



<http://www.recode.net/2017/3/24/15054884/amazon-prime-air-public-us-drone-delivery>

- Amazon completed its first public demonstration of a Prime Air drone delivery in the U.S. earlier this week.
- Amazon has been working on its drone project for years, but it wasn't until last December that the company showed off footage of its first successful delivery completed entirely by a drone. That trial was in the small rural town in the Cambridge area of England — not in the U.S.
- In order for Amazon to make drone delivery available broadly in the U.S., the company will have to wait for the Federal Aviation Administration to craft rules about how to fly over populated areas and beyond the line of sight of the operator. And that could take years.

INFO5992 Understanding IT Innovations

Week 4: Disruptive Innovation

A/Prof Jinman Kim

Semester 1, 2017



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UoS Outline

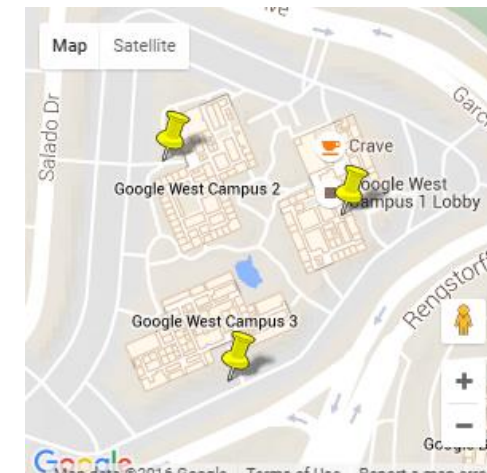
Week	Lecture Topics	Activity
1. 6 Mar	UoS Introduction; Definition of Innovation; Innovation System; Innovation in Australia	N/A
2. 13 Mar	Introduction to Technological / IT innovation	Tute 1 – Massive Open Online Courses – Enabling technologies and Peer-review
3. 20 Mar	Dynamics of Technological / IT 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 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	Tute 4 – Innovative Tech Practice – Open source Geolocation and Maps
Easter (Break)		
7. 24 Apr	Innovation ecosystem; Sydney's innovation ecosystem	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 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 Individual Assignment Submission
12. 29 May	Innovation by Start-up companies and Opportunities	Tute 7 – Business Model Canvas
13. 5 Jun	UoS Review	UoS comments / questions

Tutorials

- *Massive Open Online Courses – Enabling technologies and Peer-review*
- *Design Dominance in the Smartphone market*
- ***Innovative Tech Practice – Cognitive services***
- *Innovative Tech Practice – Open source Geolocation and Maps*
- *Sharing Economy*
- *Judging Innovation (Example in the Healthcare sector)*
- *Business Model Canvas*



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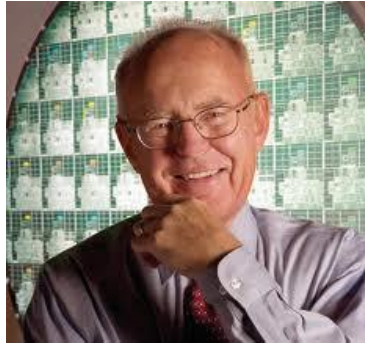
Agenda

- Disruptive Innovation
- Quiz Preparations
- Group Presentation Introduction
- Tutorial 3 – Innovative Tech Practice – Cognitive services

Improvements in Technology performance

Moore's Law

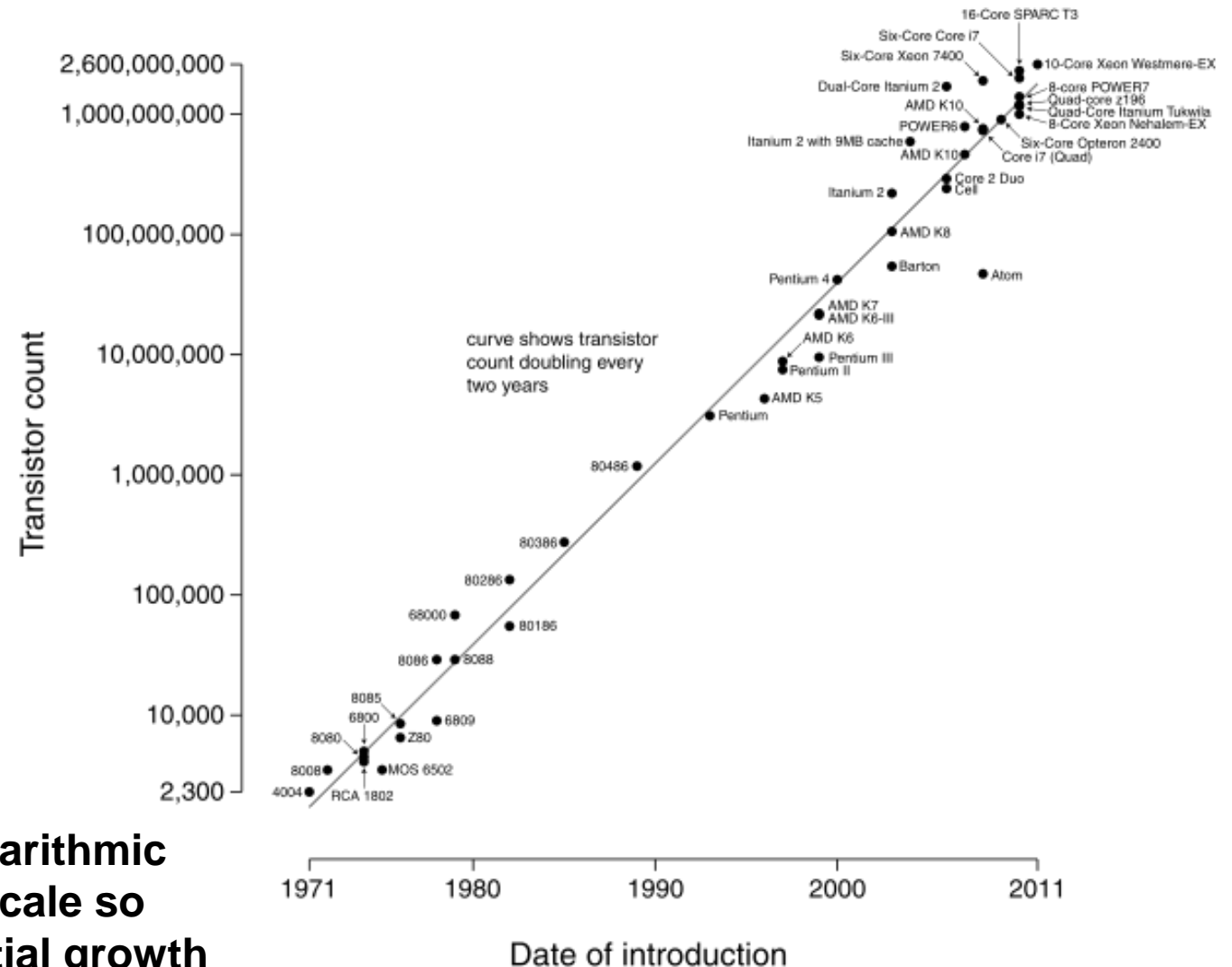
- Gordon Moore, co-founder of Intel
- 



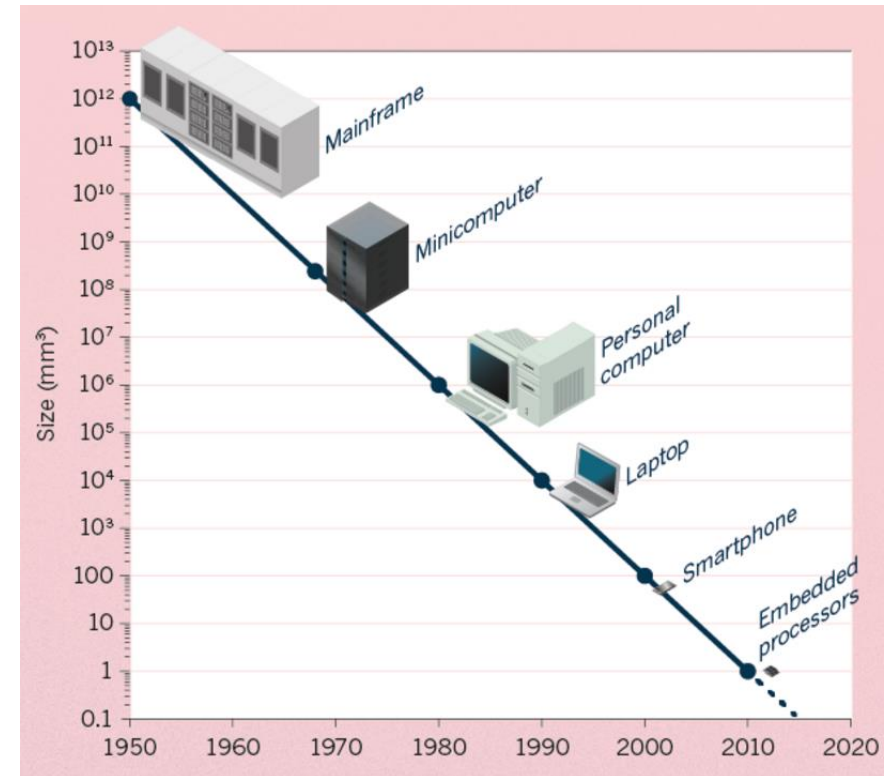
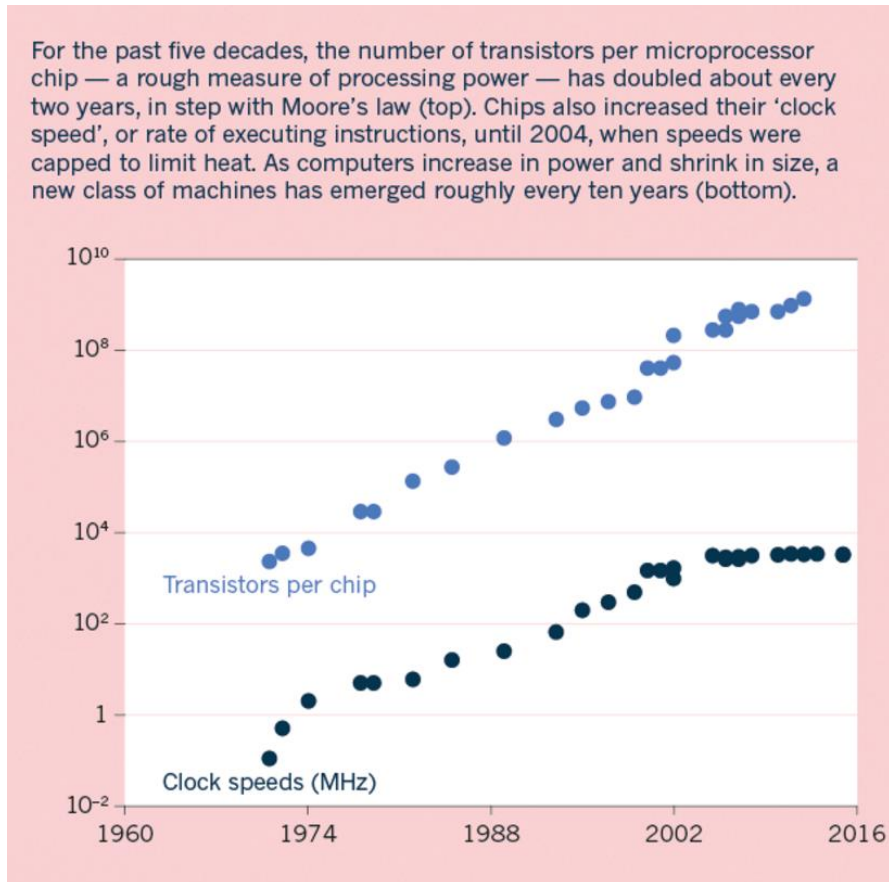
- He noticed that transistor count on an integrated circuit doubles every 2 years
- The curve here has continued to be exponential but many say it will slow down as physical limits are met

Note: logarithmic vertical scale so exponential growth

Microprocessor Transistor Counts 1971-2011 & Moore's Law



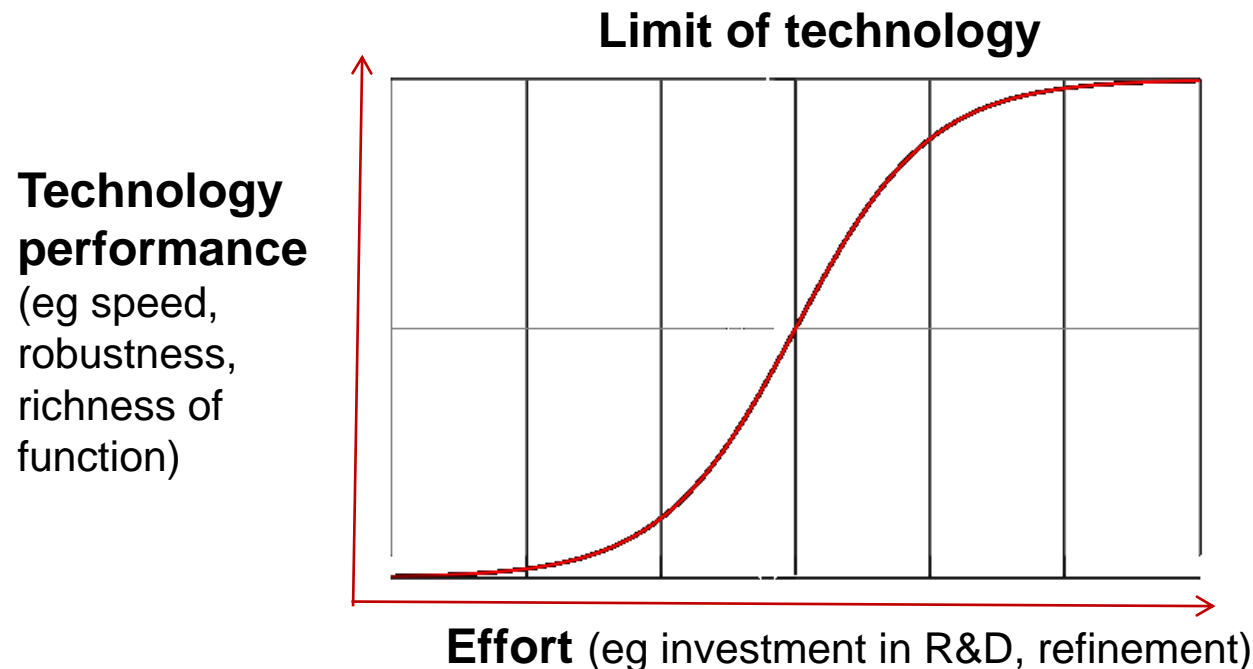
The chips are down for Moore's law



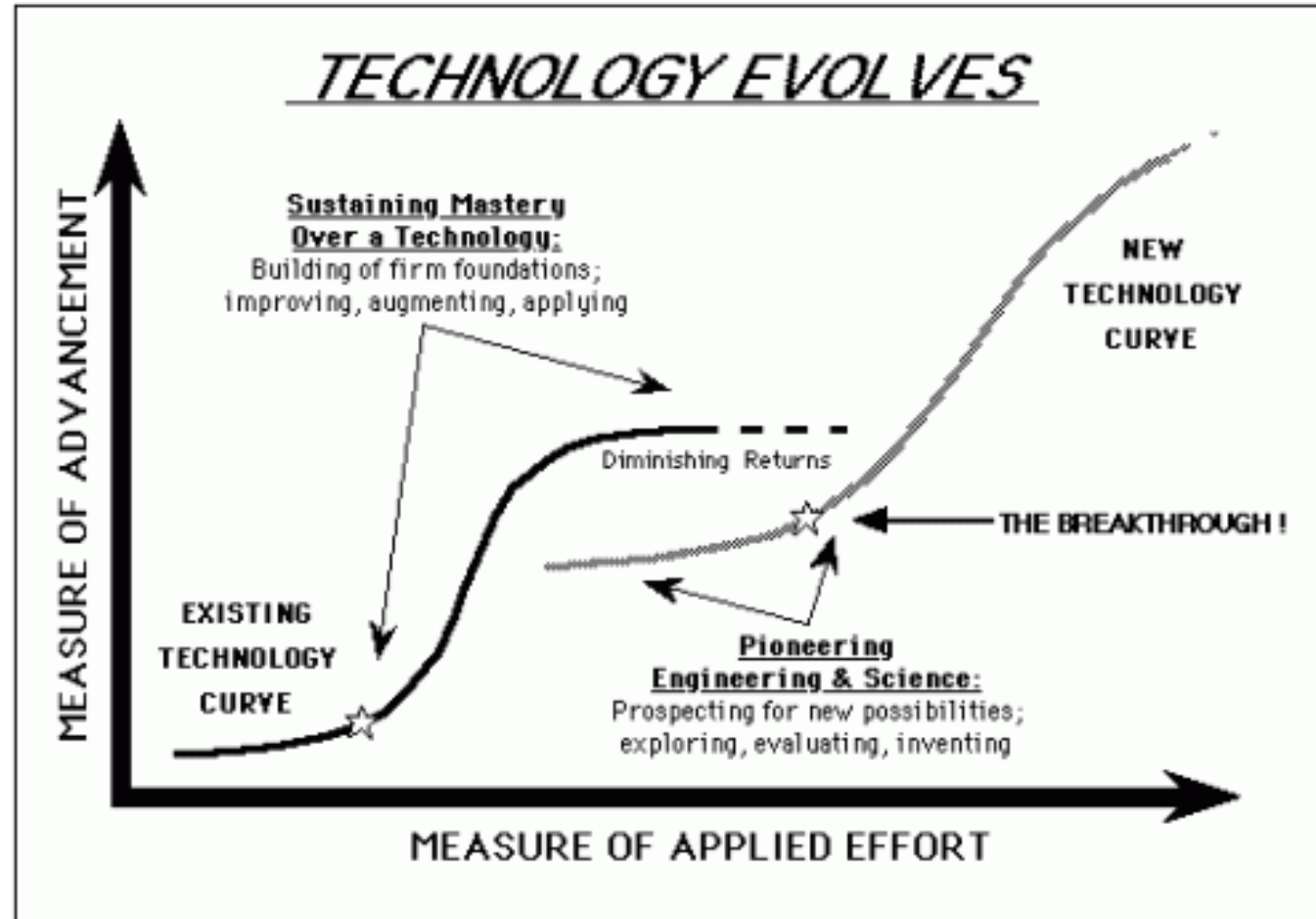
M. Mitchell Waldrop The chips are down for Moore's law, *NATURE | NEWS FEATURE*, Feb 2016
<http://www.nature.com/news/the-chips-are-down-for-moore-s-law-1.19338>

Technology Performance over time

- The “technology performance S-curve”
- Used to show and predict performance improvement of a technology
- Shows that the performance of a technology starts slowly, then improves approximately exponentially, then slows and eventually saturates



Technology evolving

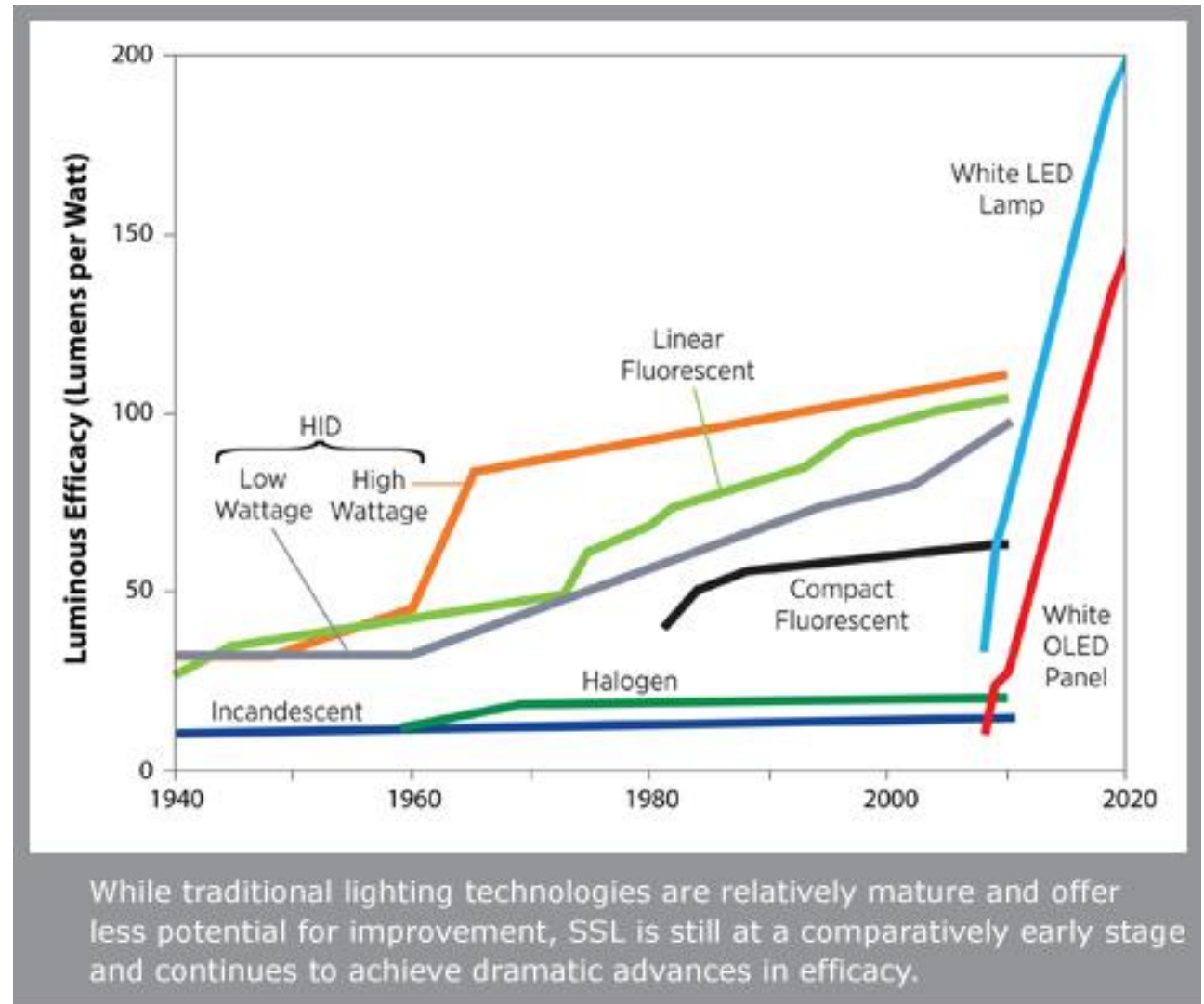


<http://olegmoskalev.net/index.php/the-food-project/34-why-do-people-waste-food/92-research-aims-a-methodology>

Adapted from Attacker's Advantage (Foster, 1986).

Example: Luminous efficacy over time

- Solid-state lighting (SSL) refers to a type of lighting that uses semiconductor light-emitting diodes (LEDs), organic light-emitting diodes (OLED), or polymer light-emitting diodes (PLED) as sources of illumination rather than electrical filaments, plasma (used in arc lamps such as fluorescent lamps), or gas.



Source: DOE SSL R&D Multi-Year Program Plan

Example: Luminous efficacy over time

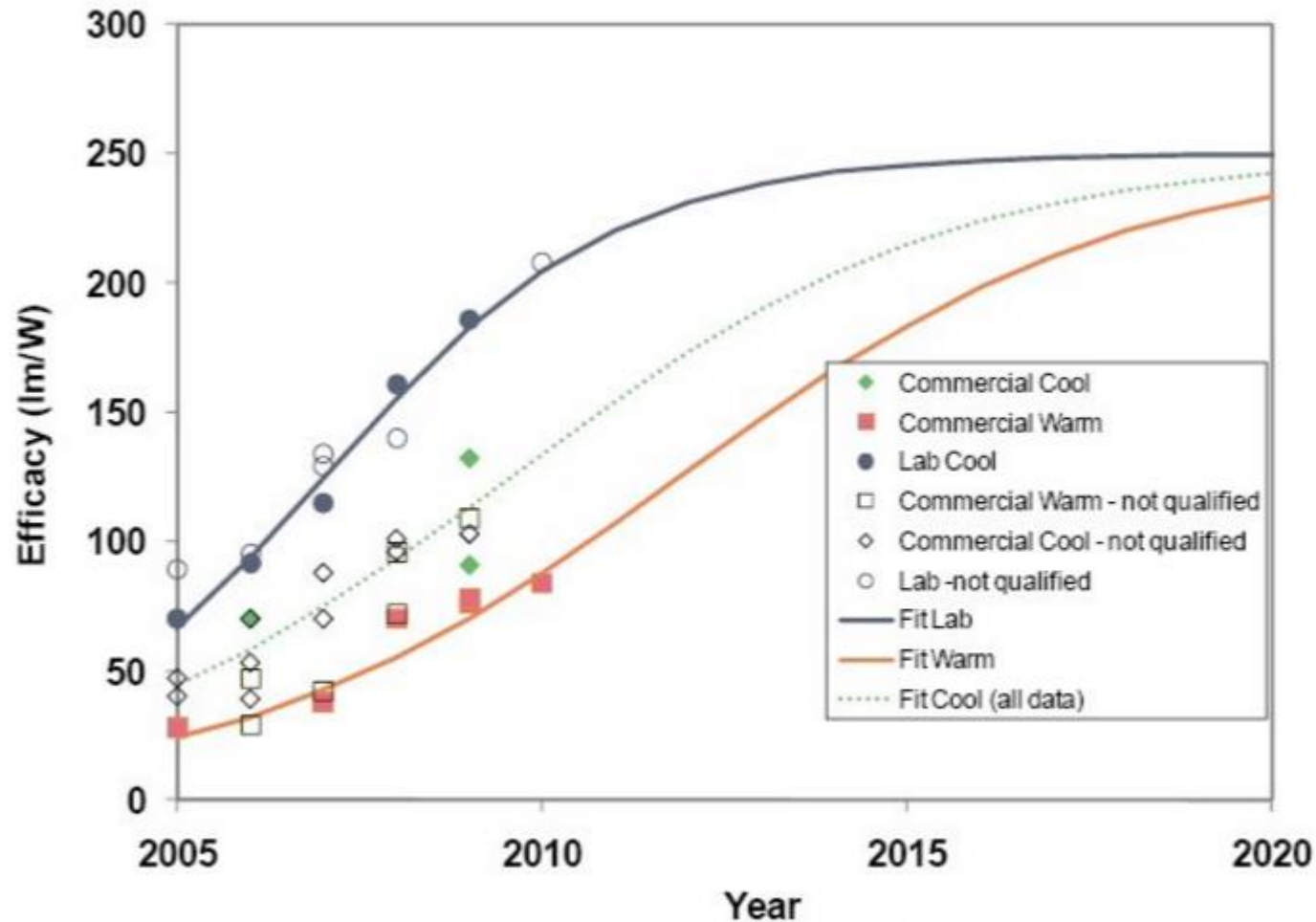
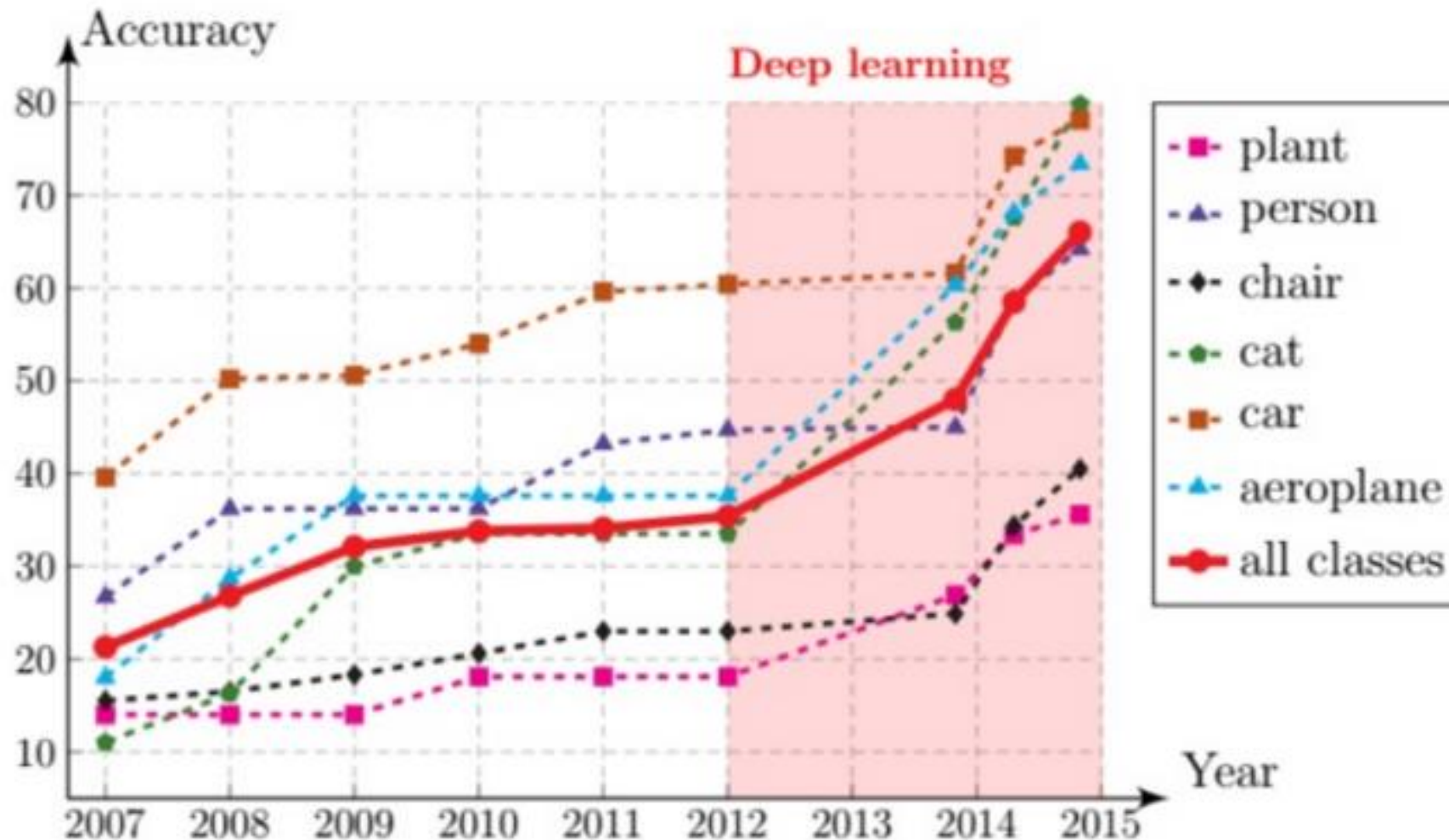


Figure 4.11: White-Light LED Package Efficacy Targets⁶⁴, Laboratory and Commercial

- Software eating the world?
- Future Home Tech: 8 Energy-Saving Solutions on the Horizon
 - 1. SMARTER, MORE CONNECTED HOMES
 - <https://energy.gov/articles/future-home-tech-8-energy-saving-solutions-horizon>

Example: Breakthrough in Computer Vision



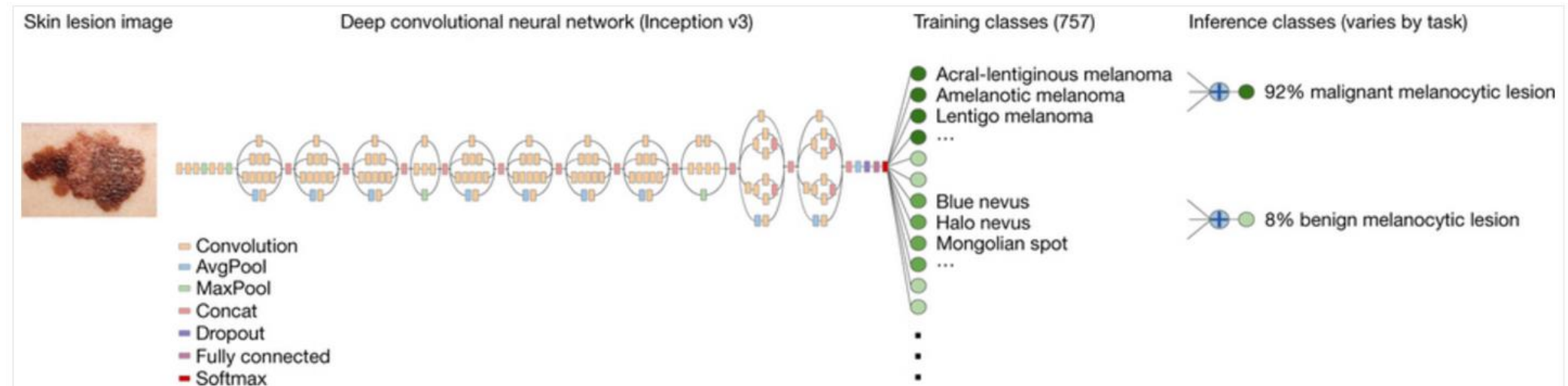
presentation given at the Deep Learning Meetup Stockholm, 20 April 2015
<http://www.slideshare.net/roelofp/deep-learning-a-birdseye-view>

Nature paper

Dermatologist-level classification of skin cancer with deep neural networks

Andre Esteva, Brett Kuprel, Roberto A. Novoa, Justin Ko, Susan M. Swetter, Helen M. Blau & Sebastian Thrun

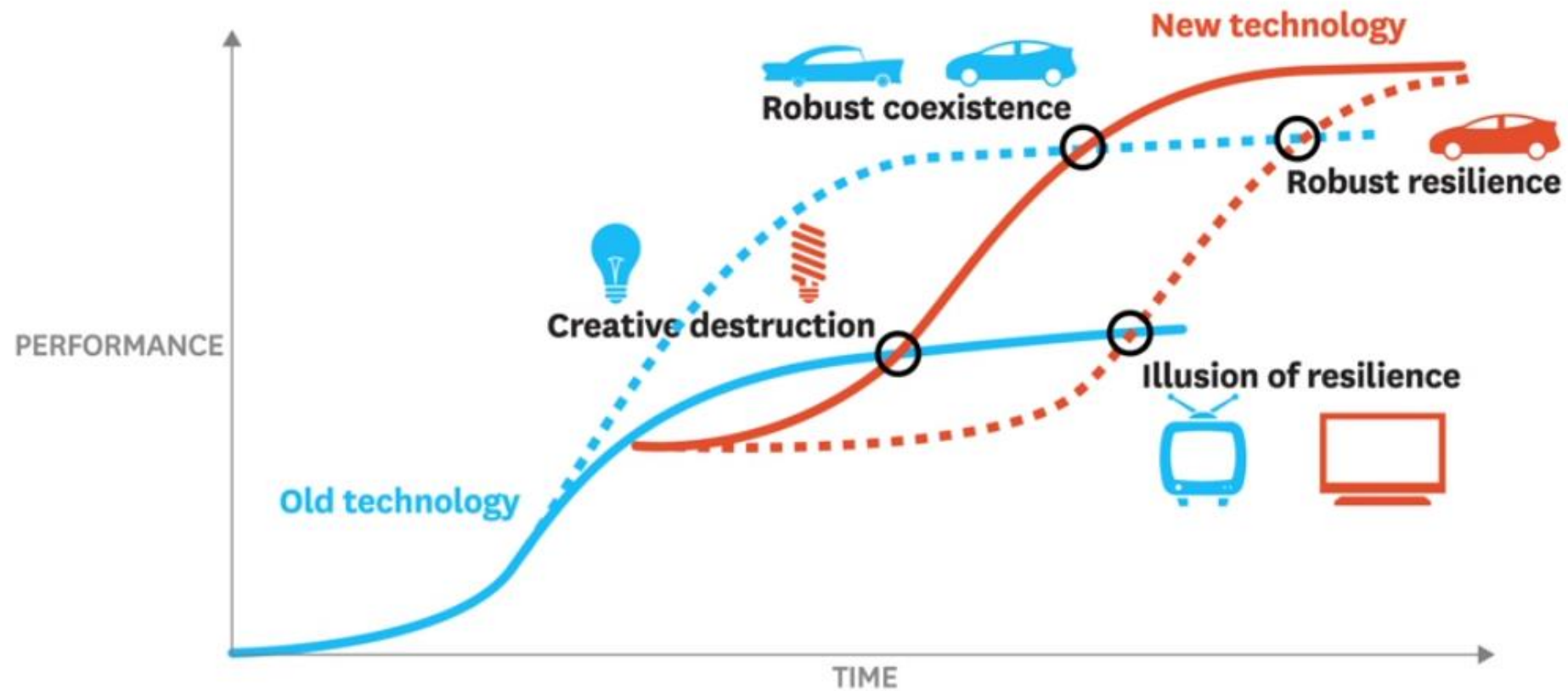
Nature 542, 115–118 (02 February 2017) | doi:10.1038/nature21056



Our classification technique is a deep CNN. Data flow is from left to right: an image of a skin lesion (for example, melanoma) is sequentially warped into a probability distribution over clinical classes of skin disease using Google Inception v3 CNN architecture pretrained on the ImageNet dataset (1.28 million images over 1,000 generic object classes) and fine-tuned on our own dataset of 129,450 skin lesions comprising 2,032 different diseases. The 757 training classes are defined using a novel taxonomy of skin disease and a partitioning algorithm that maps diseases into training classes (for example, acrolentiginous melanoma, amelanotic melanoma, lentigo melanoma). Inference classes are more general and are composed of one or more training classes (for example, malignant melanocytic lesions—the class of melanomas). The probability of an inference class is calculated by summing the probabilities of the training classes according to taxonomy structure (see Methods). Inception v3 CNN architecture reprinted from <https://research.googleblog.com/2016/03/train-your-own-image-classifier-with.html>

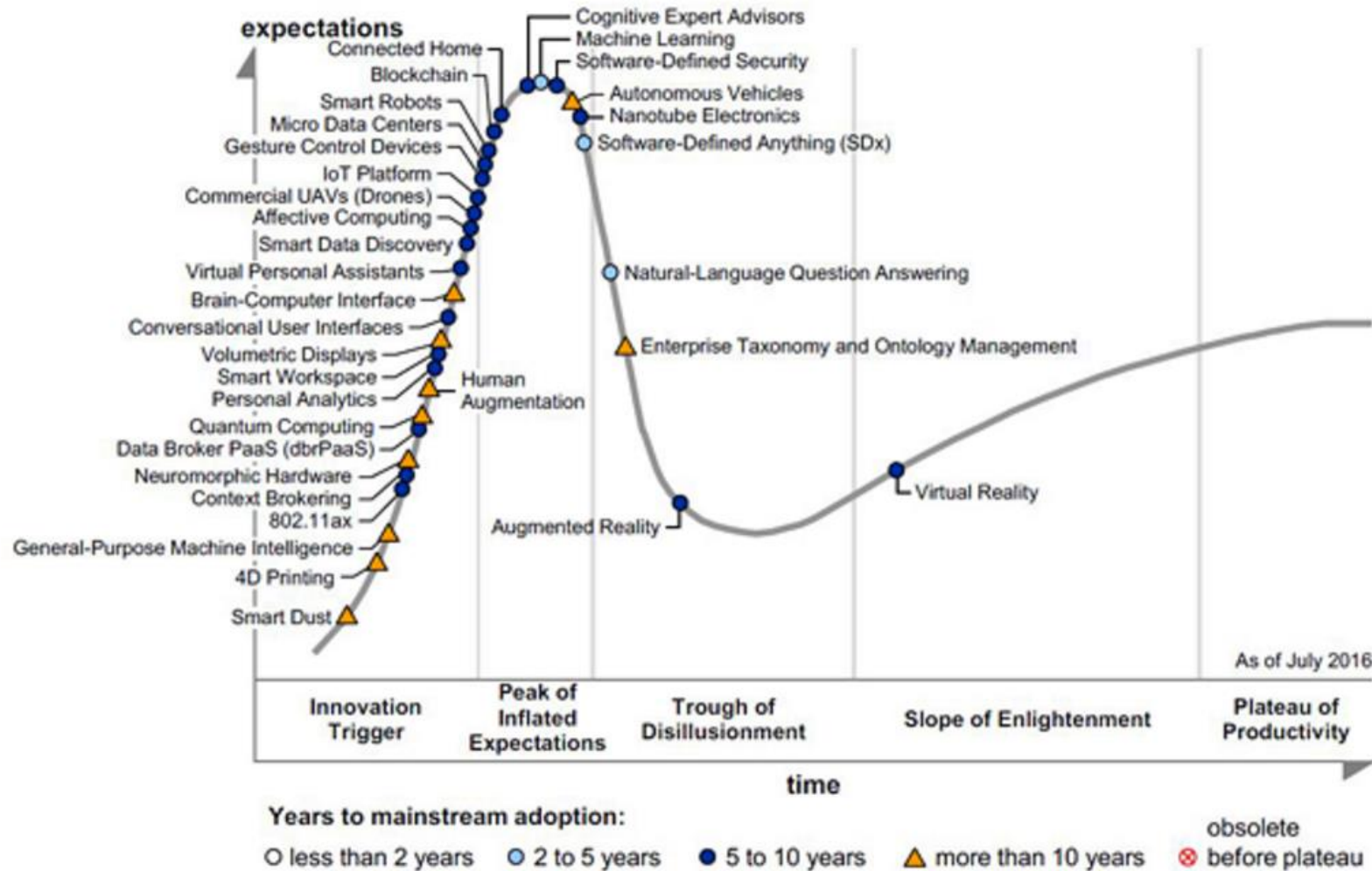
Right Tech, Wrong Time

HOW FAST DOES NEW TECHNOLOGY REPLACE THE OLD?



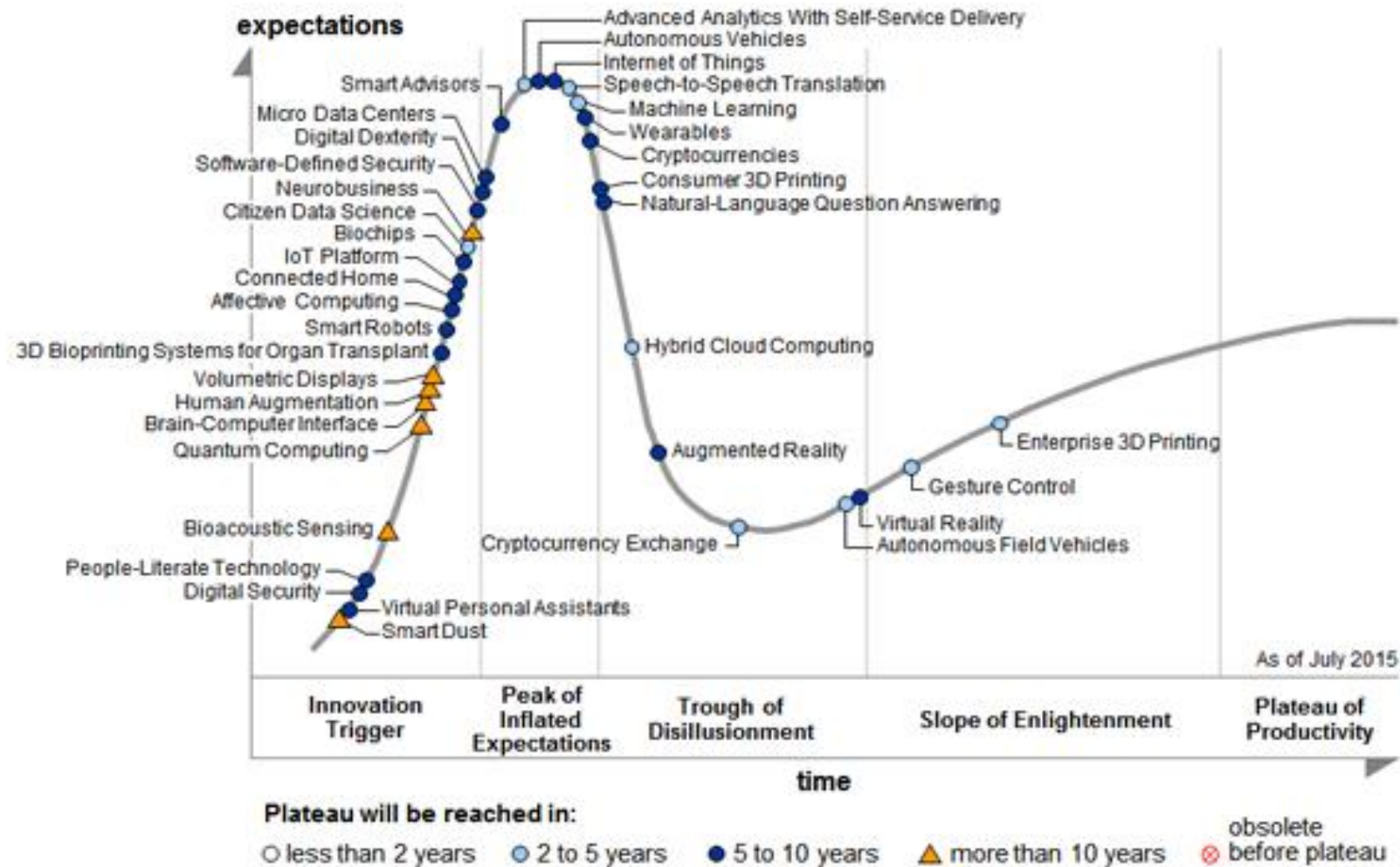
<https://hbr.org/2016/11/right-tech-wrong-time?referral=00060>

Modelling the maturity and adoption of new technologies: the “Hype Cycle” 2016



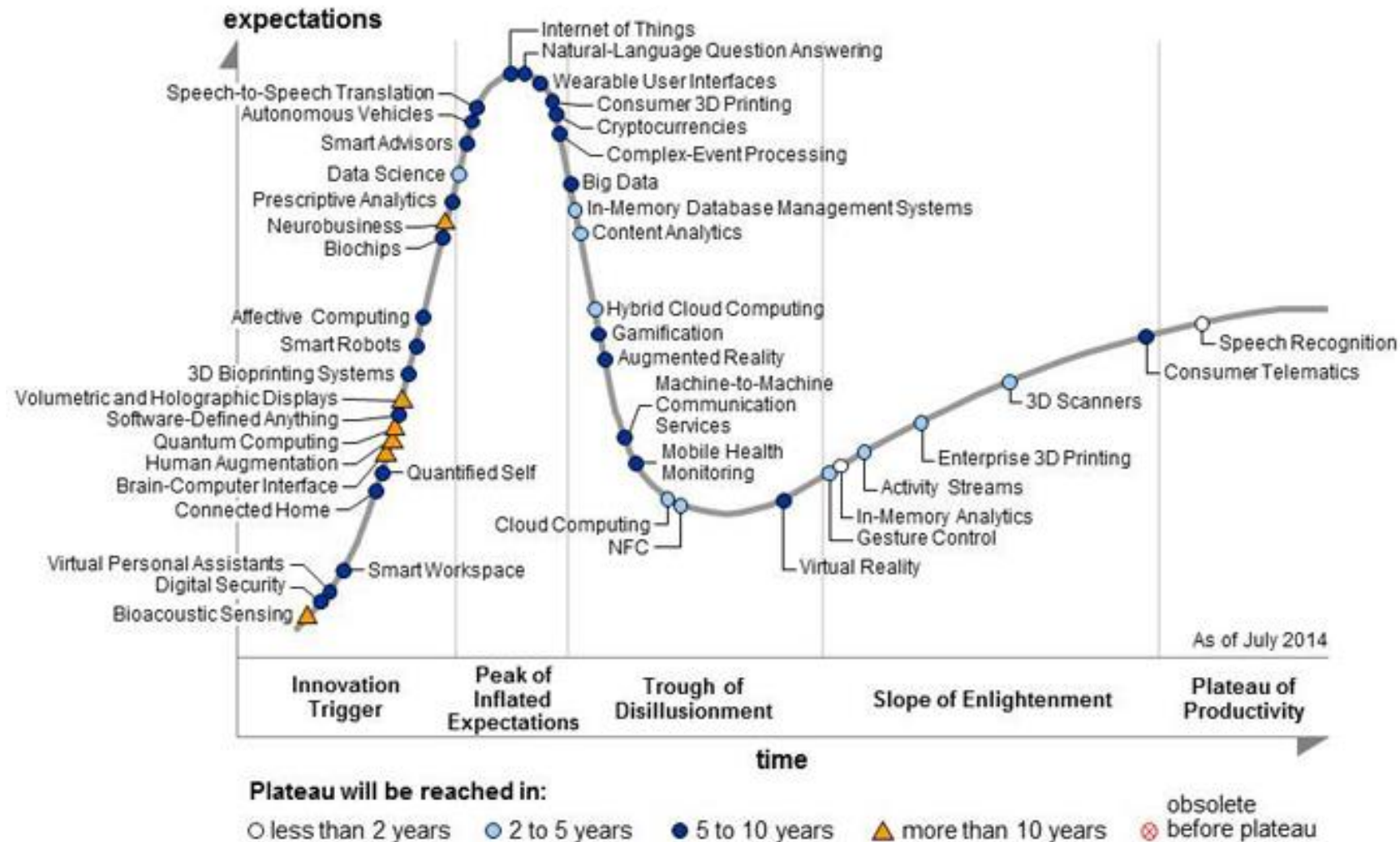
Source: Gartner (July 2016)

Modelling the maturity and adoption of new technologies: the “Hype Cycle” 2015

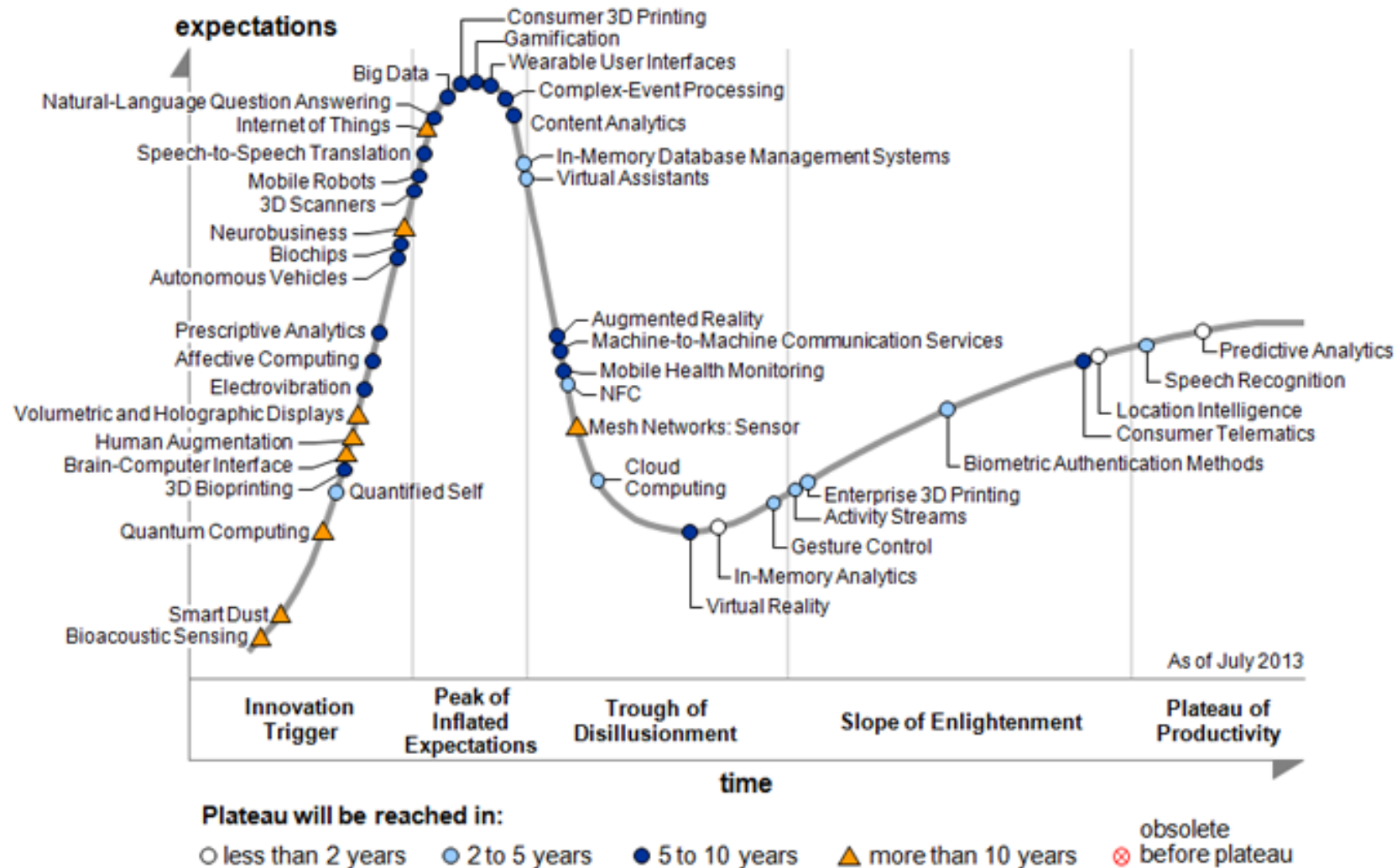


Source: <http://www.gartner.com/newsroom/id/3114217>

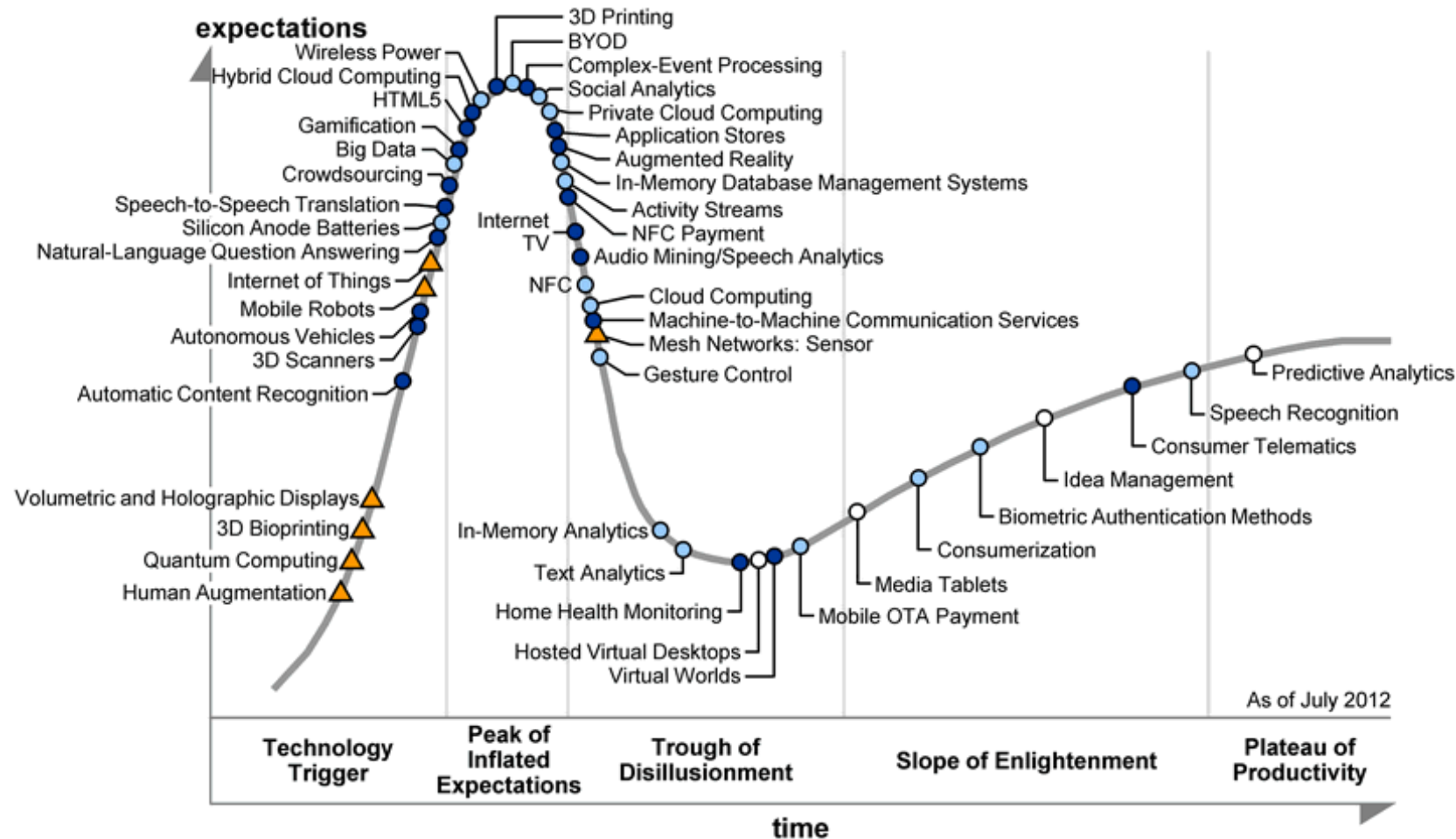
Modelling the maturity and adoption of new technologies: the “Hype Cycle” 2014



Modelling the maturity and adoption of new technologies: the “Hype Cycle” 2013



Modelling the maturity and adoption of new technologies: the “Hype Cycle” 2012

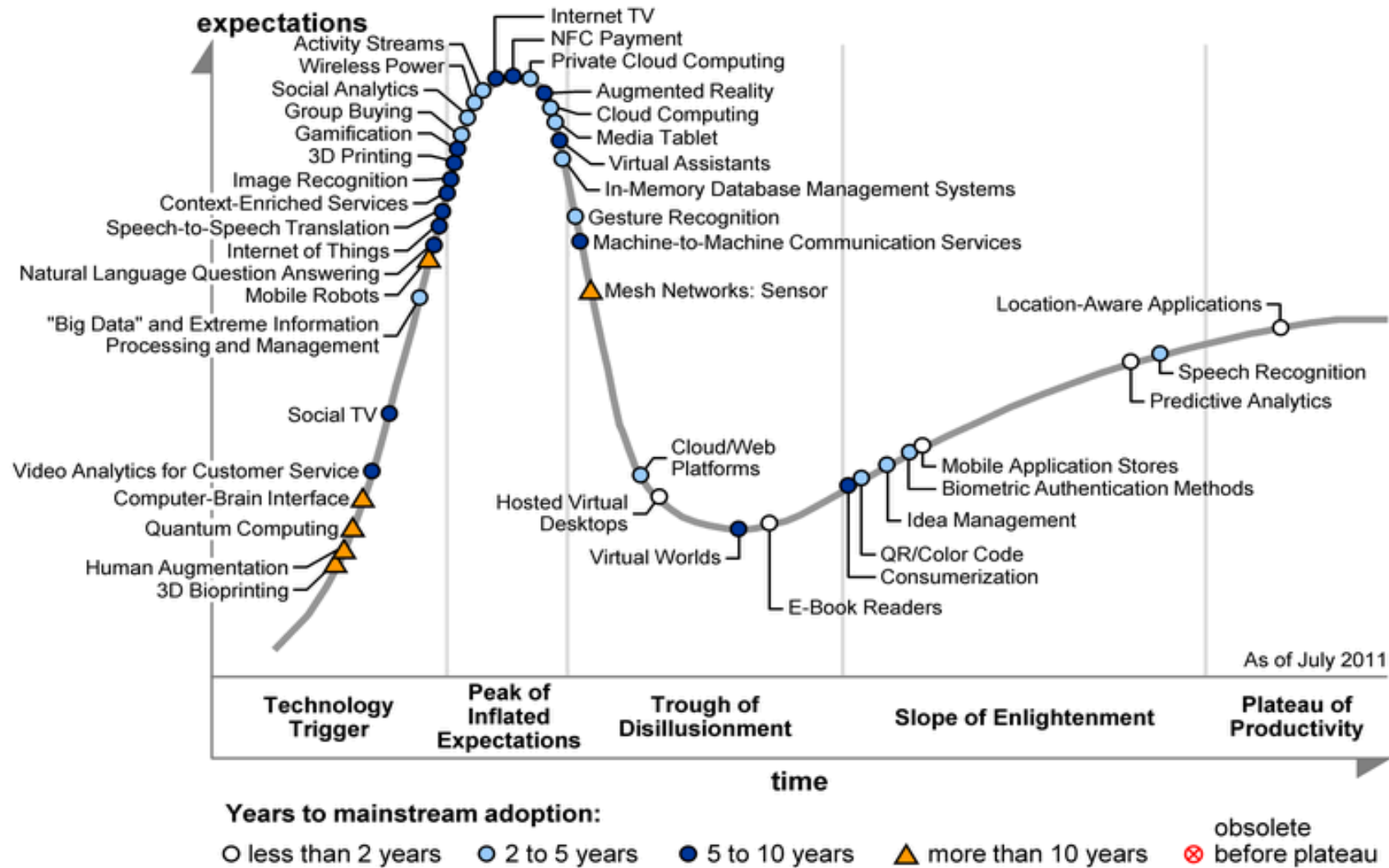


Plateau will be reached in:

○ less than 2 years ● 2 to 5 years ● 5 to 10 years ▲ more than 10 years ⊗ obsolete before plateau

Source: <http://www.gartner.com/technology/research/hype-cycles/>

Modelling the maturity and adoption of new technologies: the “Hype Cycle” 2011



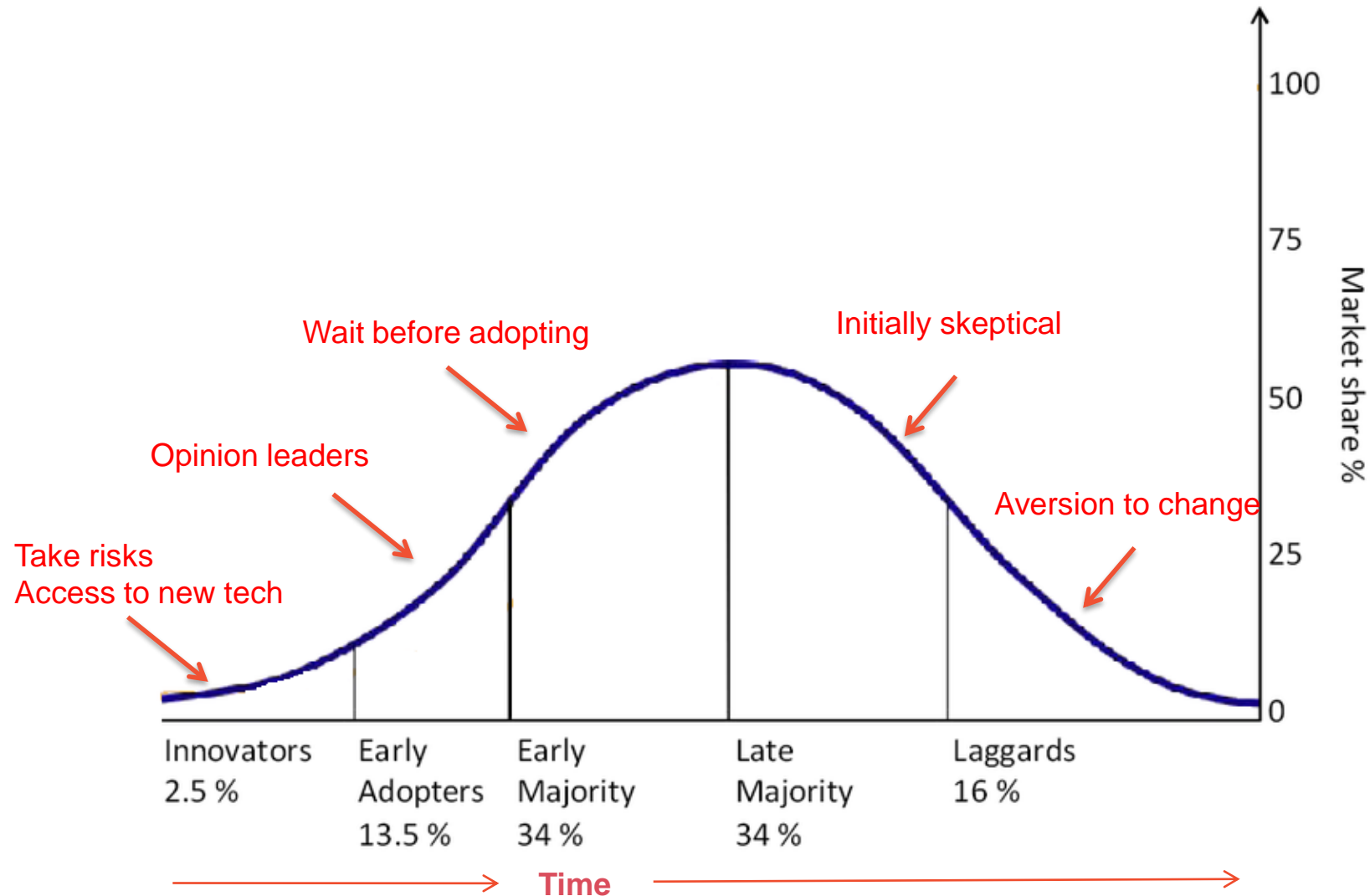
Source: <http://www.gartner.com/technology/research/hype-cycles/>

The Gartner Hype-Cycle

- Uses:
 - Strategic planning of technology development
 - Companies considering adoption of a technology
 - Investors investing in technology
- Some criticisms
 - Development of each Gartner Hype-Cycle is not done scientifically – it is the opinions of market analysts at a point in time
 - Technologies may appear already on the slope of enlightenment or disappear
 - It only works for technologies that follow this model (eg it doesn't deal well with technologies that never succeed or are quickly superseded)
 - As it is widely-used, it is partly self-fulfilling (i.e. people may not adopt technologies as they don't appear mature in the hype-cycle)
- Summary: Use with care

Disruptive Innovation

Recap Week3: Technology Adoption Lifecycle Model



“Disruptive Innovation”



Clayton Christensen,
Economist (Harvard
University) and
business strategist

- Clayton Christensen introduced the concept of “disruptive technology” (1995), later reframing it to be “disruptive innovation” (1997)
- Author (or co-author) of well-known books including:
 - The Innovator’s Dilemma (1997)
 - The Innovator’s Solution (2003)
 - Disrupting class (2008)
 - The Innovator’s Prescription (2008)
 - The Innovative University (2011)
- Good site for disruptive innovation topics:
 - <https://hbr.org/topic/disruptive-innovation>

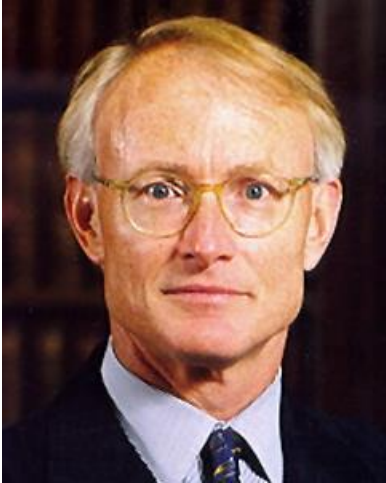
Disruptive Technology to Disruptive Innovation?

- Why did Christensen change from “disruptive technology” to “disruptive innovation” ?
- Recognized that few technologies are intrinsically disruptive or sustaining in character
- It is the *business model* that the technology enables that creates the disruptive impact
- However, Christensen's **evolution from a technological focus to a business-modelling focus** is central to understanding the evolution of business at the market or industry level
 - https://en.wikipedia.org/wiki/Disruptive_innovation
 - <https://www.startupgrind.com/blog/sg-2016-welcoming-clayton-christensen-godfather-of-disruptive-innovation/>

“Disruptive Innovation”

- “Disruptive innovations” disrupt markets
- They create new markets or change the **value network** in an existing market.
- To understand “**value network**”, we must study “**value chain**”

“Value Chain”



Michael Porter
(Harvard University)
Expert on competition and
company strategy

images.businessweek.com

- Michael Porter introduced the concept of “value chains” (1985)
- In best-selling book: “Competitive advantage: Creating and sustaining superior performance”
- The father of company strategy.
- Most cited author in business and economics.

Porter's “Value Chain”

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

Industry value chains

- An industry value chain is how value is created and passed on between participants in an industry
- Diagrams can show how value flows through the industry
- Value may be from licensing a technology, selling a product, providing a service, etc

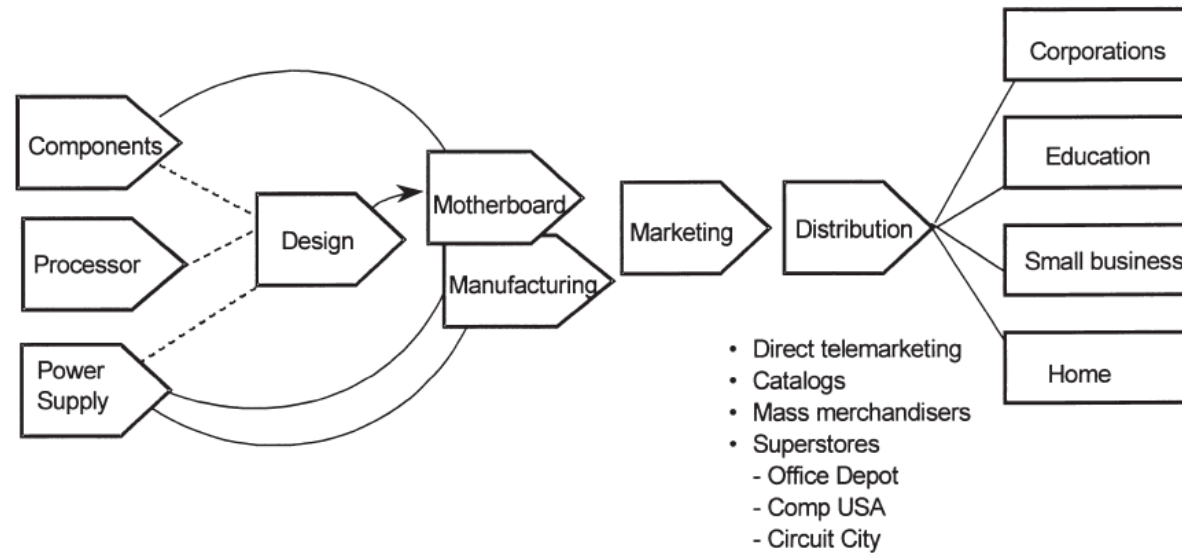
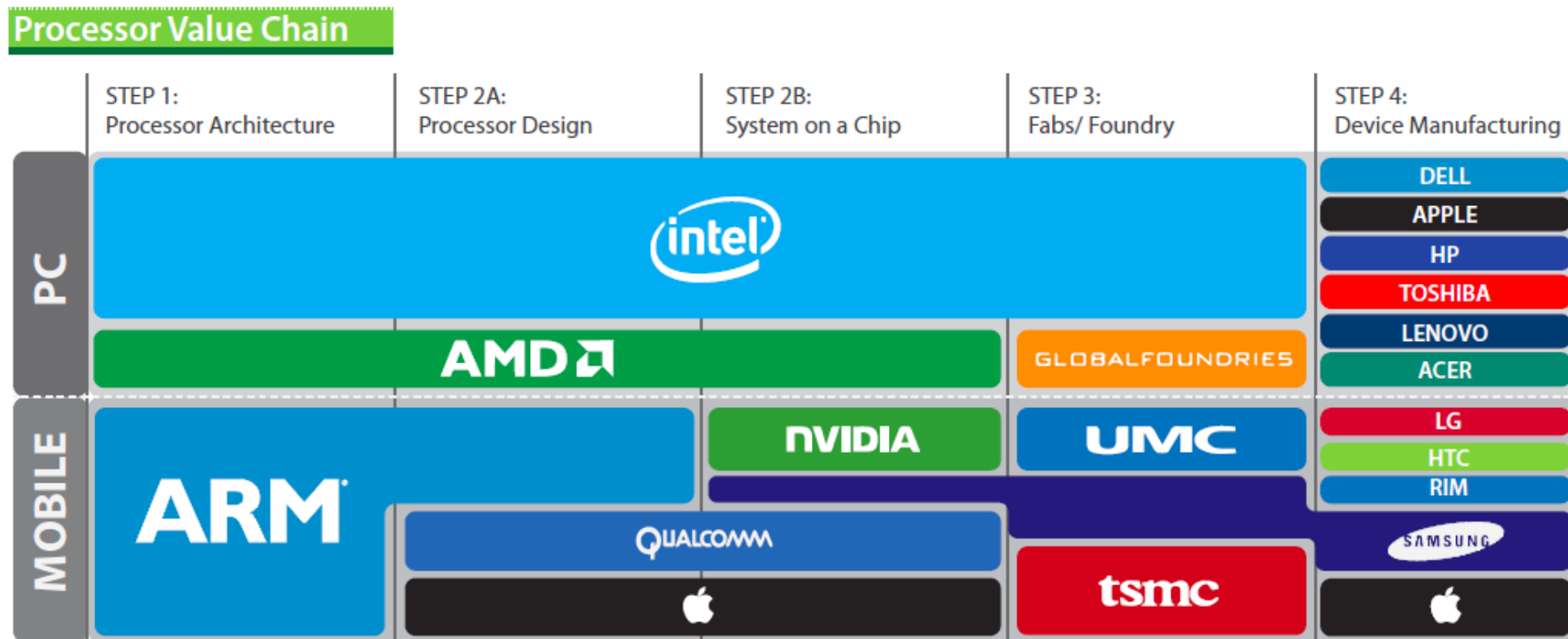


FIGURE 5. Building toward enacted value chain; a typical computer firm.

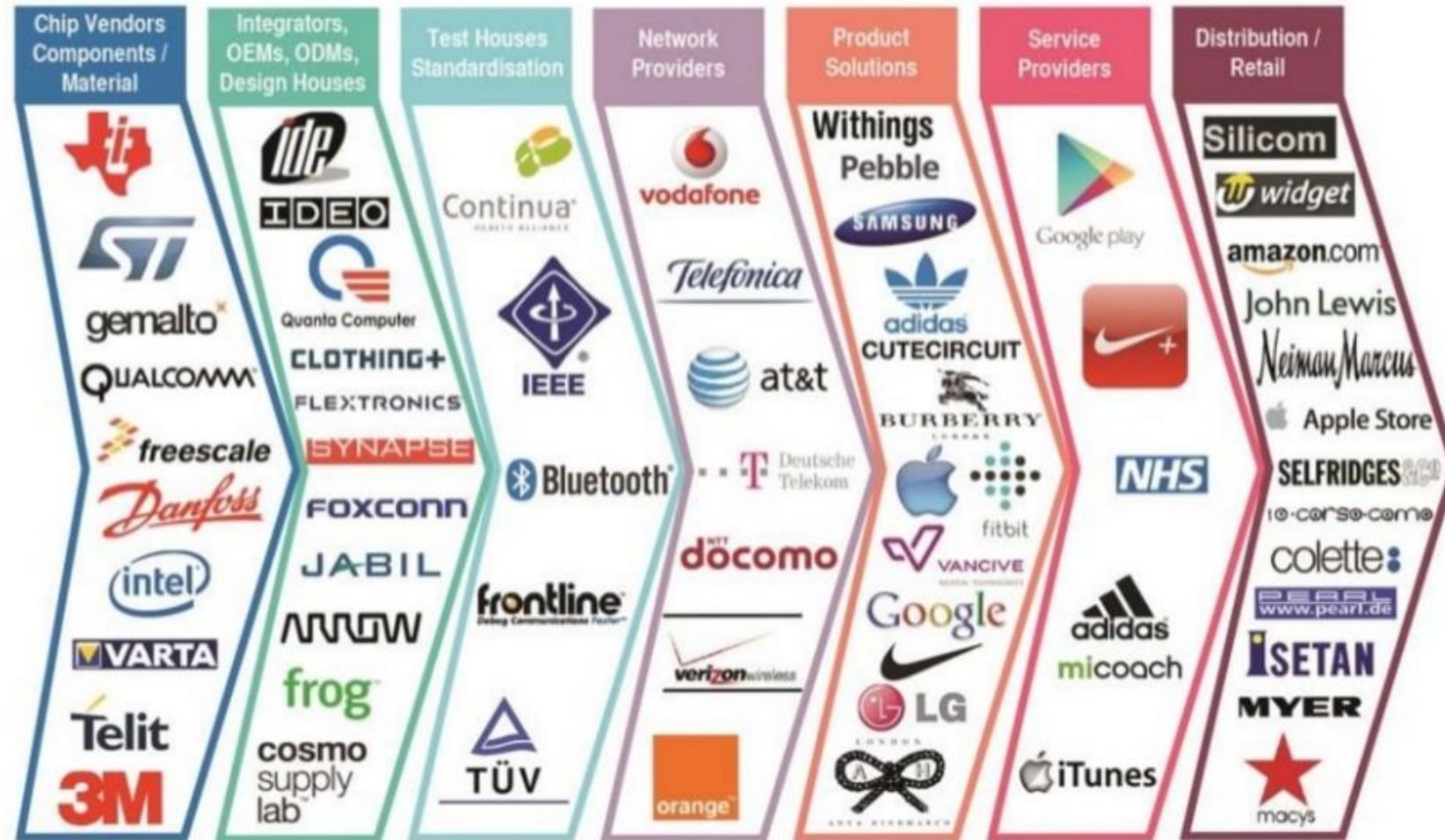
Source of figure: Kothandaraman and Wilson, “The Future of Competition: Value-Creating Networks” (2001)

Example industry value chain: Microprocessors



Source: <http://iveybusinessreview.ca/cms/1070/intel-outside-breaking-into-mobile-3/> 2012

Example industry value chain: Wearable Technology (2013)



<http://www.slideshare.net/JohannaMischke/convergence-between-cloud-internet-of-things-and-wearable-technologies>

Example industry value chain: Internet Value Chain (2011)

ATKEARNEY

Overview of the Internet Value Chain



Source: A.T. Kearney <http://slideplayer.com/slide/7999438/>

Value Network

- Term “value network” first used by Clayton Christensen
- Similar concept to “industry value chain” but usually **more focus on the whole system** rather than for a specific product/service type

Typical results of disruption of a market

- Change the value network in the market (how value is created and captured)
- Change the product categories in the market
- Change the type of companies involved in the market
- Change the actual companies in the market
- Change the business models being used in the market
- Change the relationships between companies in the market
- Change the power relationships in the market

Revisited: “Disruptive Innovation”

- “Disruptive innovations” disrupt markets
- They create new markets or change the **value network** in an existing market.



<https://hbr.org/2015/12/what-is-disruptive-innovation>

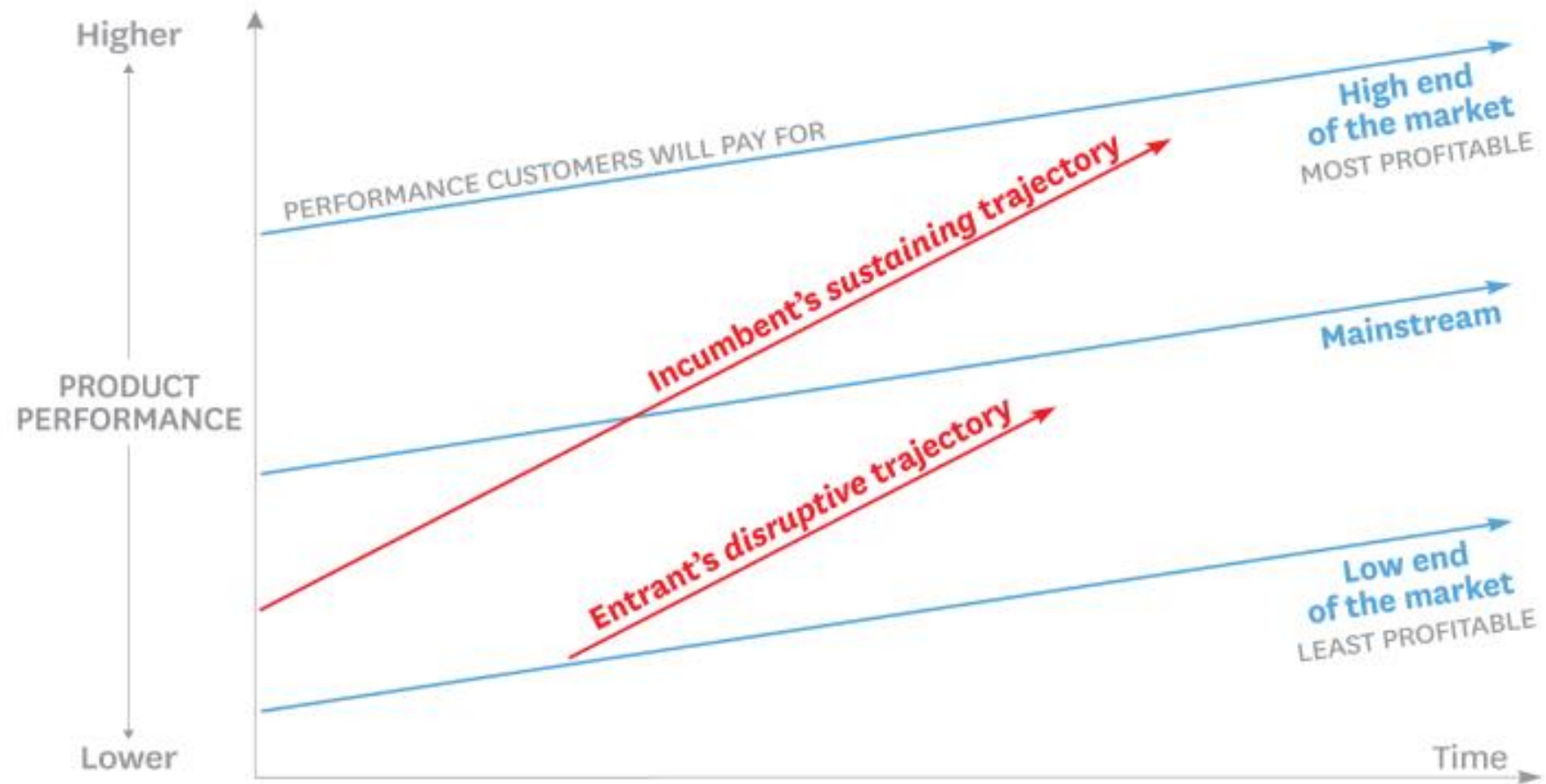
“The Innovator’s Dilemma”

- Christensen identified the “innovator’s dilemma”...
- Effective established companies study the needs of their customers
- The companies innovate to meet these customer needs
- The companies sell new products/versions to their customers
- The most important existing customers are the high-end ones who spend the most so the focus is on them
- The dilemma is that the more a company focuses on the needs of their high-end customers, the more likely it is that they will miss opportunities in emerging technologies
- Examples:
 - Kodak and digital camera
 - Microsoft and their Operating System...
 - Blockbuster and online movie streaming

Disruptive Innovation

- According to Christensen, innovations can be either **disruptive** or **sustaining**
- “Disruptive innovations” disrupt markets
 - i.e. they create new markets or change the value network in an existing market
- “Sustaining innovations” sustain markets
 - i.e. there is no change to the value network in the market

The disruptive innovation model

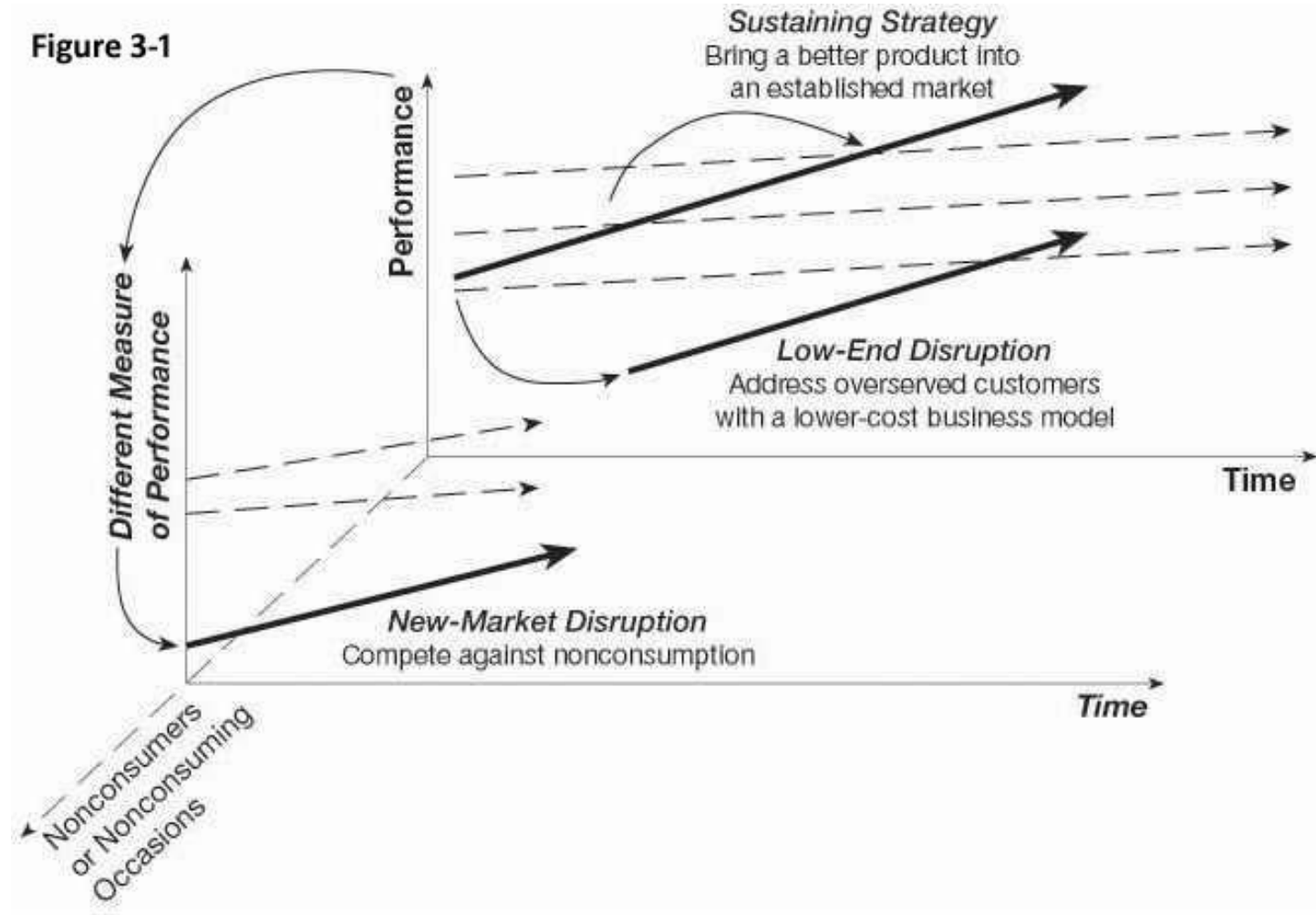


SOURCE CLAYTON M. CHRISTENSEN, MICHAEL RAYNOR, AND RORY MCDONALD
FROM "WHAT IS DISRUPTIVE INNOVATION?" DECEMBER 2015

© HBR.ORG

<https://hbr.org/2015/12/what-is-disruptive-innovation>

Types of disruptive innovation



Source: Christensen (2003)

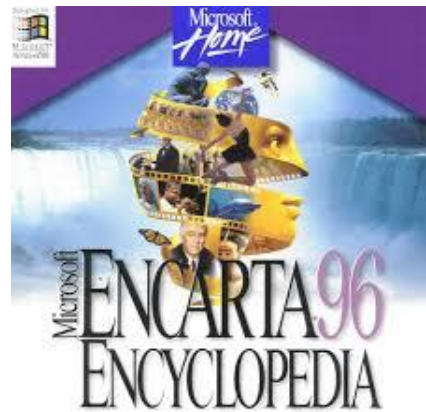
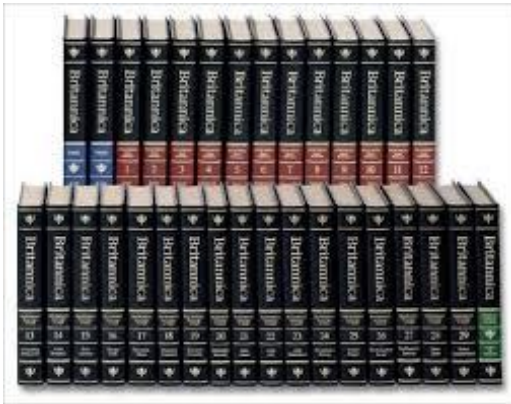
Types of disruptive innovation

- Christensen distinguishes between :
- "low-end disruption" – there are customers who do not need the full functionality or performance of products already on the market so cheaper alternatives can take over.
- "new-market disruption" – there are customers who have needs that were not being addressed by existing products

Example of low-end disruptive innovation:

Online encyclopedias

- Traditional encyclopaedias (eg Encyclopaedia Britannica) and software/online encyclopaedias (eg Microsoft Encarta) were well established
- Wikipedia was initially criticised as anyone could edit it and some thought it could never be reliable
- Ease of use and good community editing model led to Wikipedia eventually replacing most use of encyclopaedias



Example of low-end disruptive innovation:

Stock photos



- Getty Images was an established photo licensing business (founded 1995)
 - Customers paid for stock photos
- iStockphoto was a crowdsourcing stock imagery site launched in 2000
 - Stock photos were initially free but then they introduced micropayments for photo contributors
- Comparison example:
 - iStockphoto: approx \$1 (taken by amateurs)
 - Getty images: approx \$40 (taken by professionals)
- Volume of crowdsourced photos continually increased and quality continually improved
- Getty couldn't compete with iStockphoto
- Getty bought iStockphoto for \$50m in 2006

Example of low-end disruptive innovation: Ride-sharing



- Started in the 90s but not successful as the needed technology not widespread
- When GPS, smartphones and social networks were widely available, realtime ride-sharing became practical
- In 2011, realtime ride-sharing companies started operating in San Francisco
- In 2012, the Californian authorities fined companies Lyft, Uber, Sidecar and Wingz \$20,000 each and said that they must stop operating services
- In 2013, an agreement was reached and the authorities created a new service category “Transport Network Companies”

Is Uber really a Disruptive Innovation at all?

- “Disruptive innovations” disrupt markets
 - (i.e. they create new markets or change the value network in an existing market)
- In order for a business to be disruptive, it must gain a foothold in a low-end market that had been ignored by the incumbent
- Otherwise, the disruptor must create an entirely new market, turning non-customers into customers. Uber doesn’t fit into either of those boxes: it targets people who already use taxi services, and it doesn’t provide a particularly lower-end or cheap experience.
- A truly disruptive business begins with low-quality offerings, then eventually captures the mainstream market by improving quality.

<https://hbr.org/2015/12/what-is-disruptive-innovation>

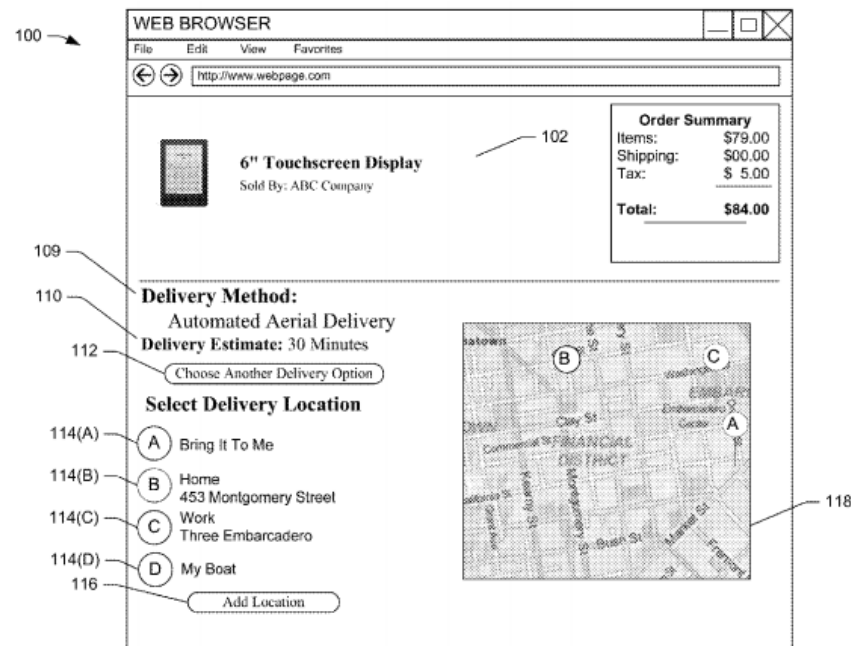
Amazon.... “It wants to escape the messy vicissitudes of roads and humans....”

- Amazon’s longer-term goal is more fantastical — and, if it succeeds, potentially transformative. It wants to go fully autonomous, up in the sky.
- Pretty much all of Amazon’s current investments in shipping — in trucks, planes and crowdsourced delivery cars — depend on the traditional shipping infrastructure.
- If Amazon’s drone program succeeds (and Amazon says it is well on track), it could fundamentally alter the company’s cost structure.
- A decade from now, drones would reduce the unit cost of each Amazon delivery by about half, analysts at Deutsche Bank projected in a recent research report. If that happens, the economic threat to competitors would be punishing — “retail stores would cease to exist,” Deutsche’s analysts suggested, and we would live in a world more like that of “The Jetsons” than our own.

http://mobile.nytimes.com/2016/08/11/technology/think-amazons-drone-delivery-idea-is-a-gimmick-think-again.html?_r=0&referrer

Amazon Drone Patents...

According to the patent, the drones will find their destination by continuously tracking the location of the purchaser's smartphone. While this might seem strange at first glance, this implementation enables delivery to customers who might not be at home. The patent, for instance, references how a package might even be delivered to a boat.



Furthermore, in a hypothetical world filled with Amazon drones flying to and fro, the drones will be able to communicate with each other regarding weather conditions and other pertinent data which could affect deliveries.

<http://bgr.com/2015/05/08/amazon-prime-air-patent-drone-delivery/>

Disruptive innovation



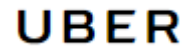
- Bitcoin bypasses traditional banks and clearinghouses with **blockchains** technology.



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



- Tencent (e.g., WeChat) outcompetes in Internet services through microtransactions.



- Uber sidesteps the license system that protects taxicab franchises in cities around the world.



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



- Netflix destroyed the movie rental industry by providing new distribution business model to customers; now also a content producer

Managing disruption: An interview with Clayton Christensen

- Euchner, J. (2011). Managing disruption: an interview with Clayton Christensen. *Research-Technology Management*, 54(1).
- Canon disrupting the photocopier market where Xerox was dominant
- Intuit disrupting the small business accounting market with QuickBooks
- MinuteClinic (walk-in clinic) disrupting the medical clinic
- **Intel resisting disruption by developing the low-cost Celeron processor**
- Cisco disrupting the voice comms market with VoIP support in routers
- Kodak not dealing with disruption from digital photography

Types of disruptive innovation

Type of Innovation	Type of Diffusion to which It Maps	Description	Example
Sustaining Innovation	High-end encroachment	The new product first encroaches on the high end of the existing market and then diffuses downward.	Pentium IV relative to Pentium III
Disruptive Innovation	Low-end encroachment	The new product first encroaches on the low end of the existing market and then diffuses upward.	
New-Market Disruption	Fringe-market low-end encroachment	Before encroachment begins, the new product opens up a fringe market (where customer needs are incrementally different ^a from those of current low-end customers).	5.25 inch disk drive relative to 8 inch drive
	Detached-market low-end encroachment	Before encroachment begins, the new product opens up a detached market (where customer needs are dramatically different ^a from those of current low-end customers).	Cell phone relative to land line
Low-End Disruption	Immediate low-end encroachment	Low-end encroachment begins immediately upon introduction of the new product.	Discount relative to department stores

* The distinctions between fringe and detached markets and between incrementally and dramatically different preferences are illustrated in the disk-drive examples provided herein.

Source: Schmidt and Druehl (2008)

Christensen on disruptive innovation 20 years on (February 2016)

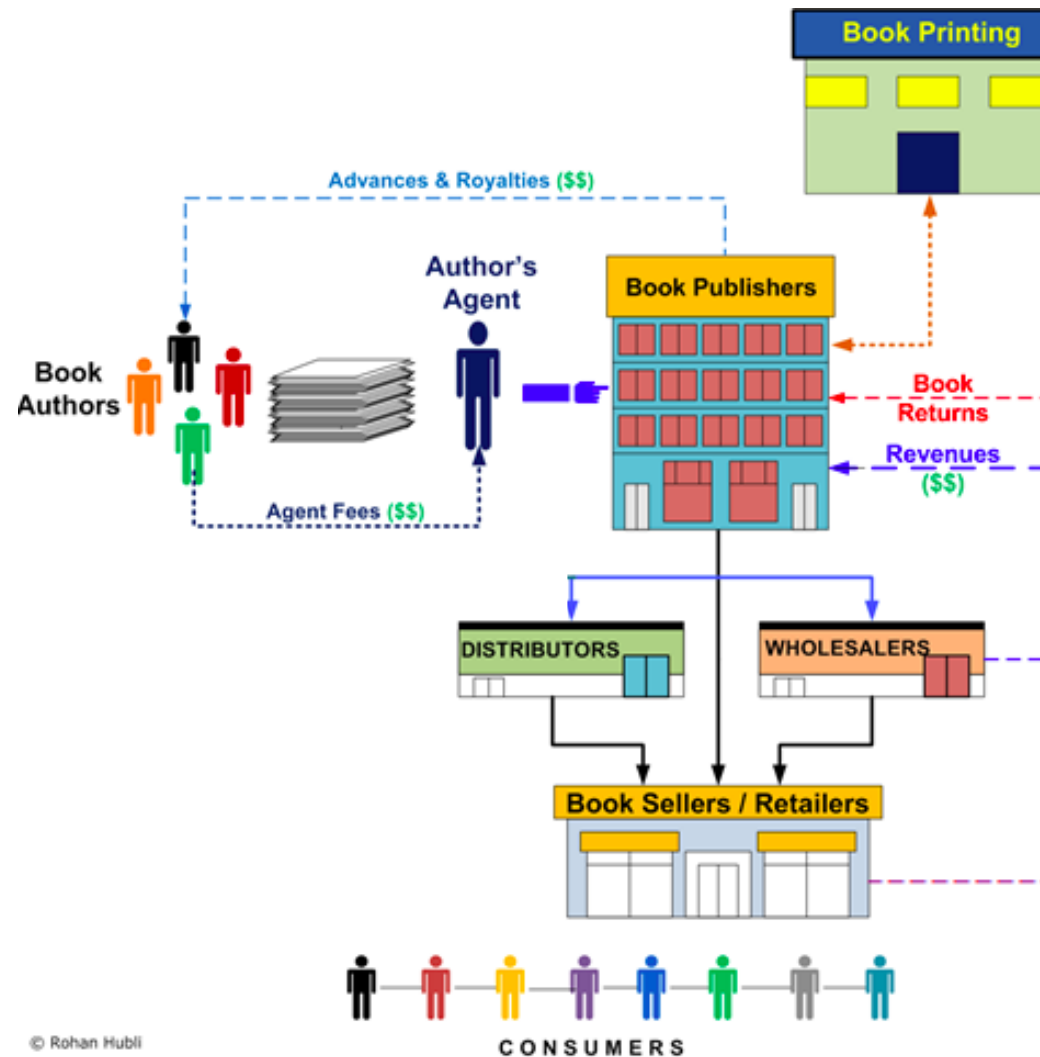


From start of podcast to 5:38 <http://a16z.com/2016/03/03/disruption-clay-marc/>

Disruptive innovators and value networks

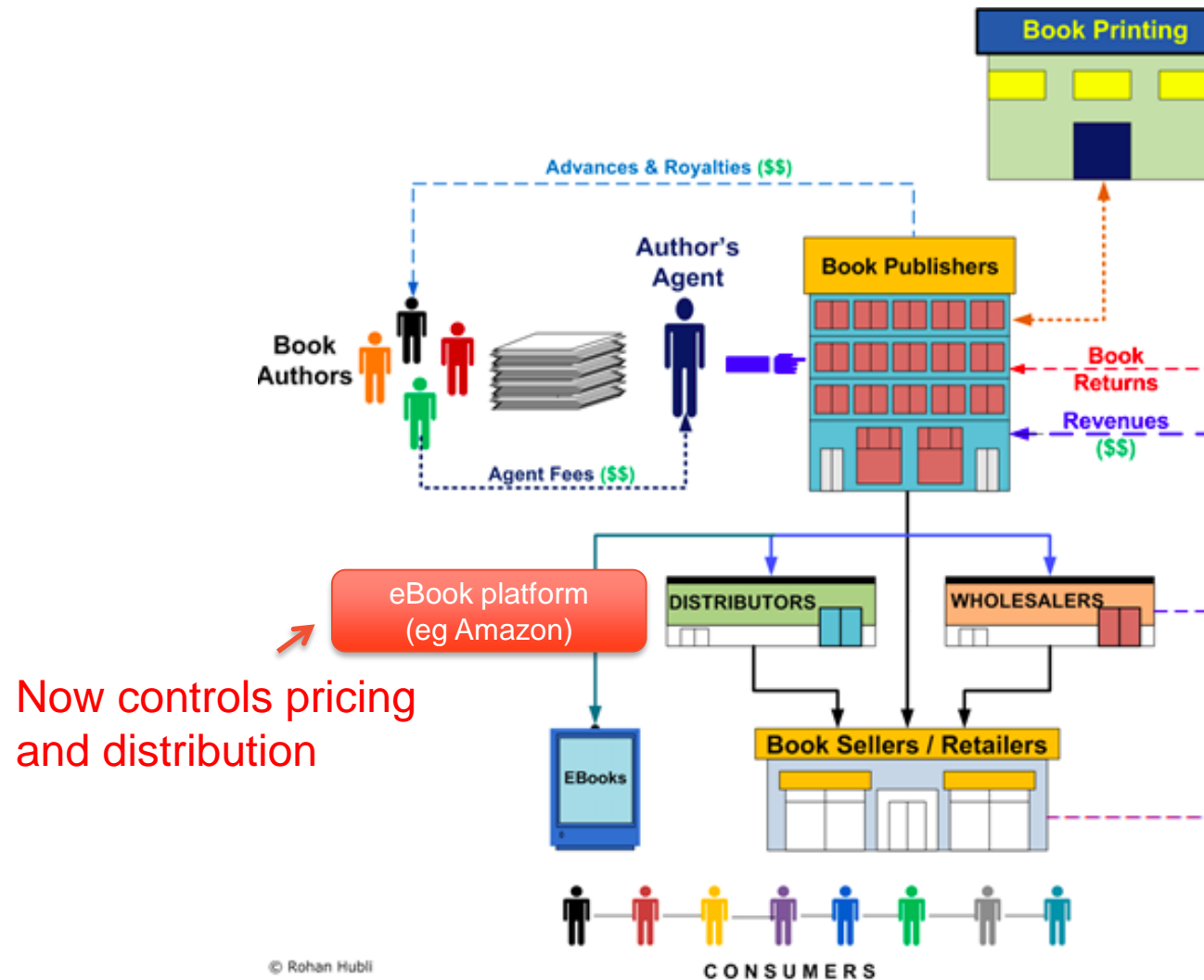
- “When would-be disruptors enter into existing value networks, they must adapt their business models to conform to the value network and therefore fail that disruption because they become **co-opted**.”
- (Clayton Christensen, *“The Innovator’s Dilemma”*, 1997)

Book publishing value network: Traditional



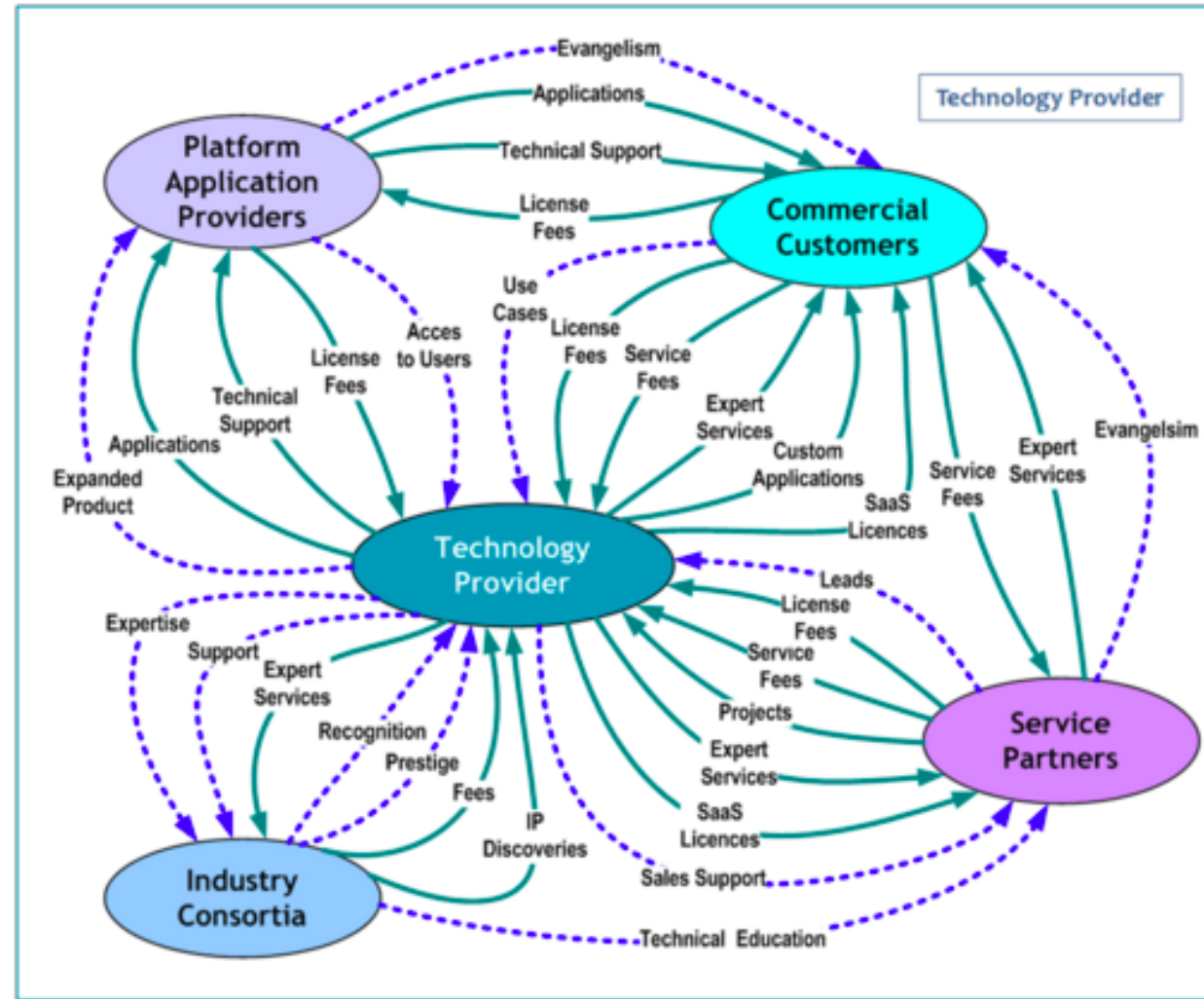
<http://marketingstrategicmanagement.blogspot.com.au/2009/10/ebooks-and-future-of-us-book-publishing.html>

Book publishing value network: Traditional + e-books



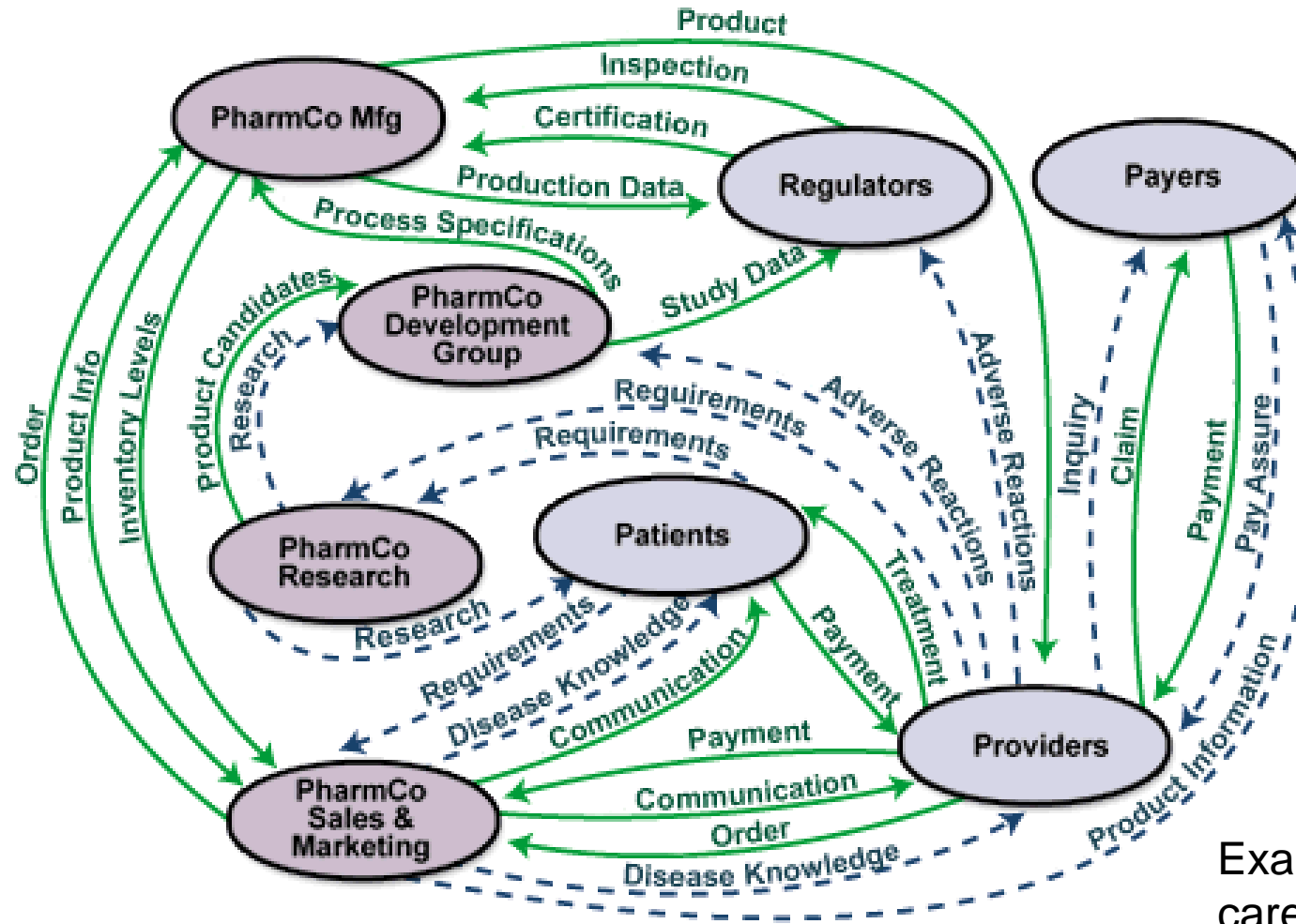
Modified from : <http://marketingstrategicmanagement.blogspot.com.au/2009/10/ebooks-and-future-of-us-book-publishing.html>

Value Network Analysis



Source of figure: Verna Allee <http://www.vernaallee.com/valuenetworks.html>

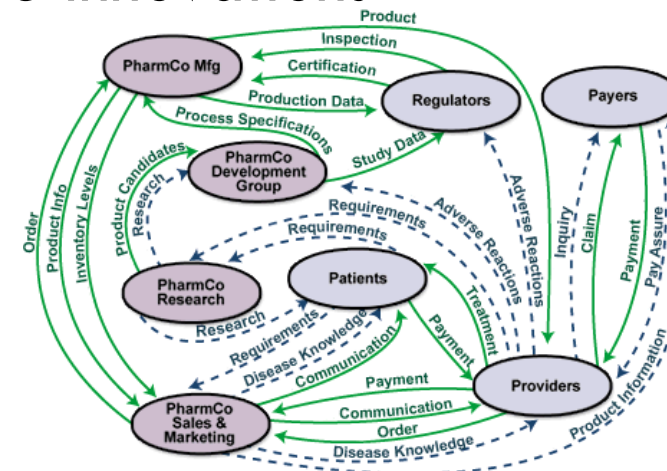
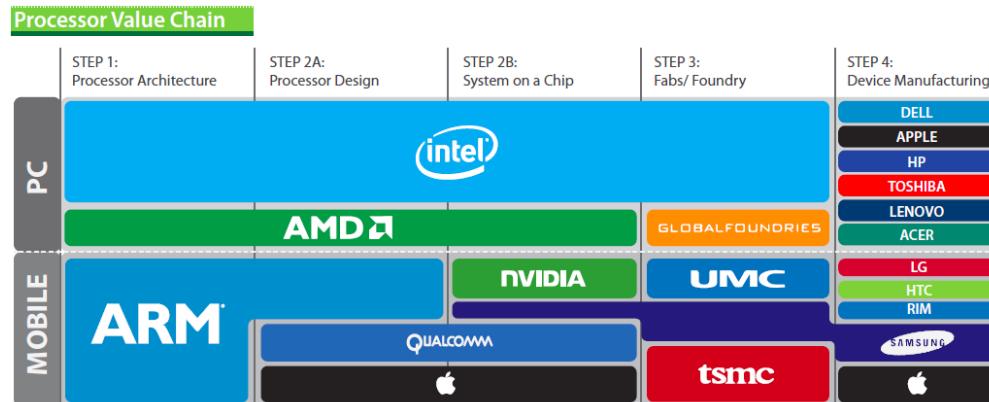
Value Network Analysis



Example: Health care value network

Use of Value Chains/Networks

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



Source of figure: Verna Allee

Disrupting the value networks

- Disrupting value networks can be done by:
- Analysing the value network and attempting to change it:
 - “Disintermediation” = “cutting out the middleman”
 - Common using the Internet, e.g. book flights from the airline directly
 - “Reintermediation” = adding in a new intermediary
 - Also common using the Internet, e.g. new types of travel agent – WebJet, Flightfox, etc)
- Ignoring the current value network and having it change around you
 - Also common using the Internet
 - Facebook: “Move fast and break things”

Move fast and break things. Unless you are breaking stuff, you are not moving fast enough.

Startup Quote!



MARK ZUCKERBERG

CO-FOUNDER, FACEBOOK

<http://startupquote.com/post/1624569753>

Summary

- Established companies doing the right thing (i.e. listening to their customers) may not see disruptive innovations coming
- Established companies can learn to notice potentially disruptive innovations at an early stage and act
- Understanding value chains/networks is useful:
 - If you are an established company:
 - In understanding emerging threats
 - In designing a strategy to disrupt a market
 - If you are a startup:
 - In disrupting a market
 - If you are in corporate IT:
 - In understanding how products and solutions may change

References

- V. Alee and O. Schwabe, Value Networks and the true nature of collaboration, Verna Alee Associates 2011
- C.M. Christensen, The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail, Harvard Business Press, 1997.
- C.M. Christensen, Innovation and the General Manager, McGraw-Hill/Irwin, 1999.
- C.M. Christensen and M.E. Raynor, The Innovator's Solution: Creating and Sustaining Successful Growth, Harvard Business Press, 2003.
- M. E. Porter, Competitive Advantage: Creating and sustaining superior performance, New York Free Press, 1985.
- G.M. Schmidt and C.T. Druehl. “When is a disruptive innovation disruptive?”, The Journal of Product Innovation Management, vol. 25:347–369, 2008.

Quiz Review

Contents from Week 1 to 4

Recap Week1: Assessment

- **Quiz 5% (Week 5)**
 - **Mid-semester Quiz**
- Participation 5% (Week 8-10)
 - Attendance and participation in group presentations
- Presentation - IT Innovation Case Studies 10% (Week 8-10)
 - Presentation of a Case Study to the class (Group Work)
- Essay (Innovation Review) 20% (Week 12)
 - Critical Essay on a topic with IT innovation (Individual Work)
- Final Exam 60% (Exam Period)
 - Final exam covering all material covered in lectures, guest lectures, assigned reading and class discussion

Mid-Sem Quiz

- The Quiz is to give you practice for the final exam – the style of question is similar to the style of question that will be used in the final exam.
- You must answer all questions and each sub-part of each question.
- In your answers, it is OK to use full sentences and bullet points.
- All tutorial and lecture contents until week 4.
- Feedback will be provided indicating what students are generally doing well and what they are not doing so well. This feedback will be posted in Blackboard to help all students in preparation for the exam.

Mid-Sem Quiz

- 45 minutes
- In the Labs using Blackboard
- Answer using any Document; then, you can cut/paste your answers to the Blackboard system

Main Topics Covered so far

- What is technological innovation?
- Why is it important?
- What are different types of innovation?
- Where do new innovations come from?
- How do they spread / diffuse through society?
- Why and how do technologies improve over time?
- How do new product categories emerge?
- Why and how do some industry-wide designs dominate?
- How do technology cycles influence types of innovation?
- What is disruptive innovation?
- Value Chain
- Why is the role of the Government so important?

Sample Qs

- Utterback and Abernathy introduced the concept of "design dominance" (or dominant design) in an industry.
 - Explain this concept.
 - Give an example of a recent IT-related architecture that has become a dominant design for an industry. Identify factors that led to that architecture becoming dominant over other possible architectures and explain how each of those factors contributed to this dominance.
- In the tutorial we discussed MOOCS use of innovative technologies. Does MOOCS fit into the description of 'Disruptive Innovation'?

Group Presentation

Innovative Tech Practice – Cognitive services

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

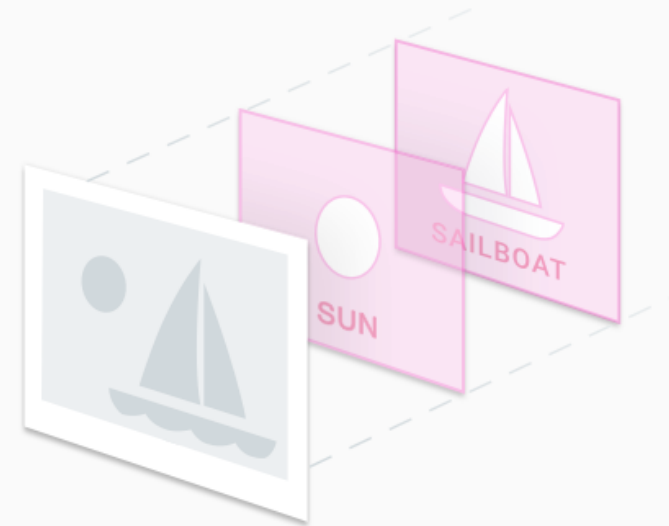
Derive insight from images with our powerful Cloud Vision API

 TRY IT FREE

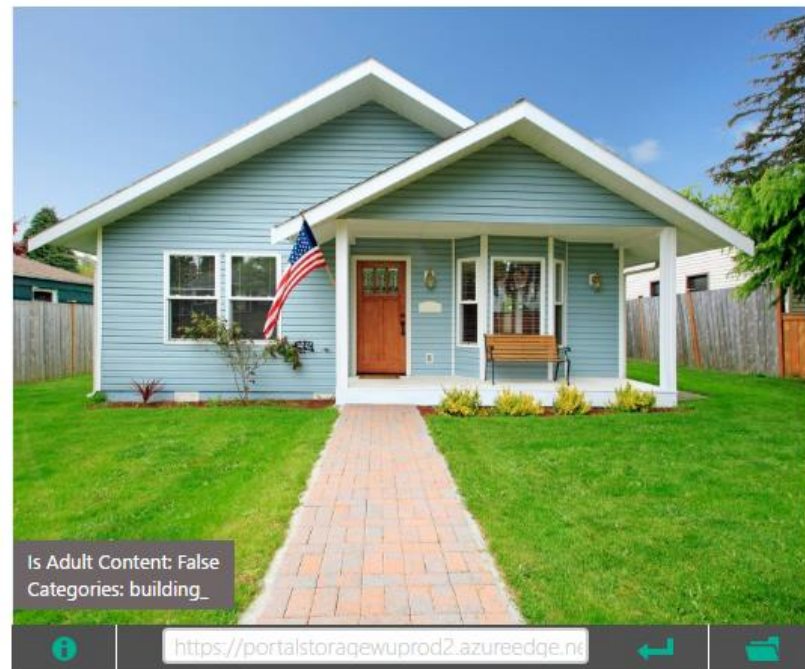
[VIEW DOCUMENTATION](#)

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", "lion", "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.

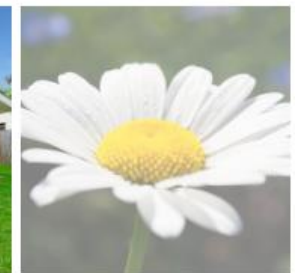
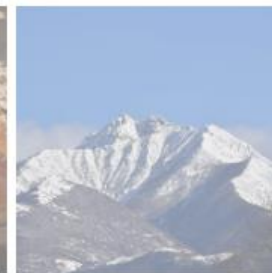
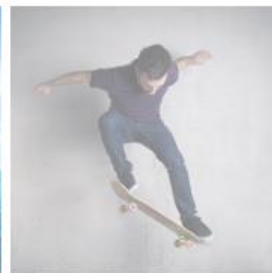
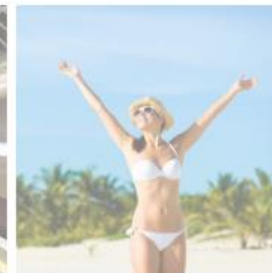


<https://cloud.google.com/vision/>



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Image Dimensions	1500 x 1155
Clip Art Type	0 Non-clipart



<https://www.microsoft.com/cognitive-services/en-us/computer-vision-api>

Judging IT Innovations



Mr Lawrence
Crumpton
Microsoft
Technical
Evangelist

— Invited Speaker from Microsoft

Tutorial Questions

- Can you describe the underlying technology and how it is used to provide the service?
- Can you think of a new business model using the service (technology)? Does it have the attributes to be a disruptive innovation?
- Consider the features and usability of the APIs. Do you think it will be easy to use the service and innovate with it for a new business? If you think the API of MS cognitive service is a Disruptive Innovation?



Past Semesters.... Innovative use of Technologies?

- Augmented Reality – Prac Lab 1
- Google Earth / Maps – Prac Lab 2
- Electronic Payment – Prac Lab 3

