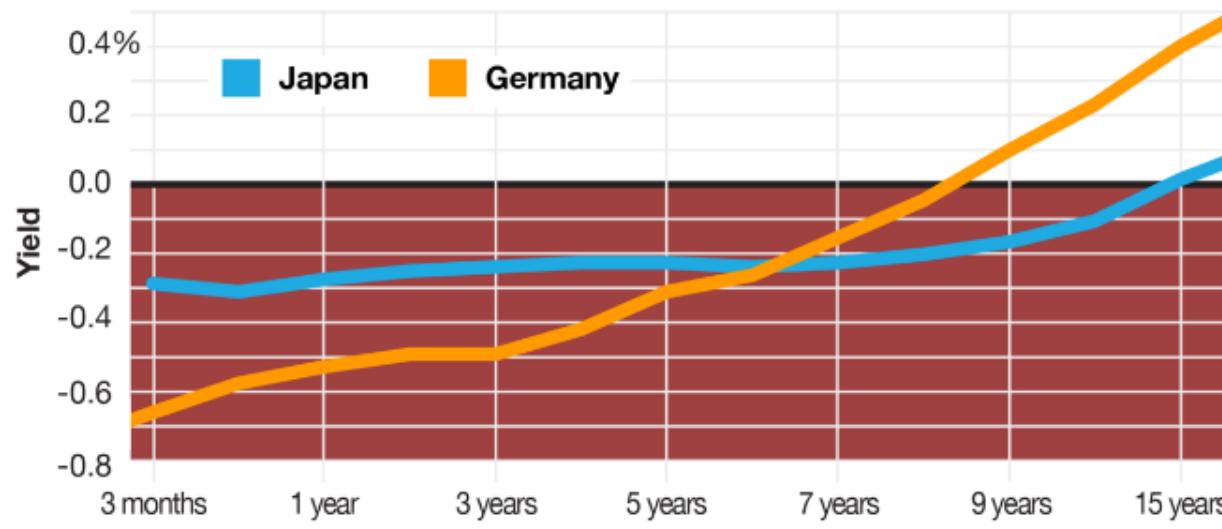
- So more opportunities for collaborative innovation

Evolution of innovation by companies: Some trends in the late 20th century

- Availability of Venture Capital Funding.... Negative cash rates
- One possibility is to invest more into innovations

Paying to Save

Government bonds in Japan and Germany pay a negative yield,
so investors holding to maturity won't get all their money back



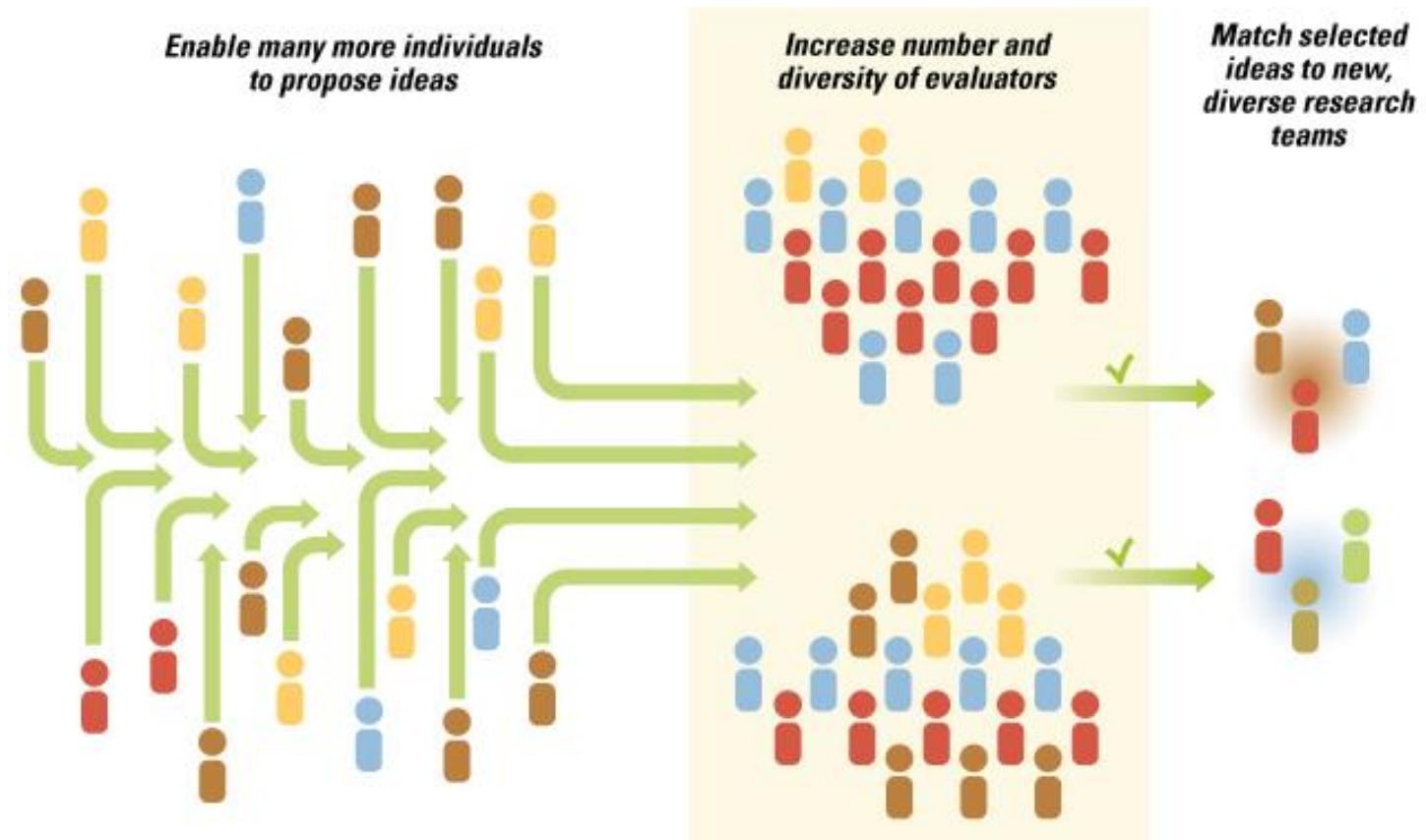
Data as of April 29, 2016

SOURCE: BLOOMBERG

[https://www.bloomberg.com/quic
ktake/negative-interest-rates](https://www.bloomberg.com/quic_ktake/negative-interest-rates)

Distributed innovation

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



<http://sloanreview.mit.edu/article/experiments-in-open-innovation-at-harvard-medical-school/>

Enabling distributed innovation: Modularity

- *the use of individually distinct functional units, as in assembling an electronic or mechanical system.*
 - Dictionary.com
- In software engineering, modularity refers to the extent to which a software/Web application may be divided into smaller modules. Software modularity indicates that the number of application modules are capable of serving a specified business domain.
- <https://www.techopedia.com/definition/24772/modularity>

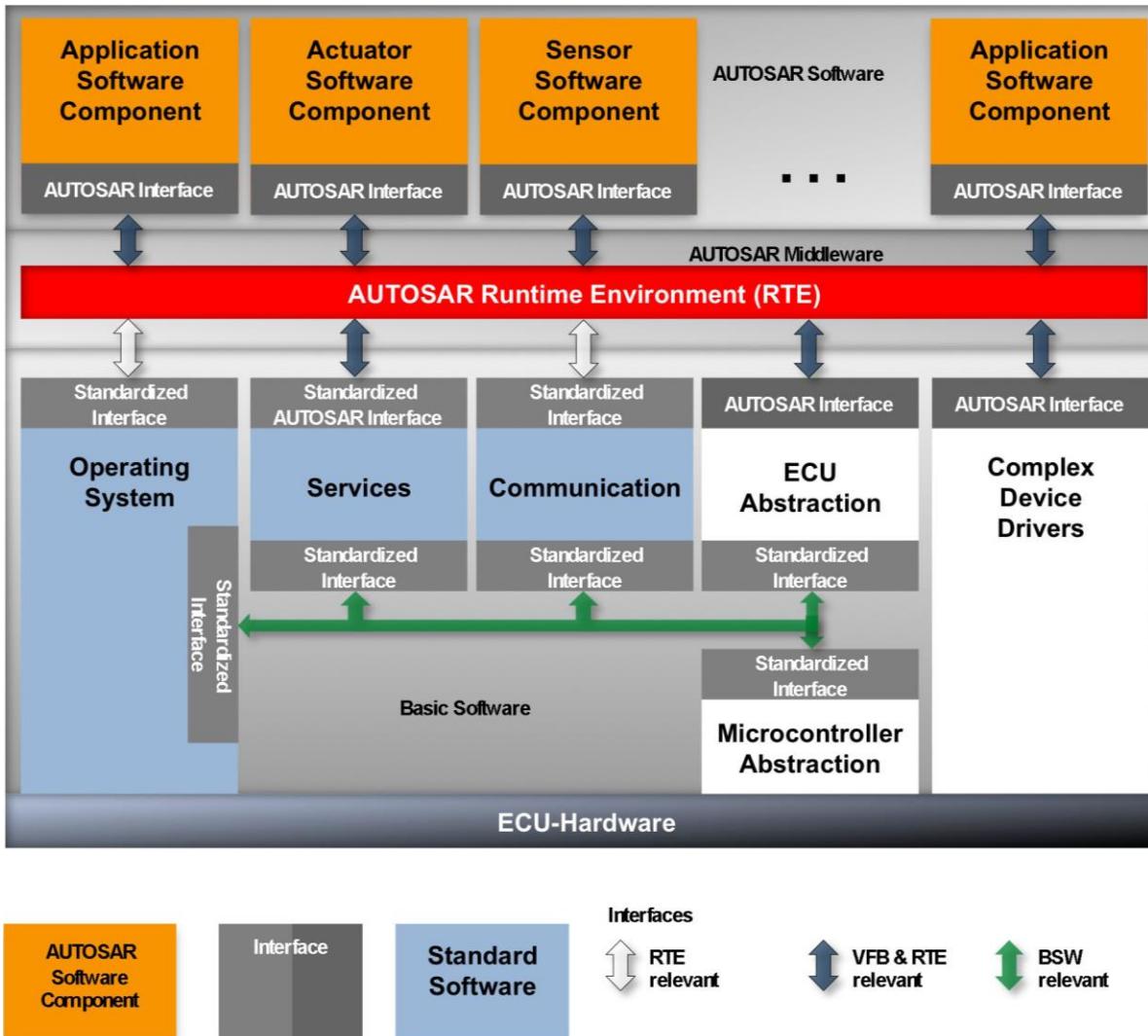
Enabling distributed innovation: Modularity

- Products may be modular at:
 - **User level** e.g. Ikea shelving systems, Firefox add-ons, Microsoft Office plug-ins, Smartphone Apps
 - **Producer level** e.g. Canon camera, Software products based on company platforms
 - **Industry level** e.g. each component of PC made by different company, etc.

Enabling distributed innovation: Modularity

- A standard interface enables components to be combined easily (e.g. by user, within company, between companies)
- Modularity can enable many different configurations to be achieved from a given set of components.
- Technology companies often design their structures around the product structure (e.g. with separate divisions developing “technology platforms”)

Recap: And still cars... (but now the software on them)



AUTOSAR:
AUTomotive Open
System ARchitecture

“Joy’s Law”

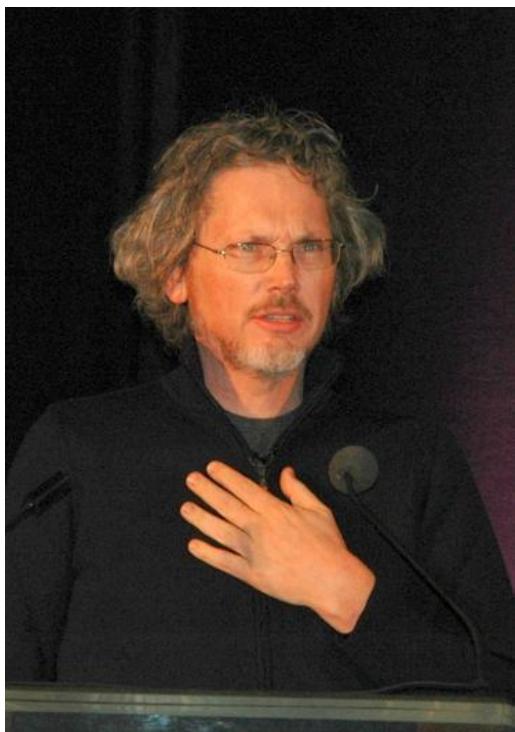


Photo: Martin LaMonica/CNET Networks

Bill Joy
Co-founder of Sun Microsystems
Computer Scientist

- “Most of the bright people don’t work for you -- no matter who you are. [So] you need a strategy that allows for innovation occurring elsewhere.”
- In 1990 speech - quoted by Surowiecki (1997)

“Open Innovation”

- Many companies have changed from purely internal R&D activities to being open to outside ideas and innovations.
- Cooperation and collaboration with external parties to increase innovation and reduce time to market.



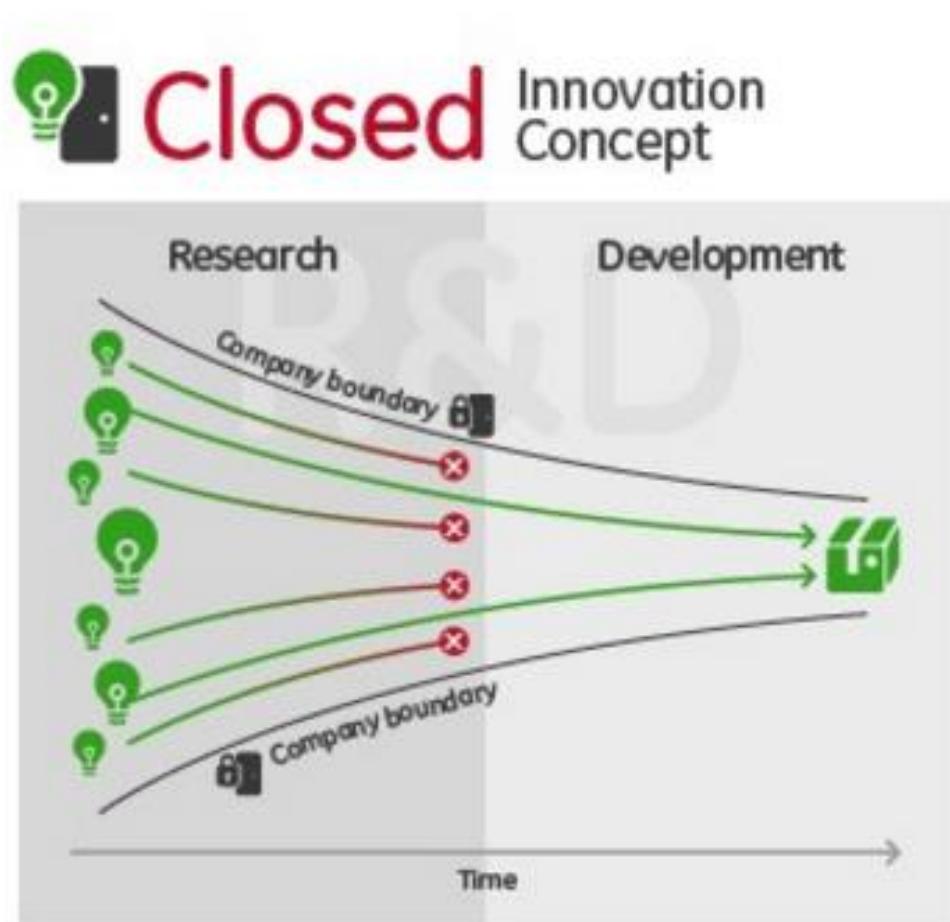
Henry Chesbrough,
Economist, Business
Administration
University of California,
Berkeley.
Started and promotes term
“open innovation”

Definition of “Open Innovation”

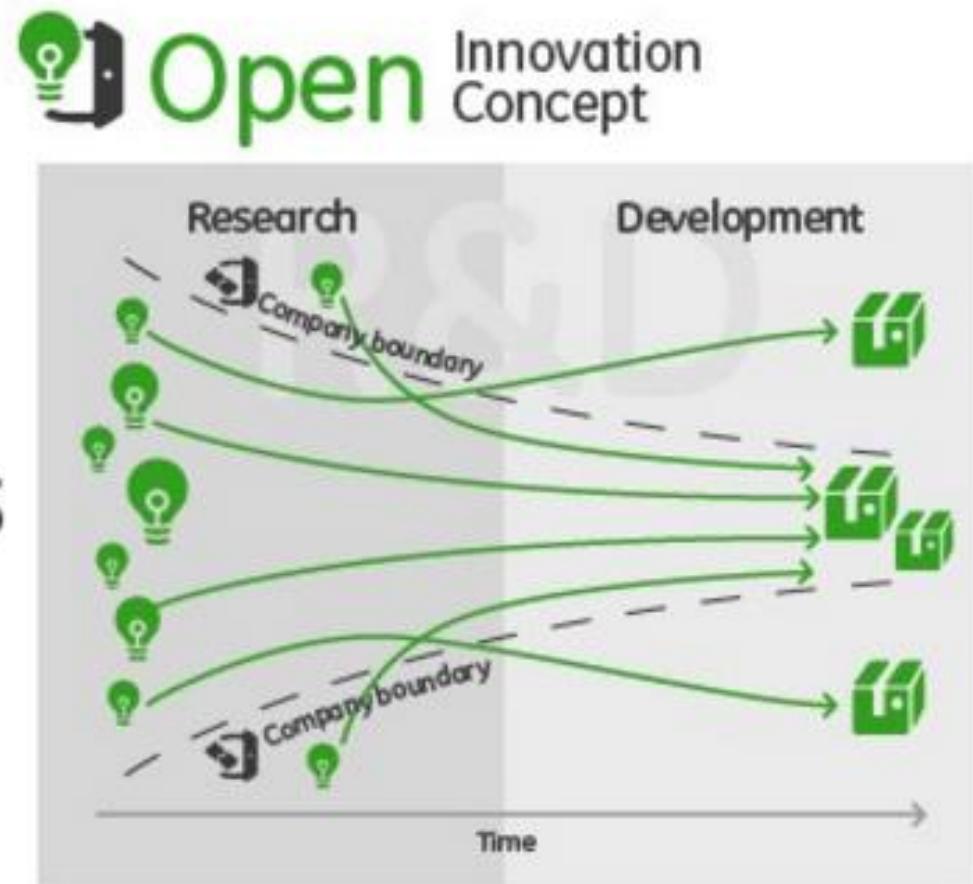
- “the use of purposive inflows and outflows of knowledge to accelerate internal innovation and expand the markets for external use of innovation” (Chesbrough, 2006)
- Revised definition: “a distributed innovation process based on purposively managed knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organization’s business model” (Chesbrough and Bogers, 2014)



The classic innovation funnel: “Closed innovation”



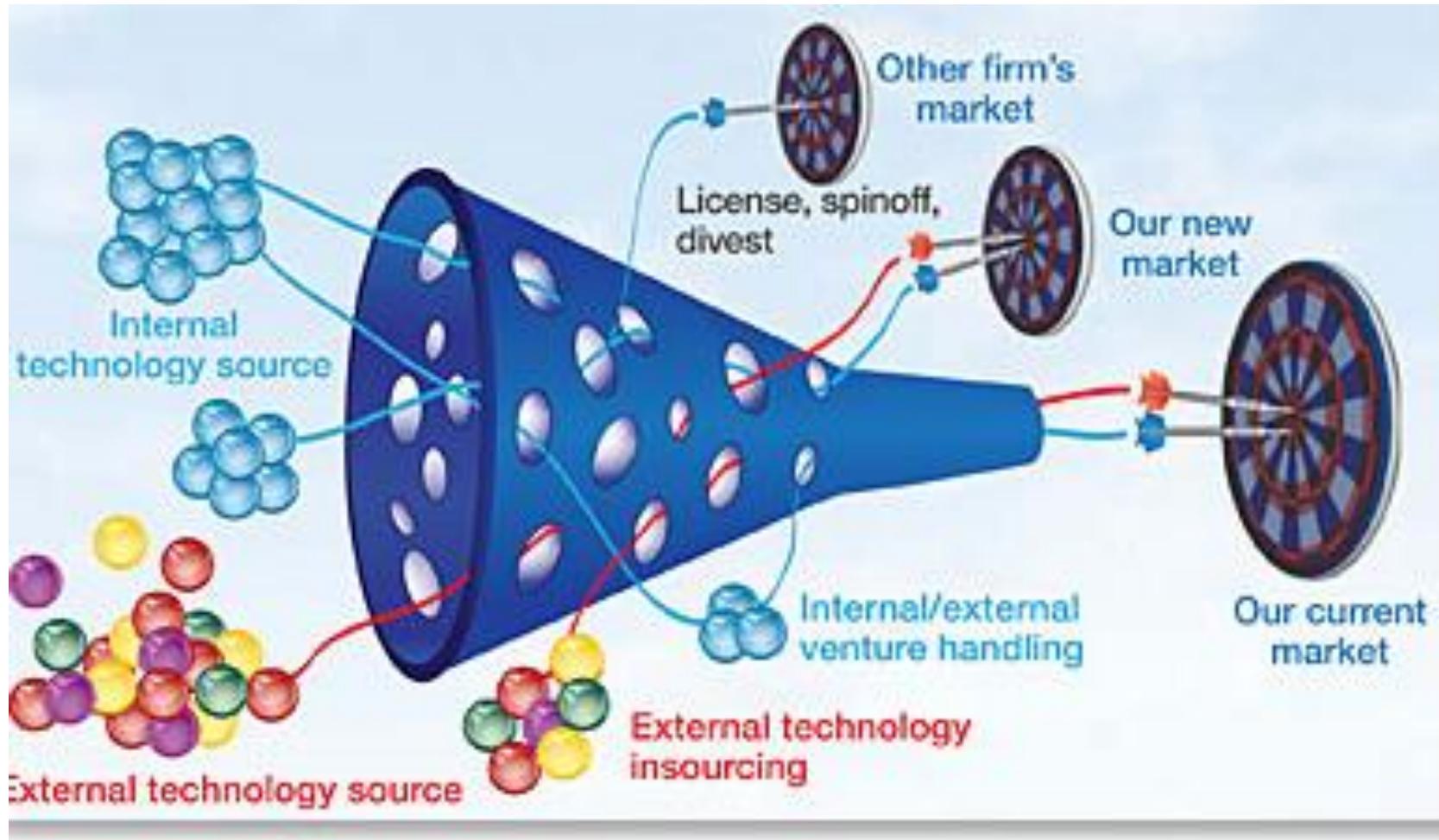
VS



Source: Charts adapted from QuickMBA.com

<http://www.geglobalresearch.com/blog/growing-middle>

Open innovation

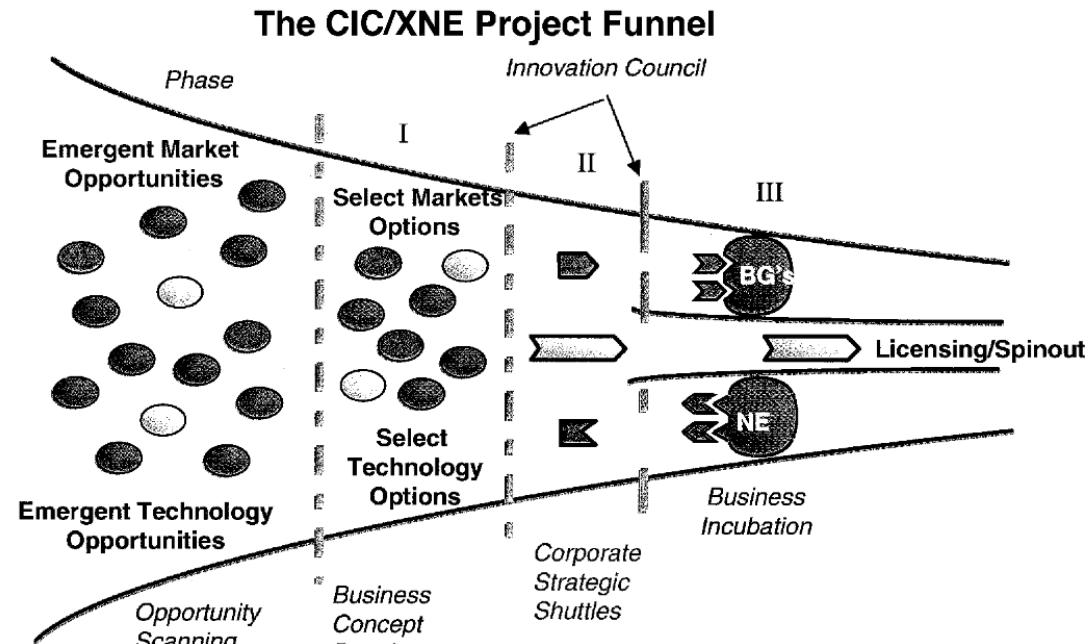


Source: Chesbrough (2013) - <http://spie.org/x91420.xml>

Example of open innovation: Innovation at Xerox PARC

- Chesbrough studied Xerox PARC's innovations, spin-outs etc

Xerox's Business Model, and Project Evaluation Errors



- ✓ Designed to minimize “false positive” errors
- ✗ Ignores risk of “false negative” errors

Source: Chesbrough (2009) -
<http://www.slideshare.net/Allagi/open-innovation-seminar-2009-brazil-henry-chesbrough>

The change from closed innovation to open innovation

- According to Chesbrough...
- In 1981:
 - Approx. 70% of total R&D spending was by companies with >25,000 staff
 - Approx. 5% of total R&D spending was by companies with <1,000 staff
- In 2012:
 - Approx. 35% of total R&D spending is by companies with >25,000 staff
 - Approx. 24% of total R&D spending is by companies with <1,000 staff

Source: <http://www.businessinsider.com.au/professor-henry-chesbrough-says-that-the-fortress-corporate-office-is-dead-2012-6>

Types of open innovation

1. Outside-in process:
 - “Enriching the company’s own knowledge base through the integration of suppliers, customers, and external knowledge sourcing”
2. Inside-out process:
 - “Earning profits by bringing ideas to market, selling IP, and multiplying technology by transferring ideas to the outside environment.”
3. Coupled process:
 - “co-creation with (mainly) complementary partners through alliances, cooperation, and joint ventures during which give and take are crucial for success.”

Source: Enkel, Gassmann and Chesbrough (2009)

Some benefits of open innovation

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

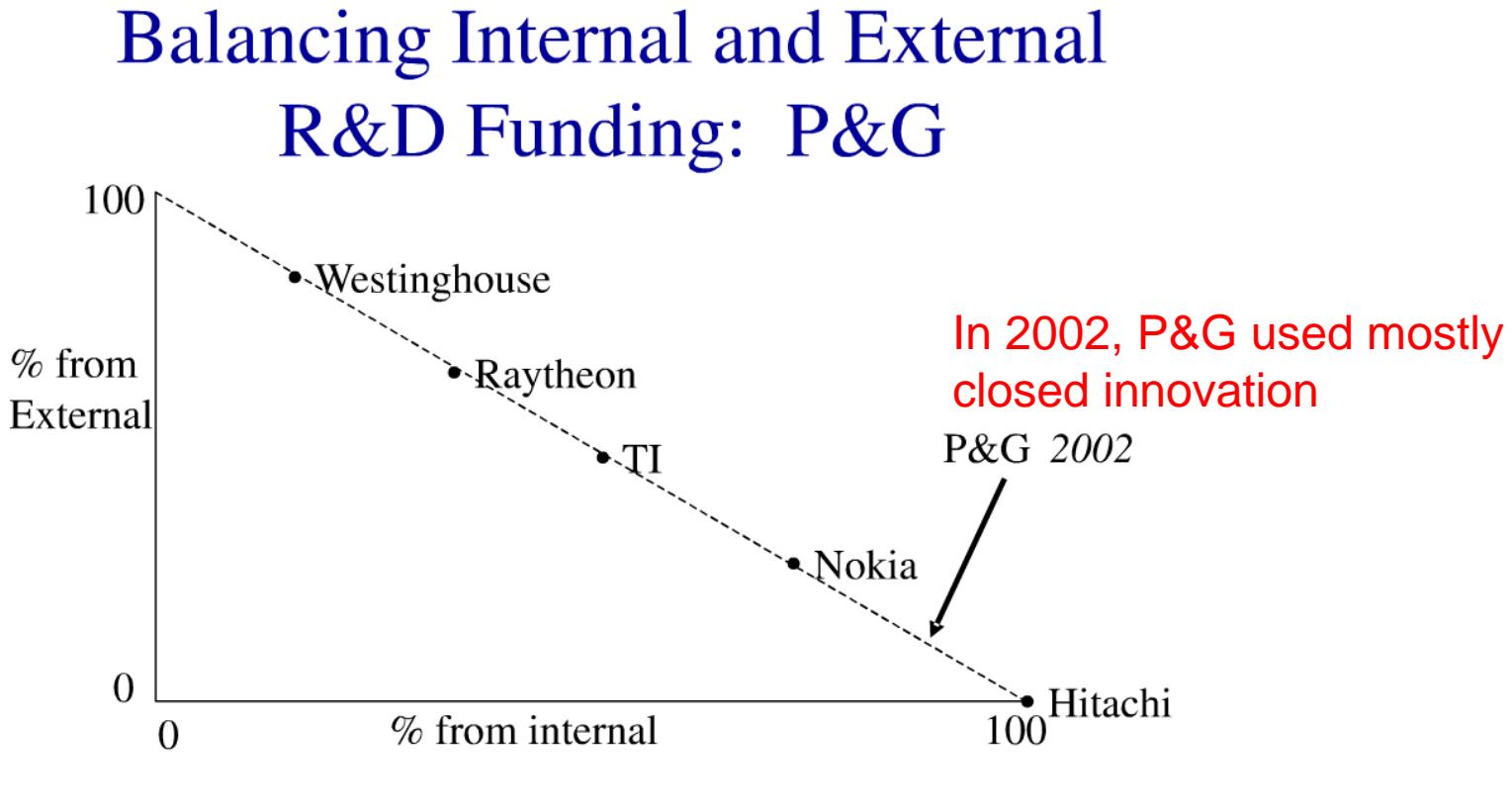
Risks of open innovation (compared to closed innovation)

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

Balancing Open and Closed Innovation?

- Both traditional (“closed”) innovation and open innovation have benefits
- Many companies do both and balance them

Balancing internal and external spending on innovation

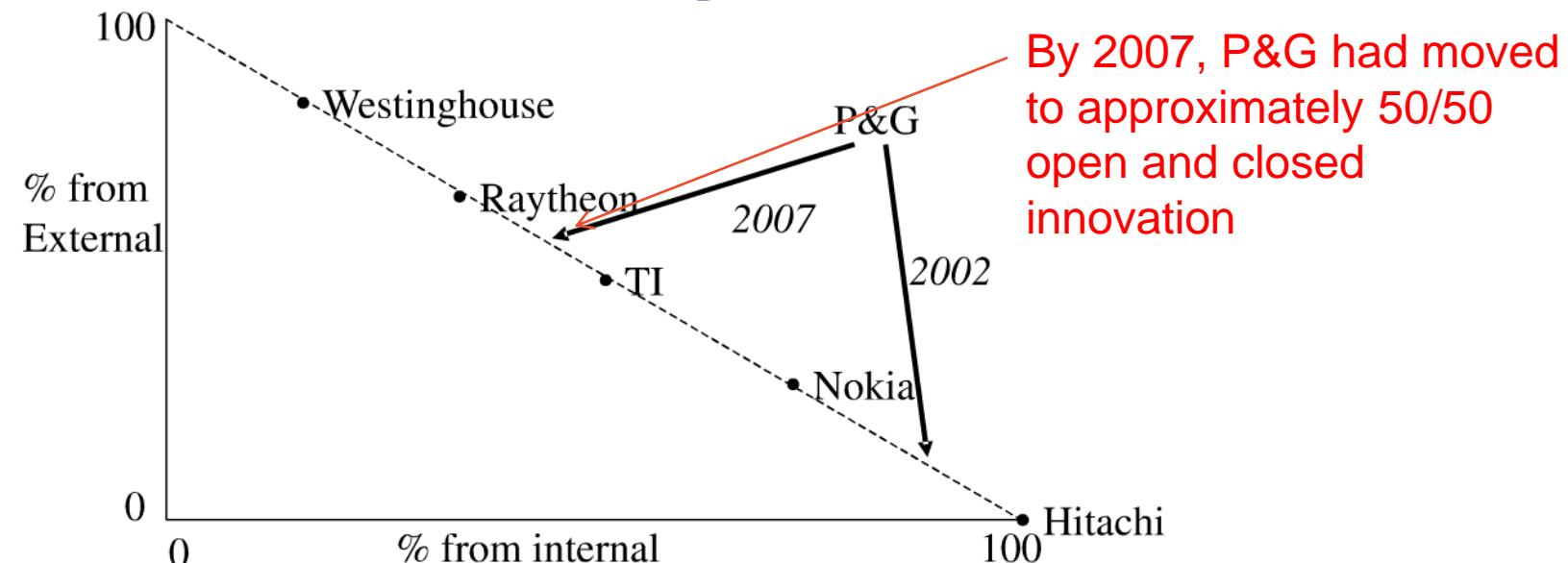


© 2008 Henry Chesbrough

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Balancing internal and external spending on innovation

Balancing Internal and External R&D Funding: P&G



By 2007, P&G had moved to approximately 50/50 open and closed innovation

Source: Gassmann, v. Zedtwicz (2002)

© 2008 Henry Chesbrough

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Example: Open Innovation – Hitachi?

- Tokyo, February 27, 2015
- Develop solutions to issues through collaborative creation with the customers. Furthermore, by aligning with various research institutes as “a global open laboratory,” Hitachi will strengthen research activities on cutting-edge technologies that will be the technology platforms of the future.
- January 13, 2016
- SANTA CLARA, Calif.--(**BUSINESS WIRE**)--Hitachi, Ltd. (TSE:6501) and Hitachi America, Ltd. today announced the opening of a new dedicated research facility, the Global Center for Social Innovation - North America (CSI-North America), for collaborative creation with strategic partners in industry and academia.

<http://www.hitachi.com/New/cnews/month/2015/02/150227.html>

Case Study

Open Innovation among companies

Examples



<http://www.ge.com/about-us/openinnovation>



<https://firstbuild.com/about/>



<https://eir.cisco.com/>



<http://samsungaccelerator.com/>



Research

<http://www.philips.com/a-w/research/open-innovation.html>
<http://www.simplyinnovate.philips.com/>



<http://www.coca-colacompany.com/innovation/from-startup-to-scaleup-the-next-wave-of-innovation>

<http://www.hivery.com/about-us/>

Social Innovation Business

HITACHI
Inspire the Next

**THE FUTURE IS OPEN
TO SUGGESTIONS**

Renewable Energy

Optimize distributed energy production for Microgrids

Microgrid x Sensing

Safe & Secure Cities

Secure safety & comfort by using wide area surveillance & high-speed image search to protect communities

Community x Security

Predictive Medicine

Improve health outcomes and reduce costs by using big data analytics on deep and wide patient data

Healthcare x Big Data Analytics

Oil & Gas

Integrated solution to remotely monitor and manage upstream Oil & Gas operations

Upstream Oil & Gas Operations x Hybrid Analytics

Robotics

Improve service quality by humanoid robot and robotics IT platform

Lifestyle x Robotics IT Platform

Optimized Factory

Improve factory operations via artificial sensing intelligence, seamless connectivity and distributed data processing across factory (OT) and cloud (IT)

Manufacturing x Digital Intelligence

<http://www.hitachi.com.au/about/news-releases/news-2016/161201.html>

Distributed Innovation:

Getting others involved in innovation

Some approaches to distributed innovation

- These are some approaches companies use to get external companies/individuals involved in their innovation:
 - A. Product platforms
 - B. Web APIs
 - C. Crowdsourcing innovation / Crowdfunding Innovation
 - D. Releasing data sets “Open data”
 - E. Free and Open Source Software
 - F. User innovation
 - G. Platform ecosystems
 - H. Accelerators, investment and others

A. Product Platforms

Product Platforms

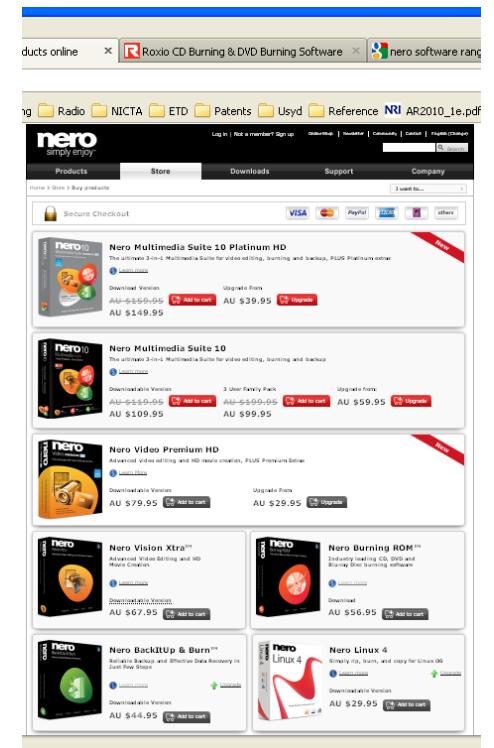
- Concept became popular in the 90s – used for reusable components/design frameworks
- Foundation of components around which a company builds related products
- Also known as “product family engineering”
- Platforms make it possible for companies to:
 - Have a rich line-up of different products with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



Canon DiG!C chip



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



Nero video editing software
(<http://www.nero.com>)

Product Platforms: Benefits

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

Some ways in which companies provide IT product platforms

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

B. Web APIs

Web APIs

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

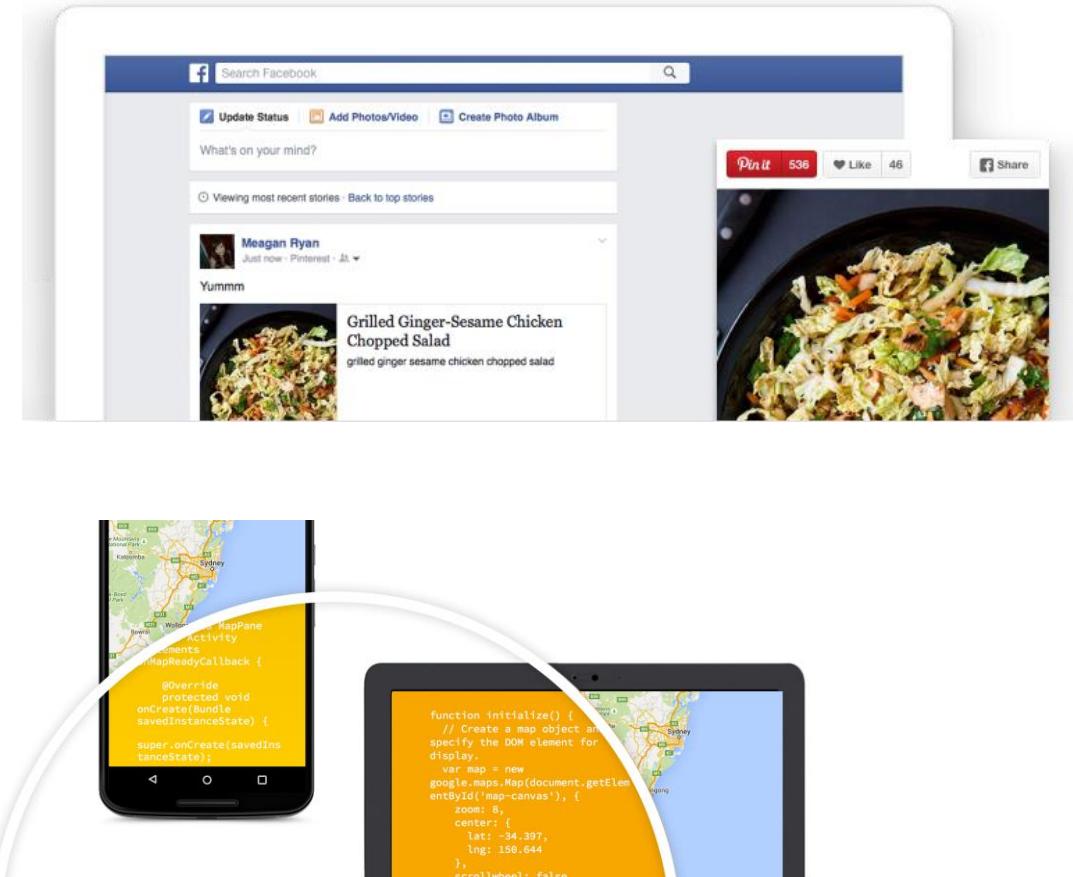


Image: developer.google.com

Web APIs: The state of them today

- Nearly 15,000 web APIs available now <http://programmableweb.com>

The screenshot shows the homepage of ProgrammableWeb. At the top, there's a navigation bar with links for "API NEWS", "API DIRECTORY", "BECOME MEMBER | LOGIN", and a search bar. Below the navigation is a main banner featuring heavy machinery like excavators and a bulldozer, with the text "EquipmentWatch API" and "EquipmentWatch Announces an API for the Heavy Equipment Industry". To the right of the banner is a sidebar titled "Today in APIs" with a "SUBSCRIBE" button. At the bottom of the page, there are three news cards: one about "ANDROID O APIS", one about "Agora Launches SDK to Add Filters to Live Video", and one about "Tesla API Crash Highlights Vulnerabilities of API Economy".

ProgrammableWeb

API NEWS API DIRECTORY

BECOME MEMBER | LOGIN

Search over 17,248 APIs and much more

LEARN ABOUT APIs WHAT IS AN API ? API RESEARCH WEATHER MAPPING ADD APIs & MORE

EquipmentWatch API

EquipmentWatch Announces an API for the Heavy Equipment Industry

ANDROID O APIS

Smartphone > Android O Packs New APIs Galore Eric Zeman

Video > Agora Launches SDK to Add Filters to Live Video Eric Carter

Auto > Tesla API Crash Highlights Vulnerabilities of API Economy Eric Carter

Advertisement

Today in APIs

Latest news about the API economy and newest APIs, delivered daily:

Email Address SUBSCRIBE

API UNIVERSITY

FEATURED LATEST

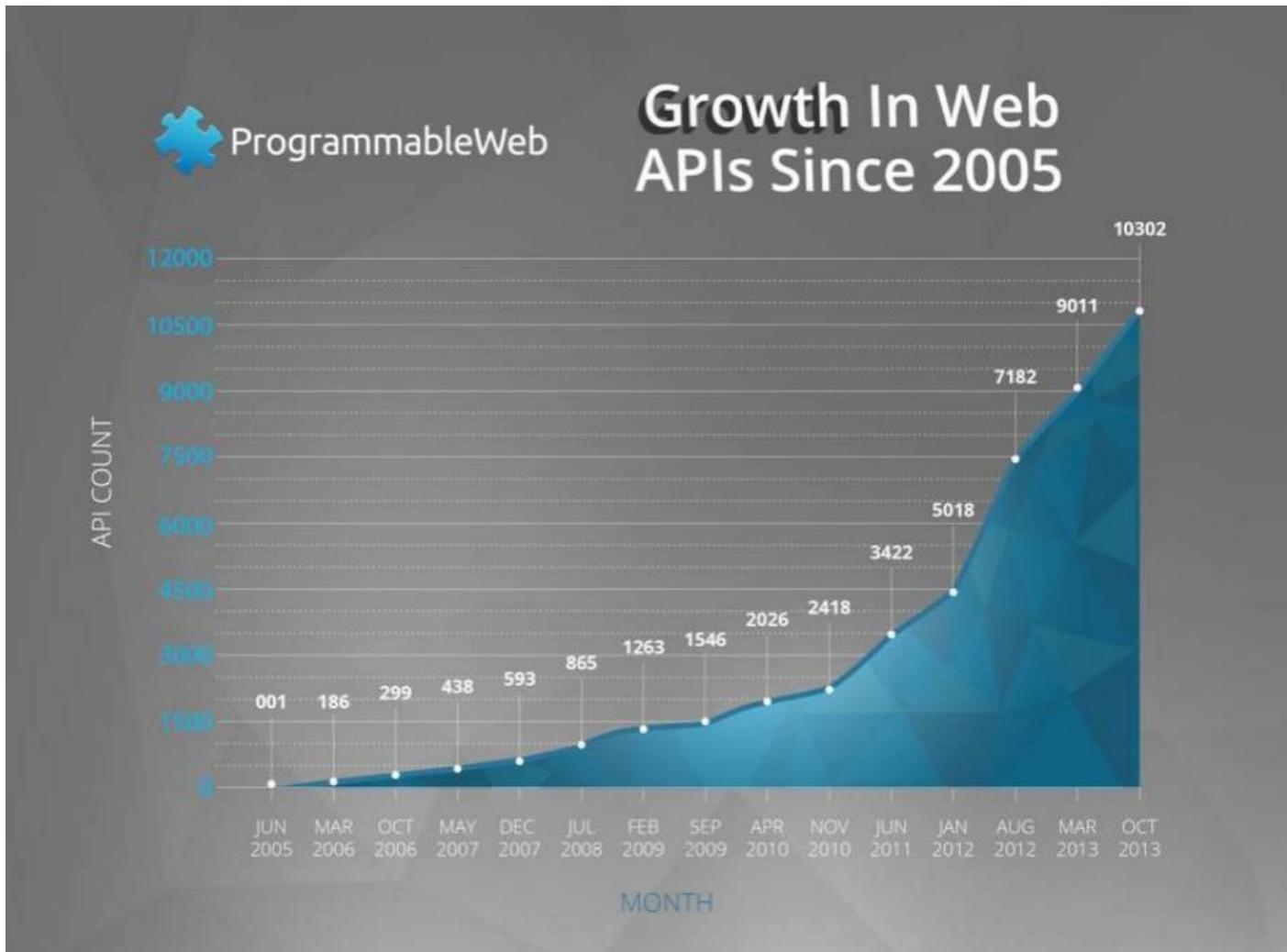
FOR API PROVIDERS

What Are APIs and How Do They Work?

8 Real World API Strategies and the Keys to Their Success

How To Find a Rockstar API Product Manager

Web APIs



Source: ProgrammableWeb <http://www.programmableweb.com/api-research>

Web APIs



Number of API count in 6 month

Source: ProgrammableWeb <http://www.programmableweb.com/api-research>

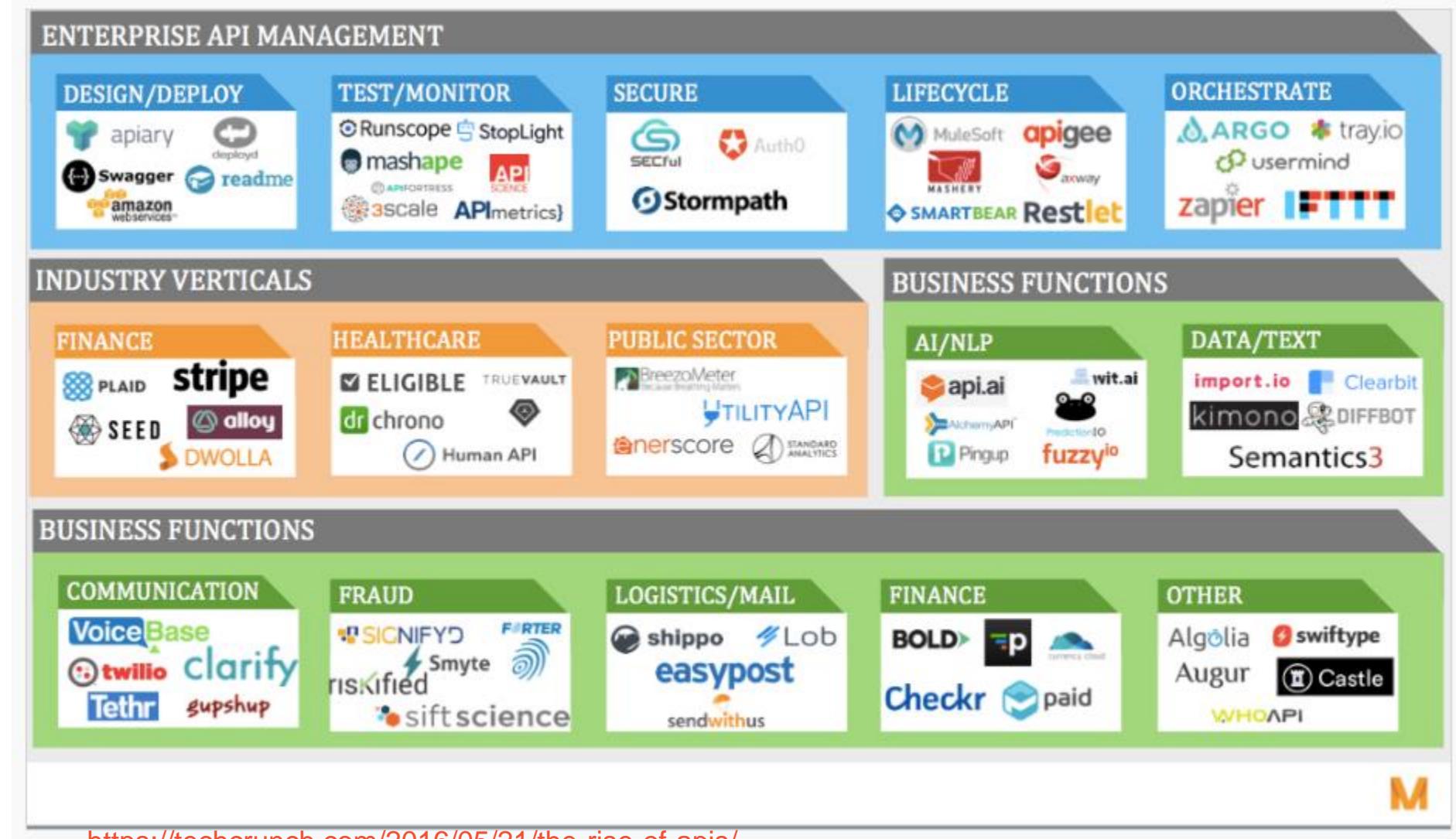
API Billionaires Club

 twitter	13 billion API calls / day	<small>(May 2011)</small>
 Google	5 billion API calls / day	<small>(April 2010)</small>
 facebook	5 billion API calls / day	<small>(October 2009)</small>
 NETFLIX	1.4 billion API calls / day	<small>(May 2012)</small>
		5 billion/day in 2014
 ACCU WEATHER	1.1 billion API calls / day	<small>(April 2011)</small>
 KLOUT	1 billion API calls / day	<small>(May 2012)</small>
 eBay	1 billion API calls / day	<small>(Q1 2012)</small>
 Sabre	1 billion API calls / day	<small>(January 2012)</small>

Source: John Musser, ProgrammableWeb (May 2012) <http://www.slideshare.net/jmussner/what-makes-a-great-open-api>

The rise of APIs – Techcrunch

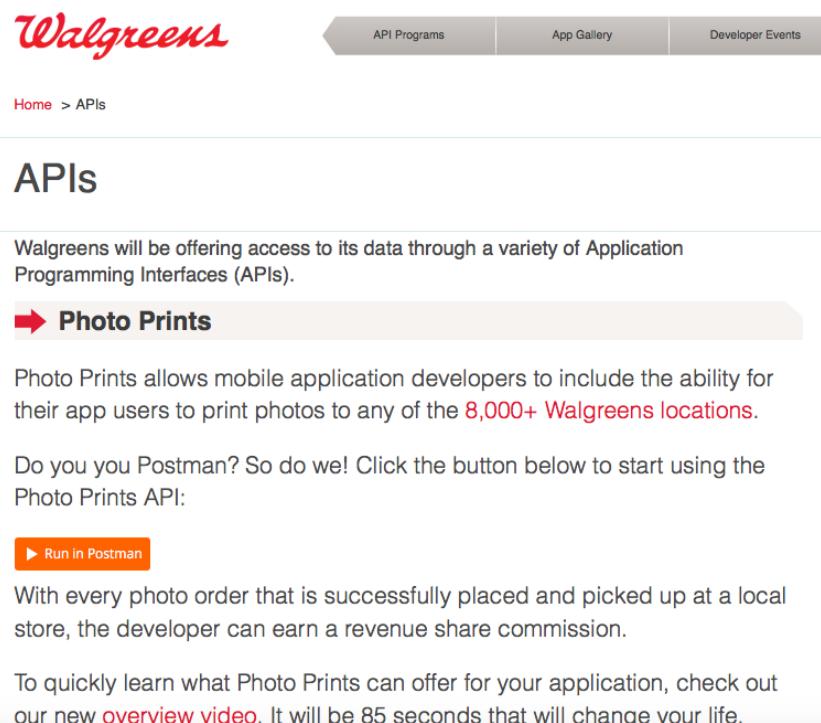
- Faster, cheaper, smarter
- A new breed of software companies
- Rethinking the value chain



“In the past, the biggest companies were those closest to the data (e.g. a system of record), able to impose a tax, or lock-in to their platform. In the API economy, the biggest companies may be the ones that aggregate the most data smartly and open it up to others.”

<https://techcrunch.com/2016/05/21/the-rise-of-apis/>

Examples: Not just the usual web companies...



The Walgreens APIs page features the Walgreens logo at the top left. A navigation bar includes links for "SIGN IN", "API Programs", "App Gallery", and "Developer Events". Below the navigation, a breadcrumb trail shows "Home > APIs". The main section is titled "APIs" and contains a sub-section titled "Photo Prints". It describes how Photo Prints allows mobile application developers to include the ability for users to print photos to any of the 8,000+ Walgreens locations. A button labeled "Run in Postman" is provided for testing the API. Text also mentions that developers can earn a revenue share commission for successful photo orders.

<https://developer.walgreens.com/apis>

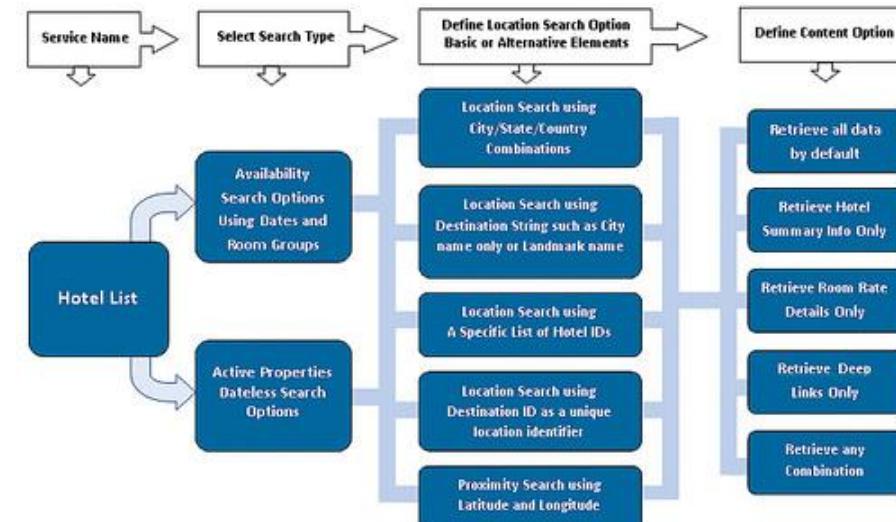
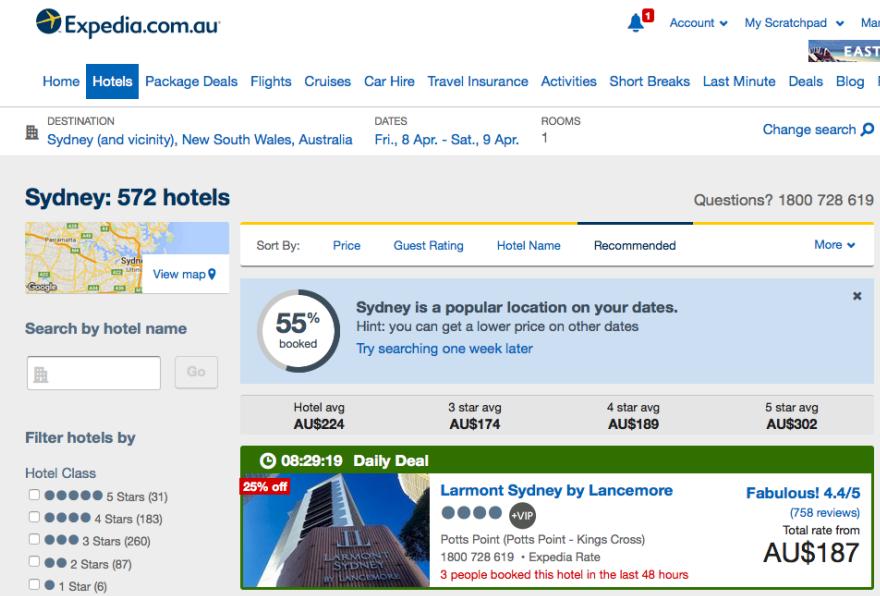


<https://www.printicular.com/>

Examples: Using APIs for business

- Salesforce.com generates 50% of its revenue through APIs
- Expedia generates 90%
- eBay generates 60%

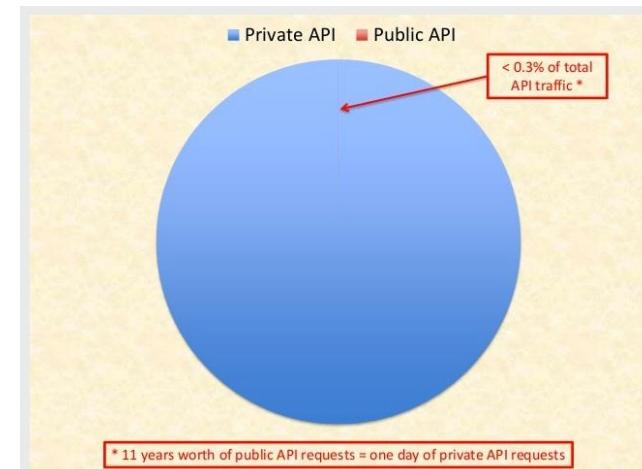
Source: <https://hbr.org/2015/01/the-strategic-value-of-apis>



Expedia Affiliation Network – typical pathways <http://developer.ean.com/docs/getting-started>

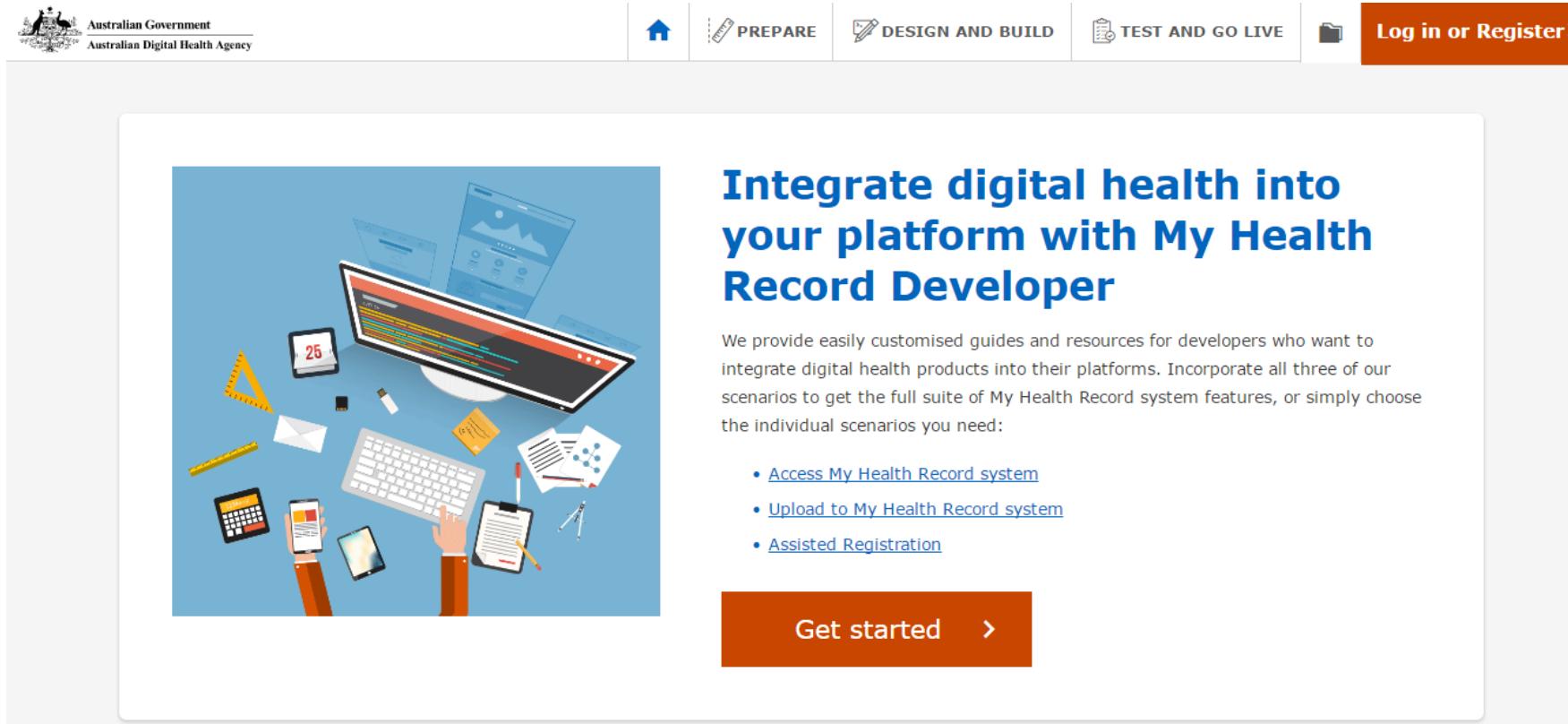
Example: Netflix

- Netflix's API was initially developed as a way for third parties to tap into Netflix's catalog, but it also became a key piece of Netflix's internal development when the company began to target living room devices.
- These days, Netflix's API gets around five billion requests per day, primarily from Netflix's own apps running on a variety of devices. Netflix's public API on the other hand never saw huge traffic.
- ... eleven years worth of public API requests equal about one day of private API requests.



Example: Personal health record in Australia

- Government wants to increase the acceptance of personal health records
- API for developers



The screenshot shows the homepage of the Australian Digital Health Agency's My Health Record Developer website. At the top, there is a navigation bar with the Australian Government logo, the Australian Digital Health Agency name, and links for Home, PREPARE, DESIGN AND BUILD, TEST AND GO LIVE, and Log in or Register. The main content area features a large illustration of a computer monitor displaying a dashboard, surrounded by various icons representing technology and development (calculator, smartphone, keyboard, ruler, etc.). To the right of the illustration, the text reads: "Integrate digital health into your platform with My Health Record Developer". Below this, a paragraph explains the purpose: "We provide easily customised guides and resources for developers who want to integrate digital health products into their platforms. Incorporate all three of our scenarios to get the full suite of My Health Record system features, or simply choose the individual scenarios you need:". Three links are listed under this paragraph: "Access My Health Record system", "Upload to My Health Record system", and "Assisted Registration". At the bottom of the main content area is a large orange "Get started >" button.

<https://myhealthrecorddeveloper.digitalhealth.gov.au/>

C. Crowdsourcing and Crowdfunding

Crowdsourcing: What is it?

- Original definition (from 2006)
- = Crowd + Outsourcing
- “Simply defined, Crowdsourcing represents the act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call. This can take the form of peer-production (when the job is performed collaboratively), but is also often undertaken by sole individuals. The crucial prerequisite is the use of the open call format and the wide network of potential laborers.”
- (Jeff Howe, Wired Magazine, 2006)

Crowdsourcing: What is it?

- Jeff Howe on crowdsourcing:



<http://www.youtube.com/watch?v=F0-UtNg3ots>

Crowdsourcing: The typical crowdsourcing process

The Crowdsourcing Process *In Eight Steps*



Image by Daren C. Brabham | www.darenbrabham.com

Crowdsourcing: Newer definition

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

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

Crowdsourcing: What is it?

- (a) there is a clearly defined crowd;
- (b) there exists a task with a clear goal;
- (c) the recompense received by the crowd is clear;
- (d) the crowdsourcer is clearly identified;
- (e) the compensation to be received by the crowdsourcer is clearly defined;
- (f) it is an online assigned process of participative type;
- (g) it uses an open call of variable extent;
- (h) it uses the internet.
- Estellés-Arolas, E., & González-Ladrón-de-Guevara, F. (2012). Towards an integrated crowdsourcing definition. *Journal of Information science*, 38(2), 189-200

Why do people engage with crowdsourcing?

Many reasons including:

- “the desire to earn money;
- to develop one’s creative skills;
- to network with other creative professionals;
- to build a portfolio for future employment;
- to challenge oneself to solve a tough problem;
- to socialize and make friends;
- to pass the time when bored;
- to contribute to a large project of common interest;
- to share with others; and
- to have fun.” Brabham (2011)

Types of Crowdsourcing (Brabham, 2011)

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 <i>peertopatent.org</i> SeeClickFix <i>seeclickfix.com</i> http://seeclickfix.com
Broadcast Search	Organization tasks crowd with solving empirical problems	Ideal for ideation problems with empirically provable solutions, such as scientific problems	InnoCentive <i>innocentive.com</i> 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 <i>threadless.com</i> http://threadless.com Doritos Crash the Super Bowl Contest <i>crashthesuperbowl.com</i> Next Stop Design <i>nextstopdesign.com</i>
Distributed Human Intelligence Tasking	Organization tasks crowd with 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 <i>mturk.com</i> http://mturk.com Subvert and Profit <i>subvertandprofit.com</i>

Brabham (2011)

Crowdsourcing for innovation: Another typology

- Intermediary platforms
 - Research & Development platforms (eg Innocentive, NineSigma)
 - Marketing, Design & Idea platforms (eg 99designs, Spigit)
 - Collective intelligence & Prediction platforms (eg Kaggle, We Are Hunted)
 - HR and Freelancers platforms (eg TopCoder, Amazon Mechanical Turk)
 - Open innovation software (eg Imaginatik)
 - Intermediary open innovation services
- Creative co-creation
 - Eg Threadless, CreateMyTattoo, Quirky
- Corporate initiatives
 - Product ideas crowdsourcing (eg IBM InnovationJam, Dell IdeaStorm)
 - Branding and Design crowdsourcing (eg Fluevog)
- Peer production
 - Eg Linux, Wikipedia
- Public crowdsourcing
 - Eg Creativecommons.org, Fold it

<http://www.boardofinnovation.com/list-open-innovation-crowdsourcing-examples/>

Cwordfunding

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

KICKSTARTER

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



<https://au.gofundme.com/>

TOP 3						
Rank	Crowdfunding Site	2014 Volume	US Alexa Rank	Fee	Important to Know...	
1	gofundme	\$470M	272	5%	Over \$2 Billion raised for personal fundraisers. Processing fee of 2.9% + \$0.30 applies.	
2	KICKSTARTER	\$444M	227	5%	Personal fundraising <u>not allowed</u> . Creative only. Processing fees of between 3-5% apply.	
3	indiegogo	???	646	5%	3% processing fee. \$25 fee for international wire.	

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

Crowdsourcing: What is it?



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

D. Releasing data sets “Open data”

Releasing data sets

- Many governments have opened up government data (“open data”)
 - In some cases, static data (eg tables of static data)
 - In some cases, live data feeds (eg an RSS feed or data service)
 - The Australian federal government <http://data.gov.au> includes:
 - Electoral boundaries
 - Crime data, census data
 - NSW Government <http://data.nsw.gov.au/> - includes:
 - Bus stop data, Electricity consumption data
- Many communities are also building open data sets
 - Eg openstreetmap.org
 - Eg openaddresses.io
- Some companies are encouraging users to develop applications using their data
 - Examples of companies releasing data sets:
 - [GoGet car share data](#) , [Coca Cola Amatil data](#)

Example: Australian Government

Why Open Data?

"Data is a game-changer for government. Open data provides the intelligence for insight, invention and exploration that translate into better products and services that improve everyday life and encourage business growth."

The Hon. Victor Dominello, MP, Minister for Innovation and Better Regulation, launching the 2016 Open Data Policy



NSW Government Open Data Policy

Licensing and AusGOAL

As part of the Open Data Policy, NSW is implementing open access licencing by utilising the AusGOAL Framework. AusGOAL provides a way by which information providers can make appropriate licencing decisions that enable the re-use of data and information in new and innovative ways by the community.

[More about AusGOAL](#)

How to publish your agency's data

Providing public access to your agency's data need not be an overwhelming activity.

Please [get in contact with us](#) and we'll be happy to assist.

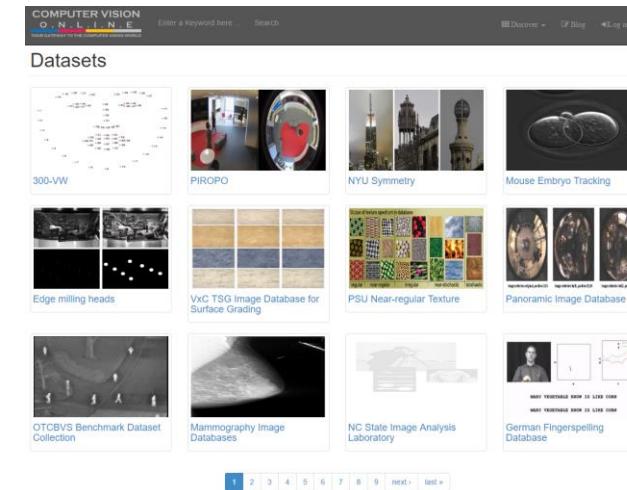
<http://data.nsw.gov.au/>

Example: Computer Vision / Medical Imaging Community

- In Research community, open source and open data is important for
 - Benchmarking / Dissemination
 - Replication / Citations
 - Reputation / State of the Art
 - Building a community



<http://www.visceral.eu/>



<http://www.computervisiononline.com/datasets>
<http://www.cvpapers.com/cvpr2014.html>

Case Studies

Big data competitions

The screenshot shows the main landing page for Kaggle Competitions. At the top, there is a navigation bar with the 'kaggle' logo, a search bar containing 'Search kaggle', and several menu items: 'Competitions', 'Datasets', 'Kernels', 'Discussion', 'Jobs', 'Sign Up' (in a blue button), and 'Log In'. Below the header, the title 'Welcome to Kaggle Competitions' is displayed in large white font, followed by the subtitle 'Challenge yourself with real-world machine learning problems' in a smaller white font. There are three main sections with icons and descriptions:

- New to Data Science?** (Icon: A presentation slide with a neural network diagram)Get started with a tutorial on our most popular competition for beginners, [Titanic: Machine Learning from Disaster](#).
- Build a Model** (Icon: A computer monitor displaying a neural network diagram next to a pencil and ruler)Get the data & use whatever tools or methods you prefer to make predictions.
- Make a Submission** (Icon: A trophy on a podium labeled '1')Upload your prediction file for real-time scoring & a spot on the leaderboard.

<https://www.kaggle.com/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.^[2] They will join the Google Cloud team and continue to be a distinct brand.^[3]

<https://en.wikipedia.org/wiki/Kaggle>

Summary

- The patterns we've talked about in previous weeks happen in an “Innovation System”
- Governments try to influence this system to provide a good environment for innovation
- There is a trend from internal “closed” innovation models towards distributed innovation models where innovation is done through members of an innovation ecosystem working together
- In IT innovation, some approaches to involving others in innovation include:
 - Product platforms
 - Web APIs
 - Crowdsourcing innovation
 - Releasing data sets
 - Platform ecosystems
 - User innovation
 - Free and open source software
 - Accelerators, investment, etc

More in later lectures

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Individual Research Report



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Quiz



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