Beyond Labeling … Natural Language Captioning

IBM

"A blue boat is sitting on the side of a building"

"A green bird sitting on top of a bowl"

"A woman sitting on a table with a giraffe"

IBM Research has top entry to MS-COCO Image Captioning Challenge (April 2017)

Deep Learning continue to impress in Computer Vision

- Keynote about IBM Watson's application to Medical imaging

- Captioning is becoming a reality – exciting time to be involved!

http://biomedicalimaging.org/2017/

Visual Insights from Image Data are Transforming Industries

IBM

Retail and Fashion

- Products?
- Styles?
- Trends?

Media and Entertainment

- Scenes?
- Highlights?
- Emotions?

Health and Wellness

- What food?
- Portion size?
- Nutrition?

Medical Imaging

- Disease?
- Clinical Features?
- Similar Cases?

INFO5992 Understanding IT Innovations

Week 7: Platform Ecosystem

A/Prof Jinman Kim

Semester 1, 2017

THE UNIVERSITY OF SYDNEY

Copyright warning

COMMONWEALTH OF AUSTRALIA

Copyright Regulations 1969

WARNING

This material has been reproduced and communicated to you by or on behalf of the University of Sydney pursuant to Part VB of the Copyright Act 1968 (**the Act**).

The material in this communication may be subject to copyright under the Act. Any further copying or communication of this material by you may be the subject of copyright protection under the Act.

Do not remove this notice.

UoS Outline

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

Agenda

- Platform Ecosystem

- Feedbacks on Quiz and Report Topics
- Reminder on Presentation; Peer Review Procedure Explanation

- Group Presentations Session I

Platform Ecosystem

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

http://oce.leagueoflegends.com/

Platform economy – Online Games

- In 2009, Riot Games released a new game product - League of Legend
- More than a new product, the strategy was to build a *platform*.
- 67 million people play it each month,[1] generating some $1 billion dollars in annual revenue for the company.[2]
- Play for free; Riot Games makes its money when, having drawn players into its designed **environment**, it finds other ways to capitalize on their presence e.g., character skins. Such an environment will have 'governance' – a set of protocols or standards to 'play' within it.
- Live events, in which League of Legend teams compete in tournaments in front of live spectators, launched what is now the fastest-growing part of the sports industry **e-sports**, which has TV rights etc.

https://dupress.deloitte.com/dup-us-en/focus/business-trends/2015/platform-strategy-new-level-business-trends.html

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.

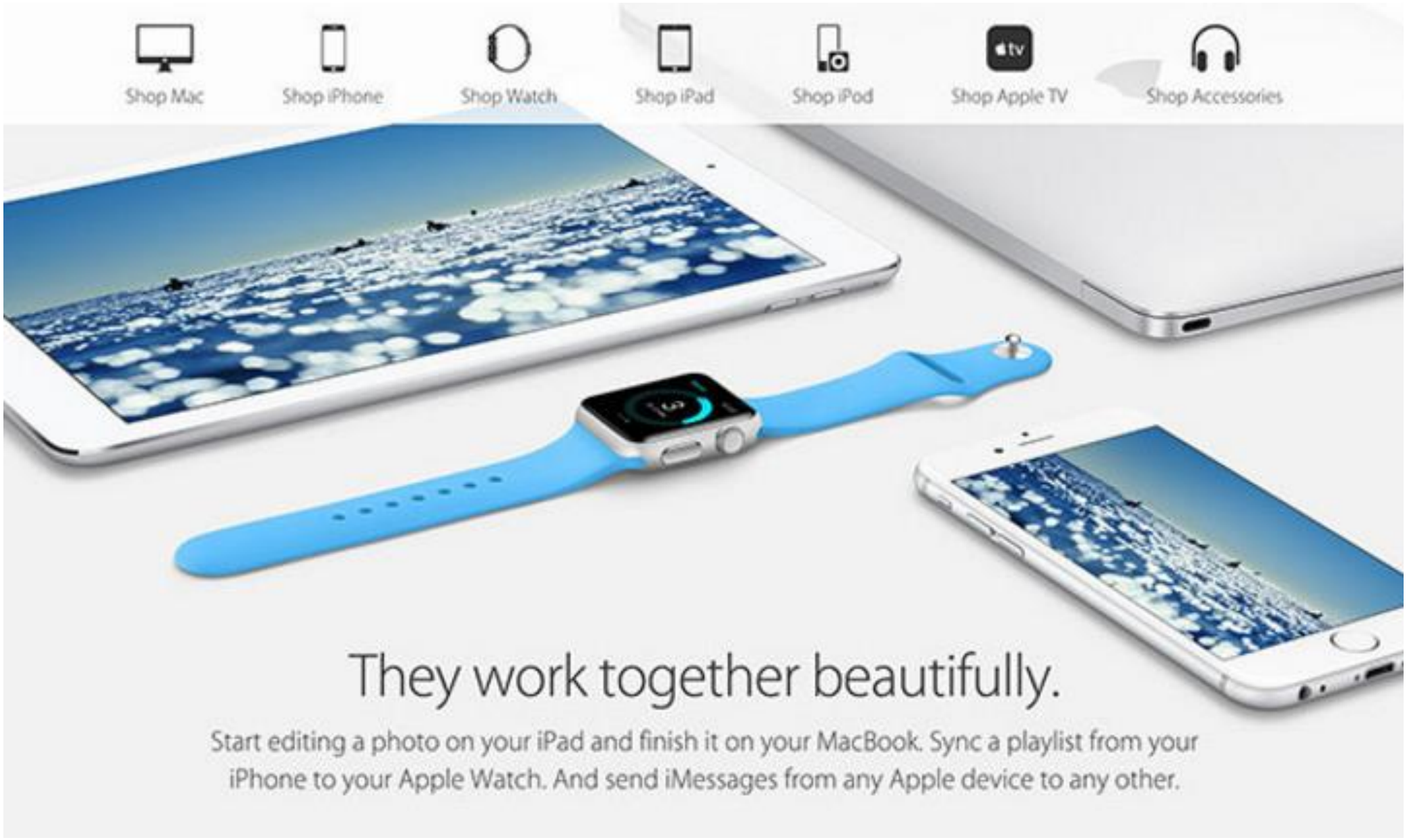
- Platforms are increasingly supported by global digital technology infrastructures that help to scale participation and collaboration
  - But this is an enabler, rather than a prerequisite, for a platform.

Deloitte, 2015

There is money to be made in providing layers of capabilities and standards that other players in that market can tap into and use to interact more efficiently.

Properly designed, Platforms can become powerful catalysts for rich ecosystems of resources and participants.

Deloitte, 2015


Shop Mac
Shop iPhone
Shop Watch
Shop iPad
Shop iPod
Shop Apple TV
Shop Accessories
They work together beautifully.
Start editing a photo on your iPad and finish it on your MacBook. Sync a playlist from your iPhone to your Apple Watch. And send iMessages from any Apple device to any other.

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 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

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

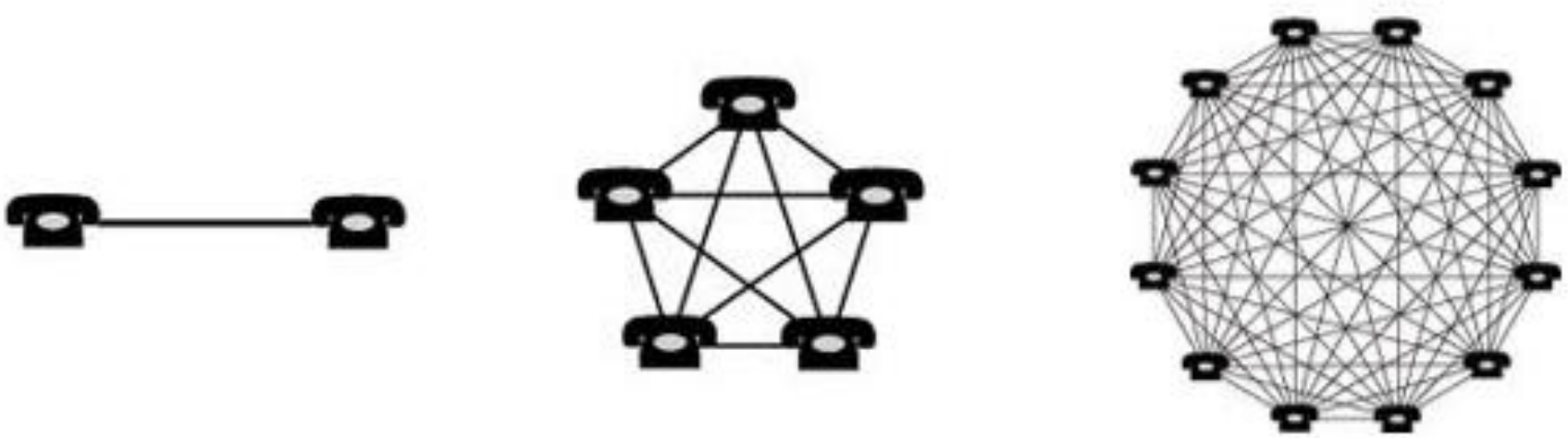
- As the number of participants on each side grew, that value increased – a phenomenon called "network effects," which is central to platform strategy. By January 2015 the company's App Store offered 1.4 million apps and had cumulatively generated $25 billion for developers.
- Apple's success in building 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.

Platform Economy

Fundamentals

Recap wk3: Networks

Wk3: Network effects - For technologies with network effects, the benefit from using a technology increases with the number of other users



Recap wk3: Types of network effects

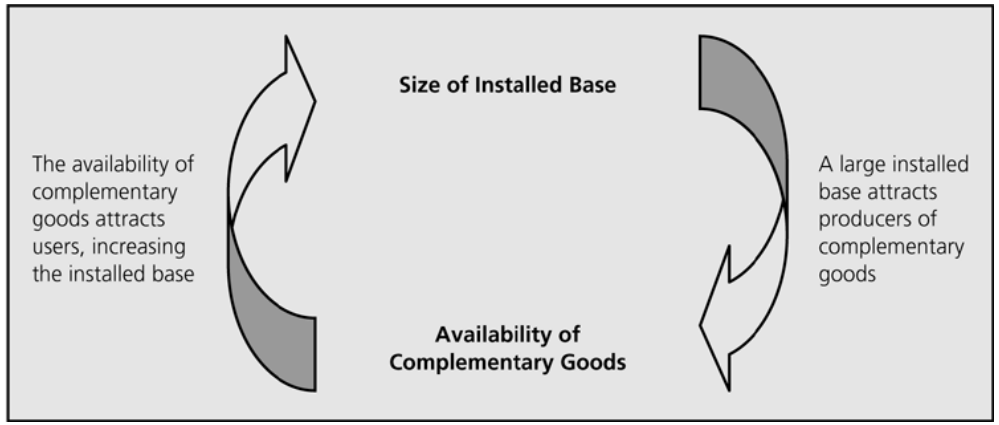
- Direct network effects:
  - Increase in usage leads to direct increase in value
  - eg Email, Telephone, Twitter
- Indirect network effects:
  - Increase in usage leads to increase in value of complementary goods leading to increase in value of the original technology
  - eg PC Architecture gained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

Source: Arun Sundararajan http://oz.stern.nyu.edu/io/network.html

Recap wk3: The self-reinforcing cycle

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

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



Source: Schilling (2008)

Recap wk5: Modularity

- *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

- Products may be modular at:
  - **User level** e.g. Firefox add-ons, 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, web API, etc.

Recap wk5: 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 wk5: 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

Recap wk5: 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**

Recap wk5: Some 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**

Types of Platform Business

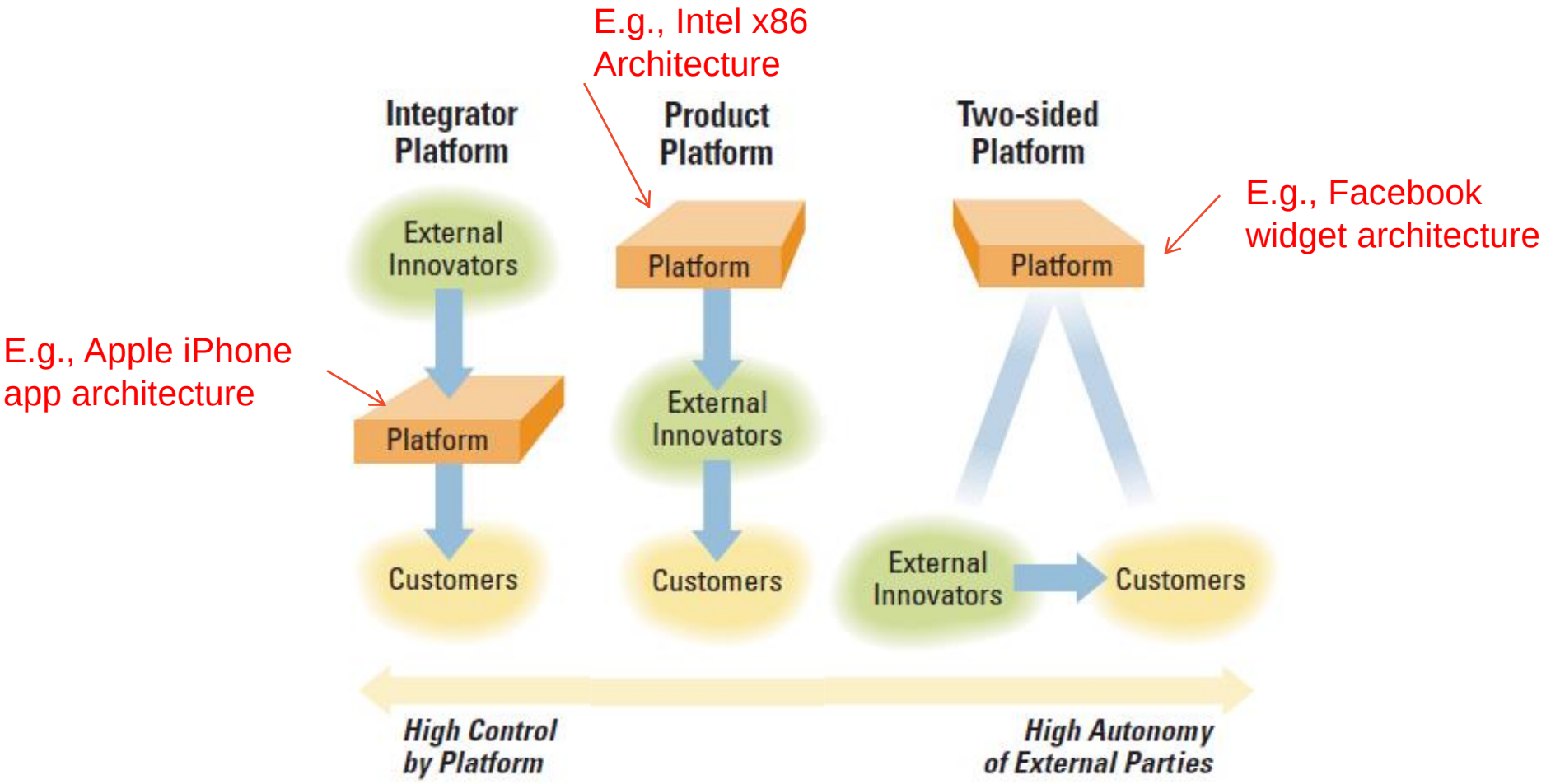
Business Ecosystem

Carliss Y. Baldwin
Professor of Business Administration, Harvard Business School

- *… In the future, I believe the key problem for organization design will be the management of **distributed innovation** in [such] **dynamic ecosystems.***
- *Specifically, how should diverse entities be integrated into a coherent network that generates goods in the present and new designs for the future?*
- *To answer that question, organization designers must think about how to distribute property rights, people, and activities across numerous self-governing enterprises in ways that are advantageous for the group (ecosystem) as well as for the designer's own firm or community.*

Baldwin, Carliss Y., Organization Design for Business Ecosystems. Journal of Organization Design, Vol. 1, No. 1, 2012.

Different forms of platform businesses



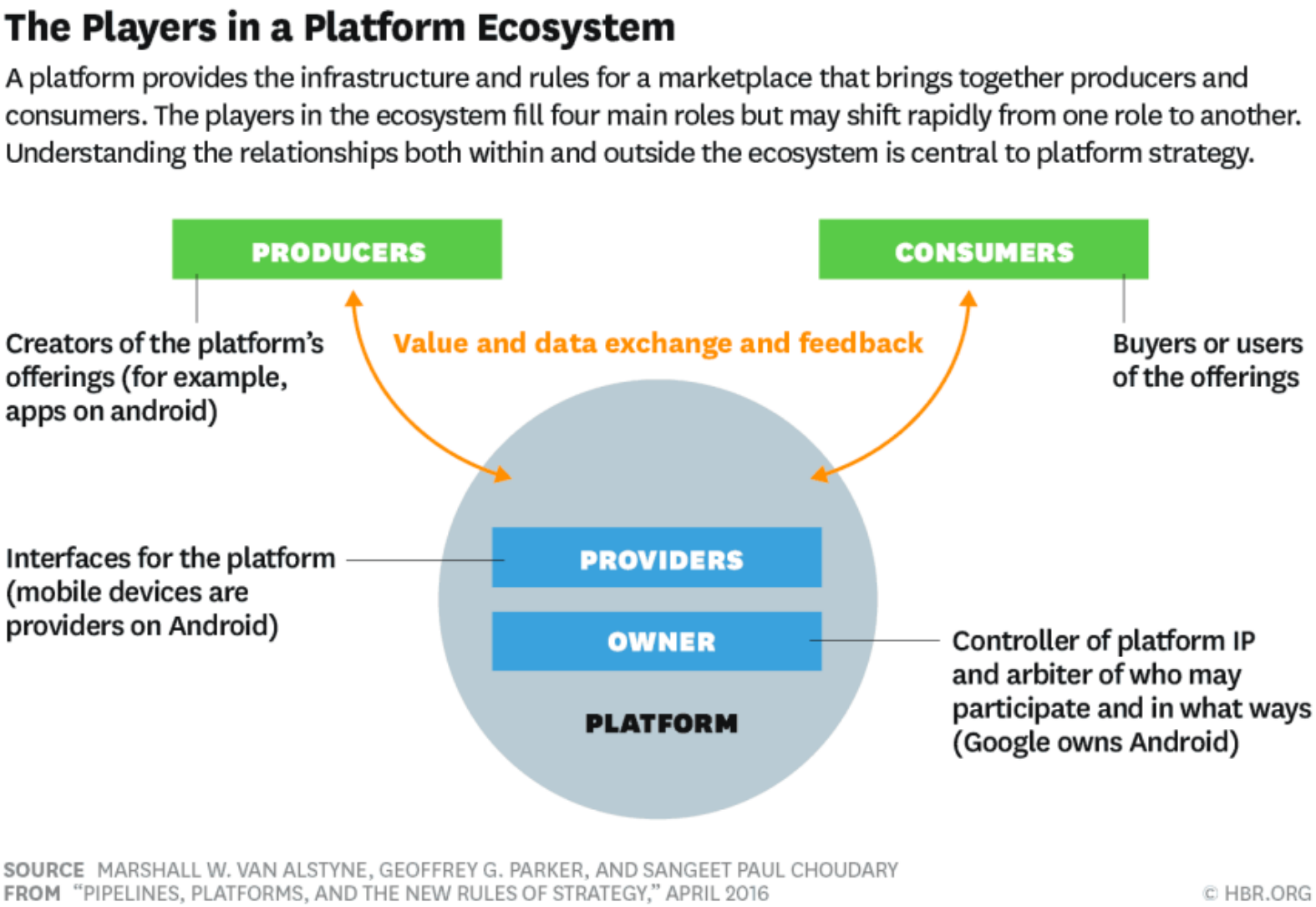
Source: K.J. Boudreau and K.R. Lakhani

Repeat of earlier slide: Platform businesses

- "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."

Source: Van Alstyne, Parker and Choudary

Main players in a platform ecosystem



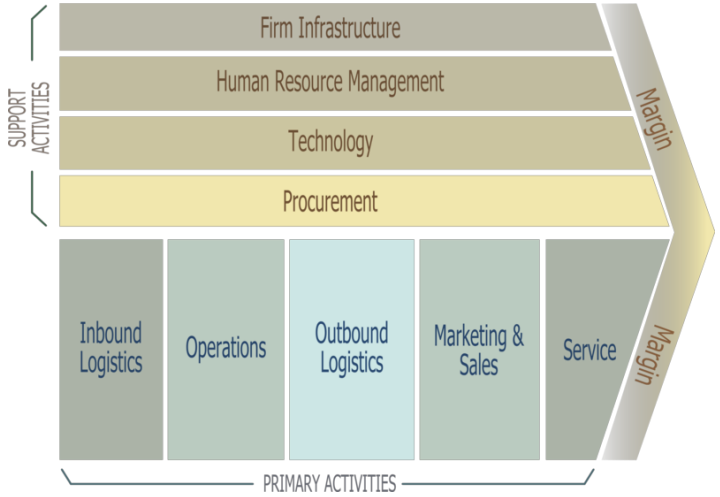
Roles in a platform ecosystem

- **Producers** create the platform's offerings
- **Consumers** buy or use the platform's offerings
- **Platform providers** provide the interfaces to the platform
- **Platform owners** owns platform intellectual property (e.g., trademarks) and control who participates in the platform and how they participate

Source: Van Alstyne, Parker and Choudary

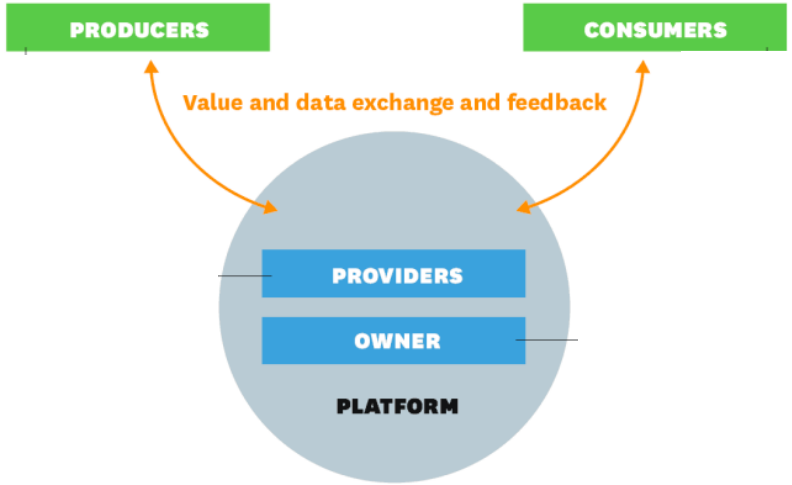
Pipelines vs platforms

Pipelines



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

Platforms



Companies that create value by controlling the interactions between producers and consumers

Can be both (e.g., Apple)

Strategy: From Pipeline focus to Platform focus

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

Source: Van Alstyne, Parker and Choudary

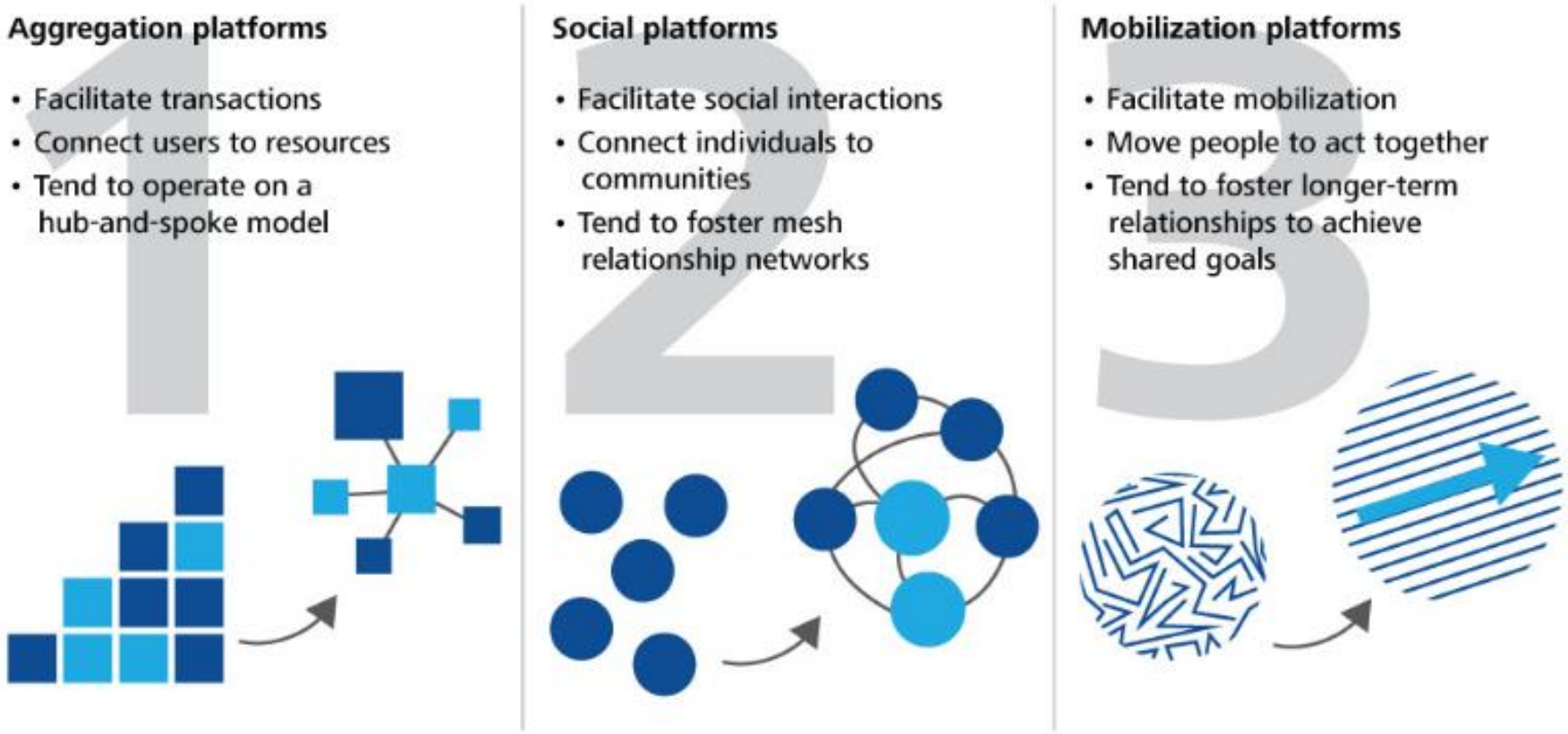
Measuring a platform business

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

Source: Van Alstyne, Parker and Choudary

Common Platform Types

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



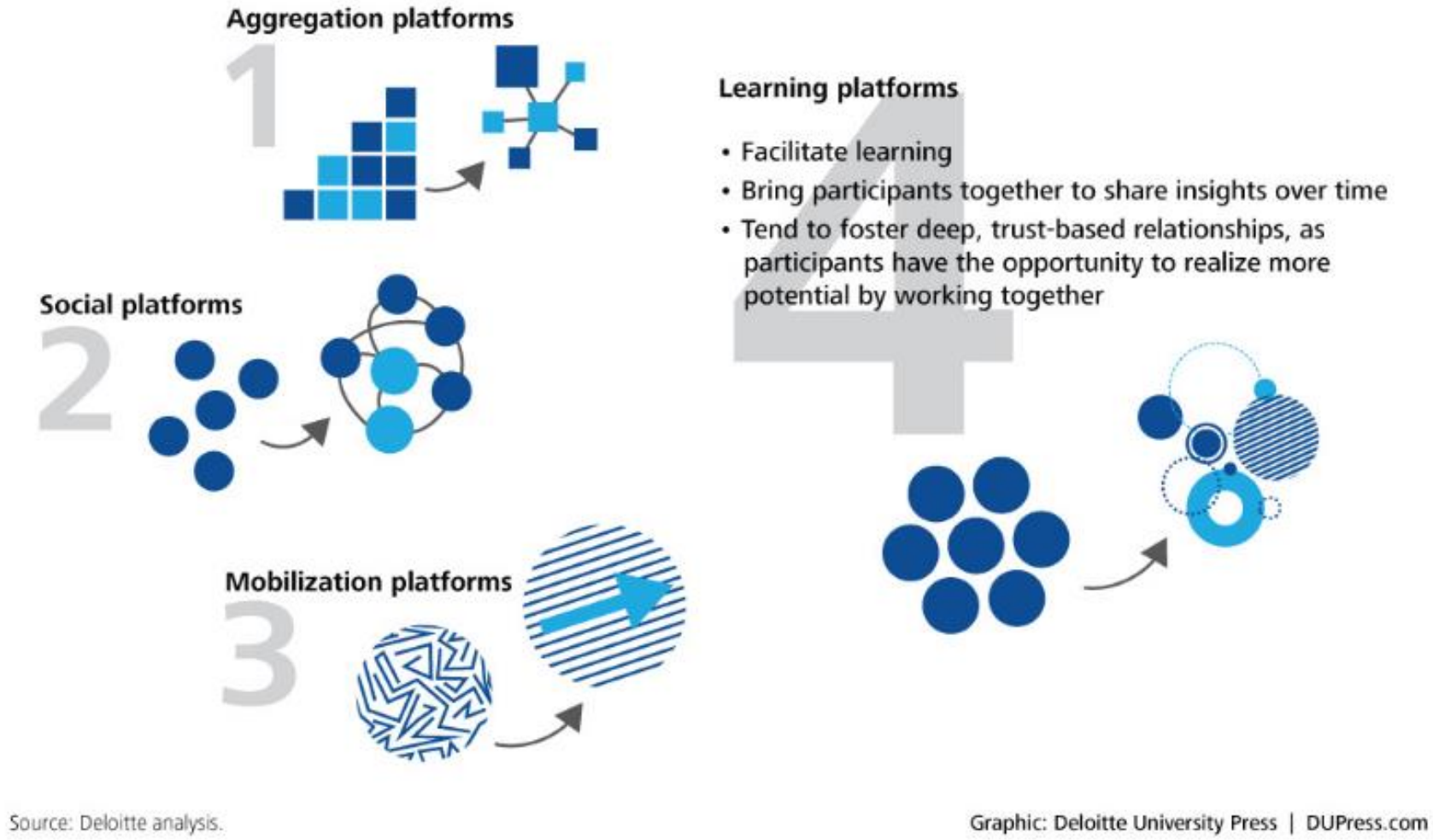
eBay, Etsy, and the App Store, Airbnb, Kaggle

Facebook and Twitter

Linux or Apache

Deloitte, 2015

Figure 3. Dynamic environments favor learning platforms that accelerate improvement for all participants.

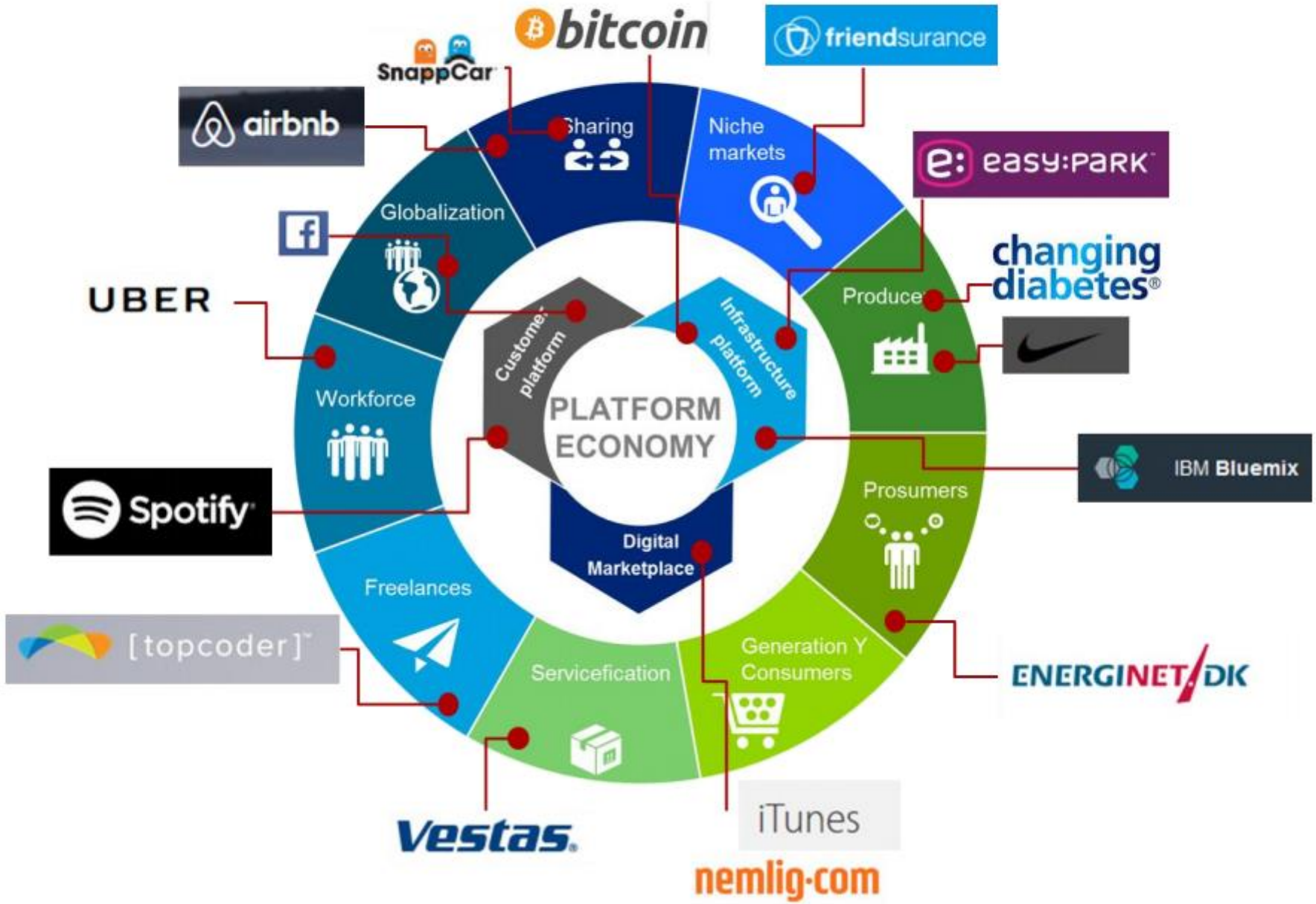


Source: Deloitte analysis.

Graphic: Deloitte University Press | DUPress.com

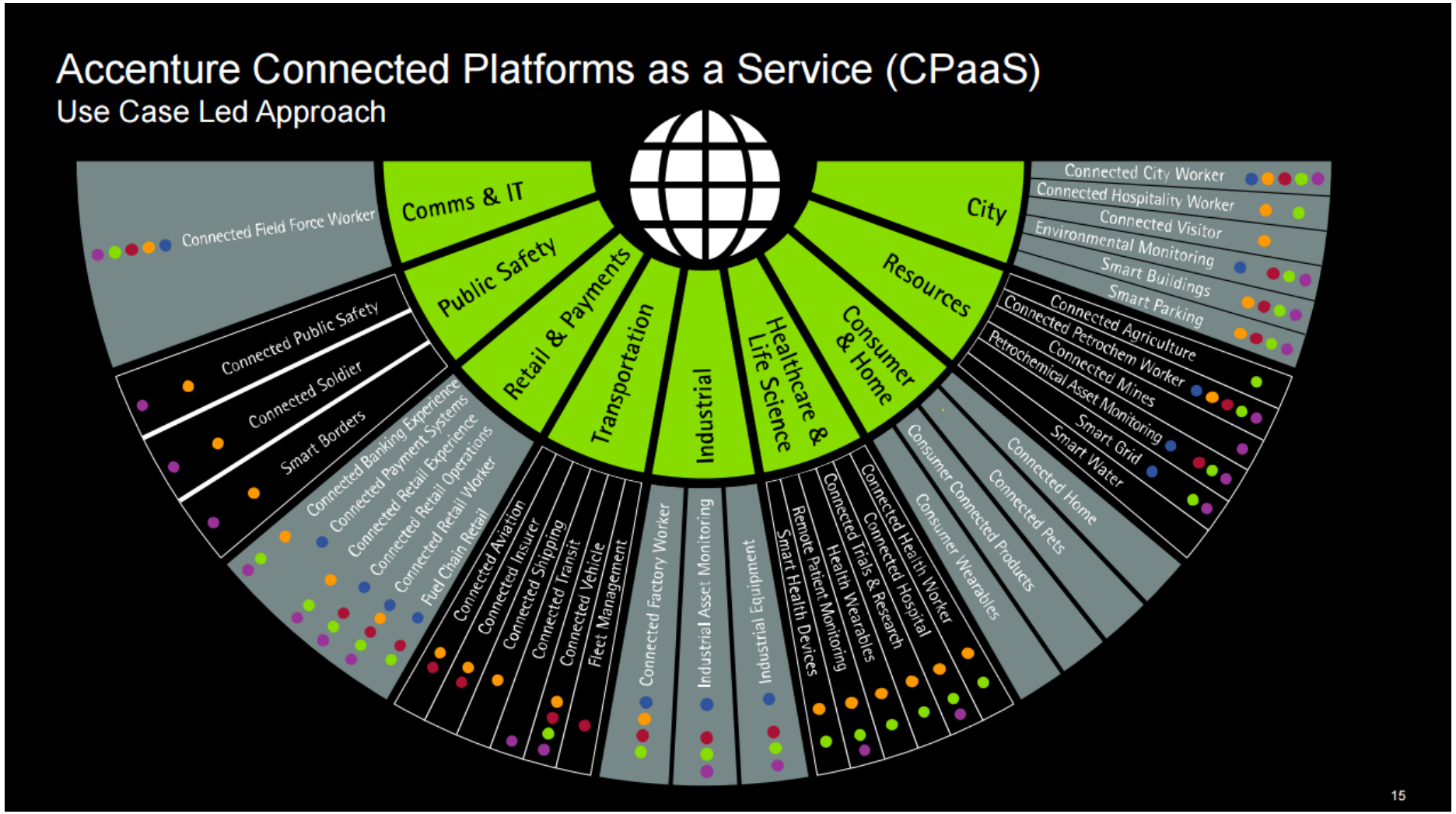
Deloitte, 2015

Different types of platform economy



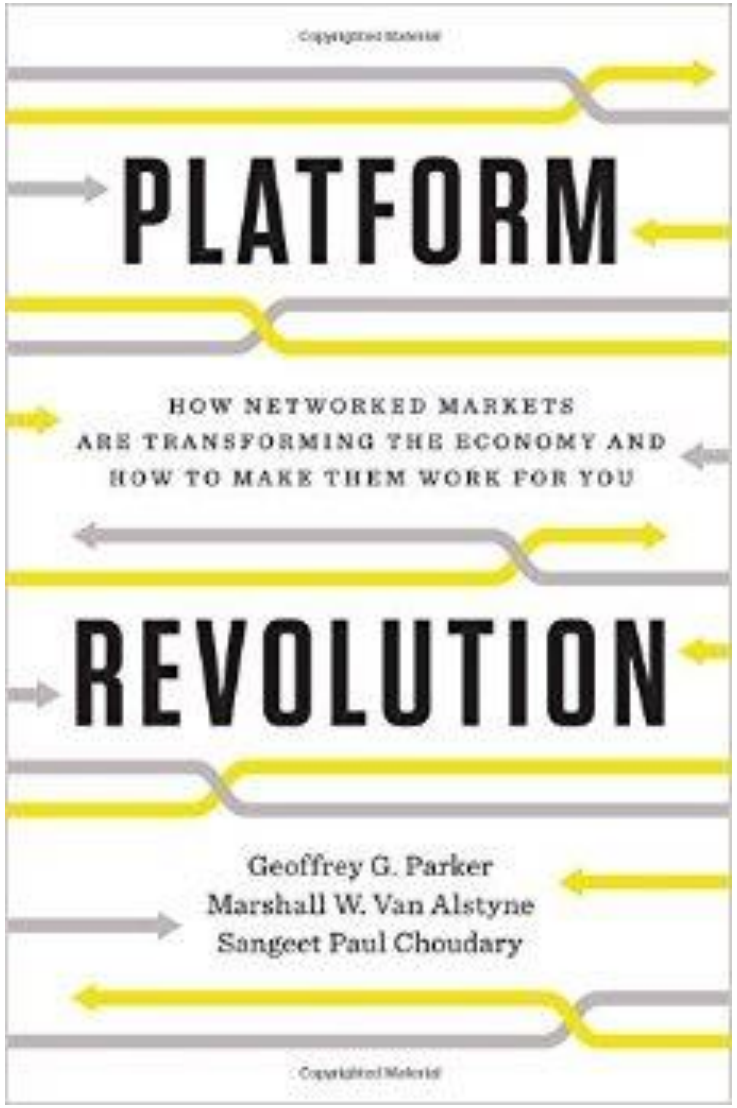
Deloitte. Digital

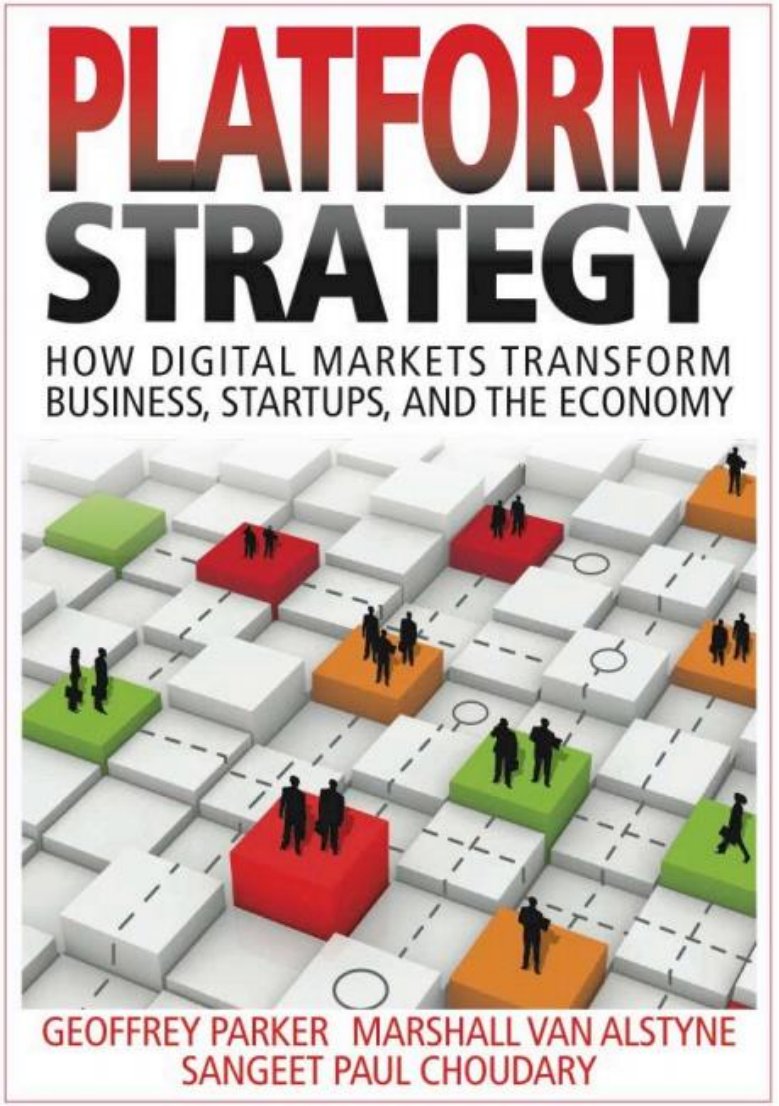
Platform as a Service



http://platforms.mit.edu/files/02_Paul_Daugherty_The_Platform_Revolution.pdf 2015

Suggested reading





Summary

- Platform businesses build networks bringing together producers and consumers in interactions that are high-value to all participants
- The key roles in a platform ecosystem are producers, consumers, platform provider and platform owner
- Platform companies produce value in a different way from traditional "pipeline companies"
- Many industries are being transformed by platform businesses
- Approaches for running successful platform businesses are different from those for running pipeline businesses (eg for strategy, focus, measuring success)
- Understanding how to build a platform ecosystem is key for many companies that are likely to be important in the future

References

- Baldwin, C. Y. (2012). Organization design for business ecosystems. *Journal of Organization Design*, *1*(1).
- Boudreau, K., & Lakhani, K. (2009). How to manage outside innovation. *MIT Sloan management review*, *50*(4), 69. *http://sloanreview.mit.edu/the-magazine/articles/2009/summer/50413/how-to-manage-outside-innovation/*
- Parker, G. G., Van Alstyne, M. W. & Choudary, S. P. (2016). *Platform Revolution*. W. W Norton & Company.
- Van Alstyne, M. W., Parker, G. G., & Choudary, S. P. (2016). Pipelines, Platforms, and the New Rules of Strategy. *HARVARD BUSINESS REVIEW*, *94*(4), 54-+.

Platform Economy

Case Studies

THE UNIVERSITY OF SYDNEY

InterBrand: 2013 Best Global Brands

Marshall Van Alstyne, Professor at Boston University, https://www.slideshare.net/InfoEcon/the-rise-of-platforms-and-what-it-means-for-business, 2013

These are Platforms

How are these related?

eBay Sellers	eBay Buyers
Expedia Airlines/Hotels	Expedia Travelers
Xbox Developers	Xbox Gamers
American Express Merchants	Amex CardHolders
Aga Khan Doctors	Aga Khan Patients
YouTube Videographers	YouTube Viewers
AirBnb Rooms	AirBnb Renters
Electric Car Charge Stations	Electric Car Drivers
Mechanical Turk Laborers	Mechanical Turk Jobs
LinkedIn Employers	LinkedIn Employees
Android Developers	Android Users

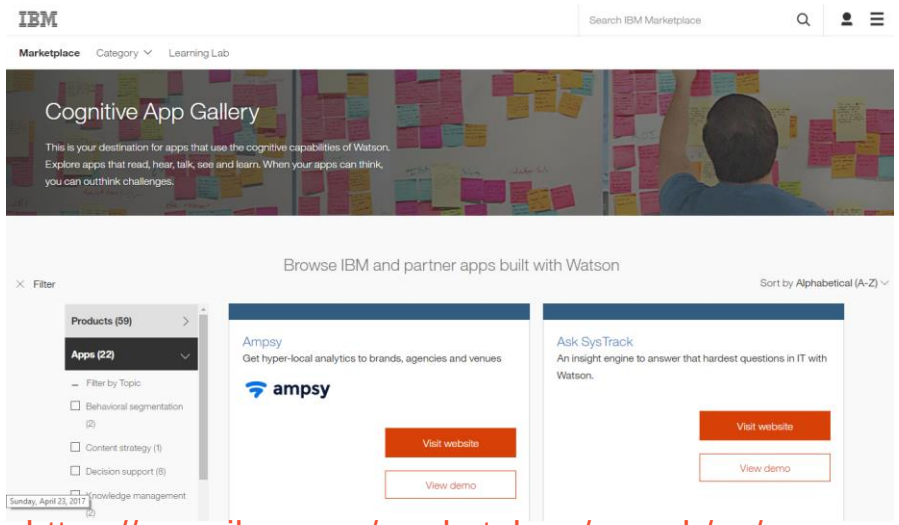
Each Side Attracts More of the Other

Can you Map the examples to Platform economy type?

- Producer, Consumer, Provider, Owner
- Aggregate, Social, Mobilise
- How about To Distributed innovation ?
  - Product platforms, Web APIs, Crowdsourcing innovation / Crowdfunding Innovation, Releasing data sets “Open data”, Free and Open Source Software, User innovation

Companies …

- Google
- Apple – e.g., iTunes
- Microsoft – e.g., OS, App store
- Amazon
- IBM – e.g., Watson
- eBay
- Samsung
- Oracle
- SAP
- American Express
- Intel
- Cisco



https://www.ibm.com/marketplace/search/us/en-us?productType=productApp&category%5B%5D=Cognitive

ORACLE

Integrated Cloud Applications & Platform Services

AMERICAN EXPRESS

American Express® Payment Gateway

Easy. Secure. Powered by American Express.

https://paymentgateway.americanexpress.com/en-AU/

Examples of some platform businesses

Industries being transformed by platform businesses

INDUSTRY	EXAMPLES
Agriculture	John Deere, Intuit Fasal
Communication and Networking	LinkedIn, Facebook, Twitter, Tinder, Instagram, Snapchat, WeChat
Consumer Goods	Philips, McCormick Foods FlavorPrint
Education	Udemy, Skillshare, Coursera, edX, Duolingo
Energy and Heavy Industry	Nest, Tesla Powerwall, General Electric, EnerNOC
Finance	Bitcoin, Lending Club, Kickstarter
Health Care	Cohealo, SimplyInsured, Kaiser Permanente
Gaming	Xbox, Nintendo, PlayStation
Labor and Professional Services	Upwork, Fiverr, 99designs, Sittercity, LegalZoom
Local Services	Yelp, Foursquare, Groupon, Angie's List
Logistics and Delivery	Munchery, Foodpanda, Haier Group
Media	Medium, Viki, YouTube, Wikipedia, Huffington Post, Kindle Publishing
Operating Systems	iOS, Android, MacOS, Microsoft Windows
Retail	Amazon, Alibaba, Walgreens, Burberry, Shopkick
Transportation	Uber, Waze, BlaBlaCar, GrabTaxi, Ola Cabs
Travel	Airbnb, TripAdvisor

FIGURE 1.2. Some of the industry sectors currently being transformed by platform businesses, along with examples of platform companies working in those arenas.

Source: Parker, Van Alstyne and Choudary

Feedback and Summary

Quiz and Individual Report

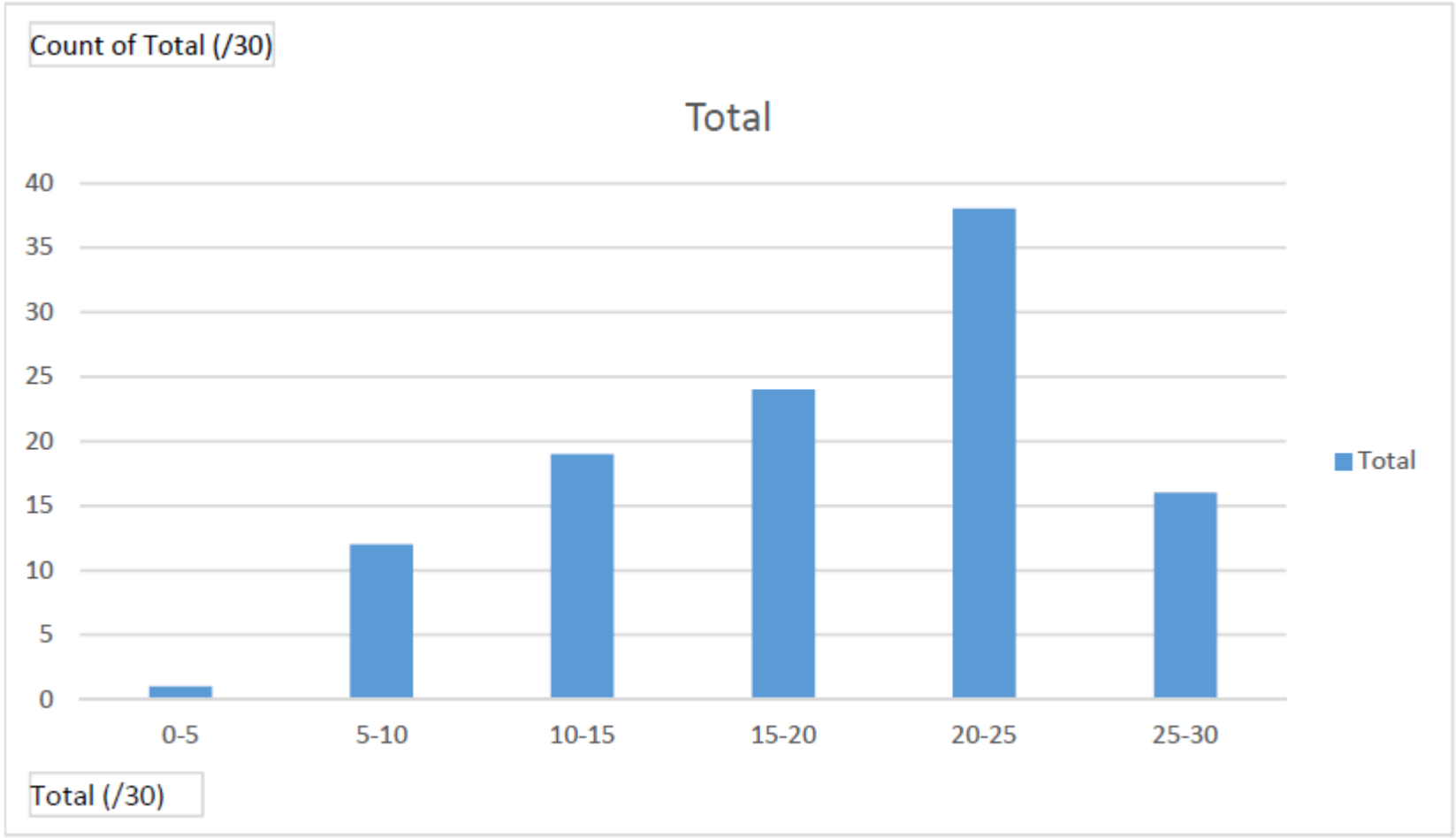
Topic

THE UNIVERSITY OF SYDNEY

Quiz – Marks distribution

- Average
  - 1.86 / 4
  - 3.48 /6
  - 4.53 /6
  - 6.75 /10
  - 1.73 /4
- 18.35 /30

- Max 29.5



Quiz - General Comments

- Feedback is ***general*** across the entire class (rather than separate feedback to each student independently)
- I strongly recommend that you discuss with your Lecturer, and your teaching team, if you do not understand why you didn't do well so that you can improve for the final exam.
- Remember that this is a mid-term quiz which means its an exercise to see where you can do better.
- The marking has not been strict, i.e., for answers which were not clear or borderline, marks were rewarded. This may not be the case in the final exam, so be cautious in your answers.

Individual Topics

- About half the class submitted topics

- Two very popular topics: Open source software and Crowd*;
- Web API was also popular; few on Open Innovation.

- Try to pick more unique topics! Other topics you can consider includes ‘Releasing Data’, ‘User innovation’, ‘Plat ecosystem’

- Regardless of the Topic, it’s the examples that you pick!

Group Presentation

THE UNIVERSITY OF SYDNEY

Reminder and Notes

- You must register to Easychair
- You can update your slides until the date of your presentation – you need to upload the updated version

- Make sure to do the peer review and submit it by the end of Week 9 (Friday 12th May 23:59) into Easychair

Presentation Schedule and Peer Review

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

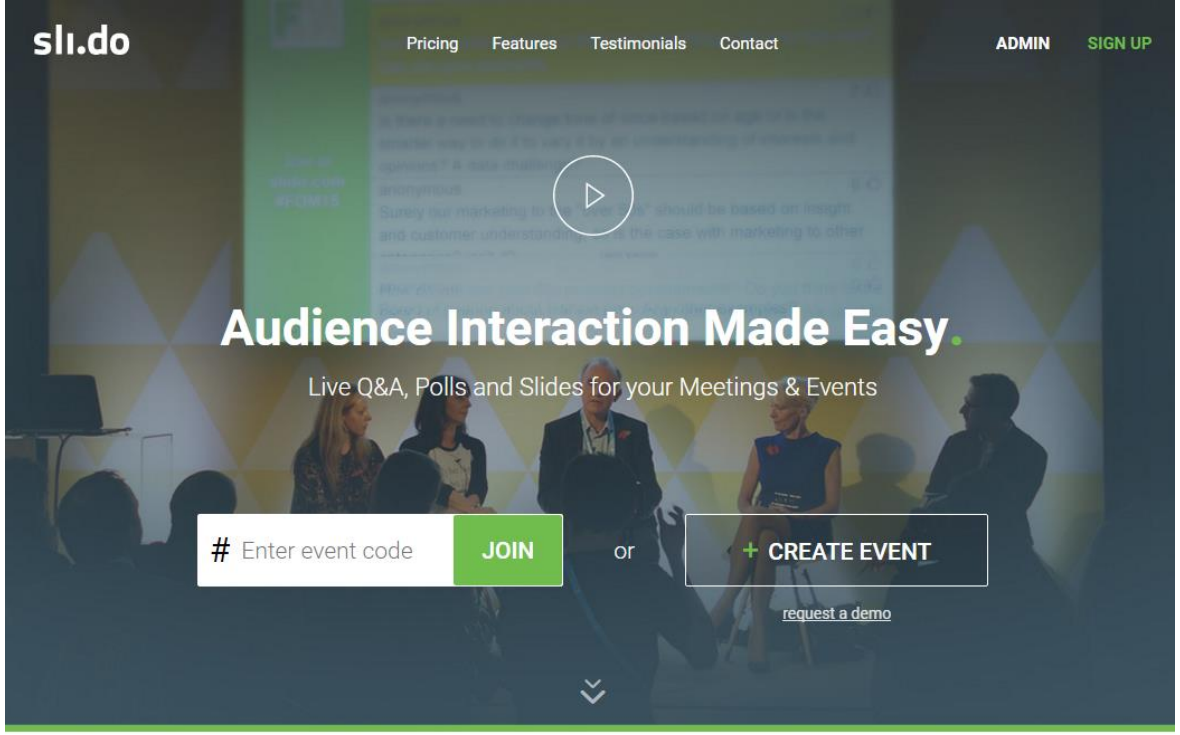
Presentation Schedule and Peer Review

Review Distribution	
Group 3	5
Group 4	4
Group 5	5
Group 6	6
Group 7	4
Group 8	4
Group 9	5
Group 10	5
Group 11	5

Review Distribution	
Group 12	5
Group 13	5
Group 14	7
Group 15	5
Group 16	5
Group 17	5
Group 18	5
Group 19	4
Group 20	4
Group 21	4

- 5 peer review presentation for each group
- Every group will mark between 4 and 7 presentations. Every group will have opportunities to review diverse topics
- At least one presentation, per group, per week.

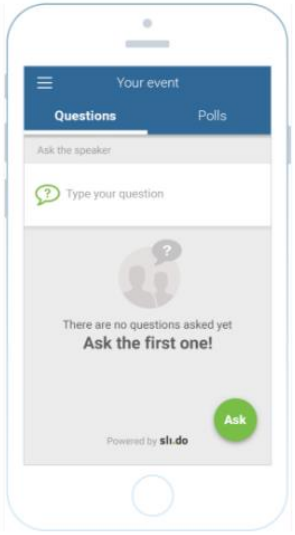
- Thank you Group 14 for doing the most reviews!



Crowdsource the best questions
from your audience

Let your participants ask questions from any device and vote for the ones they like the most.

TRY NOW Learn more



https://www.sli.do/

Group Presentation - Session I

THE UNIVERSITY OF SYDNEY