

About the MCQ Online Test 01

- 10 multiple-choice questions
- 20 mins duration
- Assesses Module 1 (Week 01, 02 and 03)
- 5% of the total course marks
- Held during the lecture session in week 4, from **7:30-7:50pm on Monday Mar 22, 2021**. Students are responsible for managing their schedule – if you missed the quiz because you forgot about it, have another lecture, or for any other reasons, you must apply for special consideration.
- Delivered remotely online on Canvas. Go to the course page for INFO5992, and click on ‘Quiz’ on the side tab. Click on “MCQ Online Test 01”
- Individual assessment and closed book. The assessment is not proctored - you must complete the online quiz by yourself and without references to any materials (including notes, lecture slides and via search engines)

INFO5992 Understanding IT Innovations

Week 3: Innovation Frameworks II: Disruptive
Innovation & Innovator's Dilemma

Ivan Chua

Semester 1, 2021



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LECTURES & TUTORIALS: INFO5992 – S1, 2021

Version 1.0 (As at 24 Feb 2021)

Week	Date	Learning Objectives	Lecture	Tutorial	Consultation	Assessment
Module 1: Innovation Frameworks						
Week 01	Mar 1, 2021	LO1, LO2, LO3	Unit of Study Introduction, Administrivia, Definition of IT Innovation, Importance of Innovation to a Country, General Purpose Technologies, Overview of Emerging Technologies	Tutorial 01	Consultation 01	None
Week 02	Mar 8, 2021	LO4, LO5	Innovation Frameworks I: Dynamics of IT Innovation, Dominant Design	Tutorial 02	Consultation 02	None
Week 03	Mar 15, 2021	LO6	Innovation Frameworks II: Disruptive Innovation, Innovator's Dilemma, Value Chain & Value Network	Tutorial 03	Consultation 03	None
Module 2: Development of Key Intellectual Property in the Modern Age						
Week 04	Mar 22, 2021	LO7	Introduction to Open Innovation and Closed Innovation Distributed Innovation I: Product Platforms, Web APIs	Tutorial 04	Consultation 03	MCQ Online Test 01
Week 05	Mar 29, 2021		Distributed Innovation II: Crowdsourcing, Free and Open-Source Software, Open Data	Tutorial 05	Consultation 04	None
Mid-Semester Break (Apr 5-9, 2021)						
Week 06	Apr 12, 2021	LO7	Distributed Innovation III: Platform Ecosystems, User Innovation	Tutorial 06	Consultation 05	None
Module 3: Commercialisation Process and Business Strategies for Emerging Technologies						
Week 07	Apr 19, 2021	LO8	Commercialisation I: Startup vs Traditional Companies, Lean Startup Methodology and Agile Development	Tutorial 07	Consultation 06	MCQ Online Test 02
Week 08	Apr 26, 2021		Commercialisation II: Customer Development Process	Tutorial 08	Consultation 07	None
Week 09	May 03, 2021		Commercialisation III: Innovation Management, Value Proposition Canvas, Business Model Canvas	Tutorial 09	Consultation 08	None
Week 10	May 10, 2021	LO9	Commercialisation IV: Capital & Fundraising for IT Innovation	Tutorial 10	Consultation 09	Innovation Report Due
Module 4: Innovation At-Scale						
Week 11	May 17, 2021	LO10	Innovation Ecosystem: Silicon Valley and Australia	Tutorial 11	Consultation 10	MCQ Online Test 03
Week 12	May 24, 2021	LO11, LO12	Organisational Cultures and Structures Supporting Innovation, Judging IT Innovation	Tutorial 12	Consultation 11	None
Week 13	May 31, 2021	N/A	Course Review & Final Examination Discussion	Tutorial Review	Consultation 12	MCQ Online Test 04
STUVAC Period	Jun 7-11, 2021	N/A	N/A	N/A	Consultation – Final Exam	N/A
Exam Period	Jun 15-26, 2021	N/A	N/A	N/A	N/A	Final Exam

Agenda – Week 2

Section One (1st Half)

Disruptive Innovation

1.1 Disruptive Innovation Model

1.2 Low-End Disruption

1.3 New Market Disruption

1.4 Value Chain & Value Network

Integrated case studies include Netflix, Uber, Google Cloud (ML), Tesla and Amazon Kindle

Section Two (2nd Half)

Innovator's Dilemma & Ambidexterity Strategy

2.1 Innovator's Dilemma

2.2 Ambidexterity Strategy

2.3 Case Study: Cognitive Computing

Disruptive Innovation

Section 1

Disruptive Innovation Model

Section 1.1

“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>

What is Disruption?

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

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



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LEARNING ENGINE



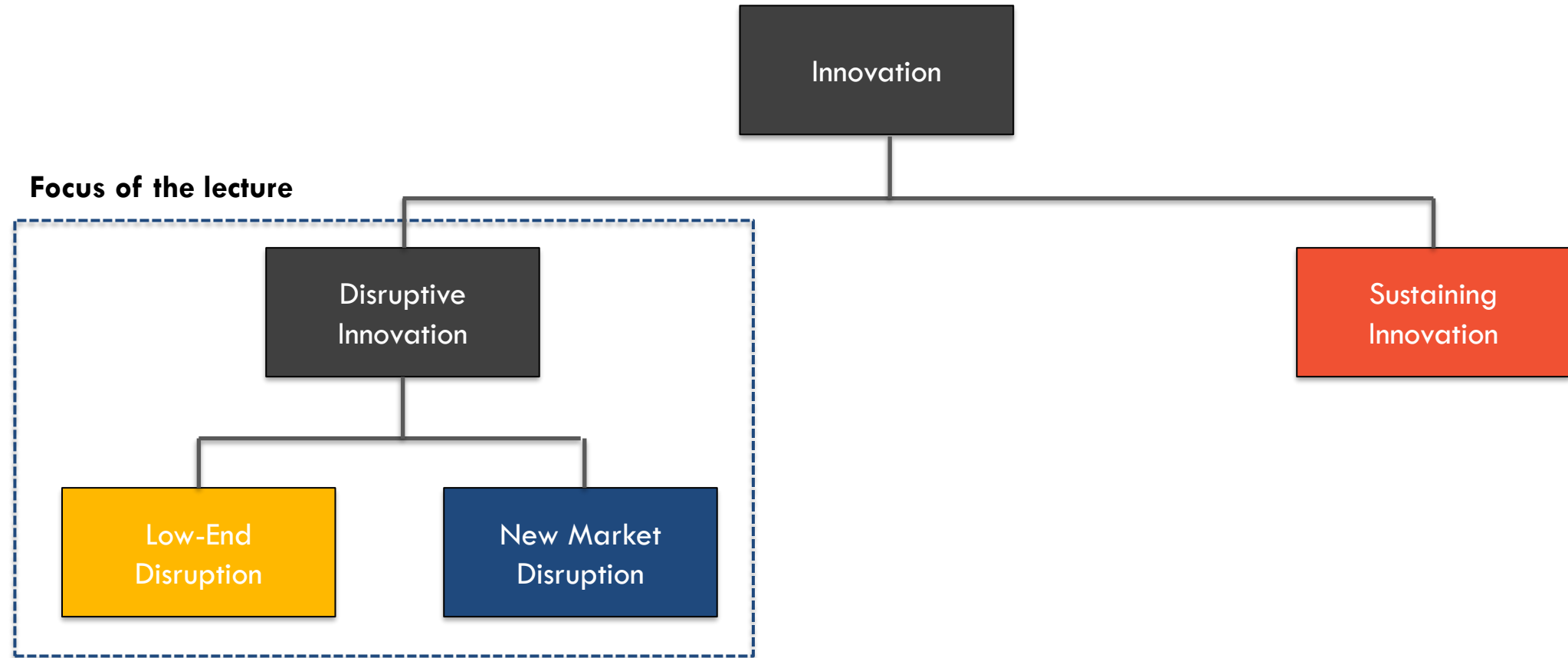
amazonkindle

Why Do Disruptive Innovation Happen?

Disruptive innovations originate in low-end or new-market footholds. Disruptive innovations are made possible because they get started in *two types of markets that incumbents overlook*.

Low-End Foothold	New-Market Foothold
<p>Exist because incumbents typically try to provide their most profitable and demanding customers with ever-improving products and services, and they pay less attention to less-demanding customers.</p> <p>In doing so, incumbents' offerings overshoot the performance requirements of the latter. This opens the door to a disrupter to provide those low-end customers with a "good enough" product.</p>	<p>Disrupters create a new market where none existed – meaning finding a way to turn nonconsumers into consumers.</p>

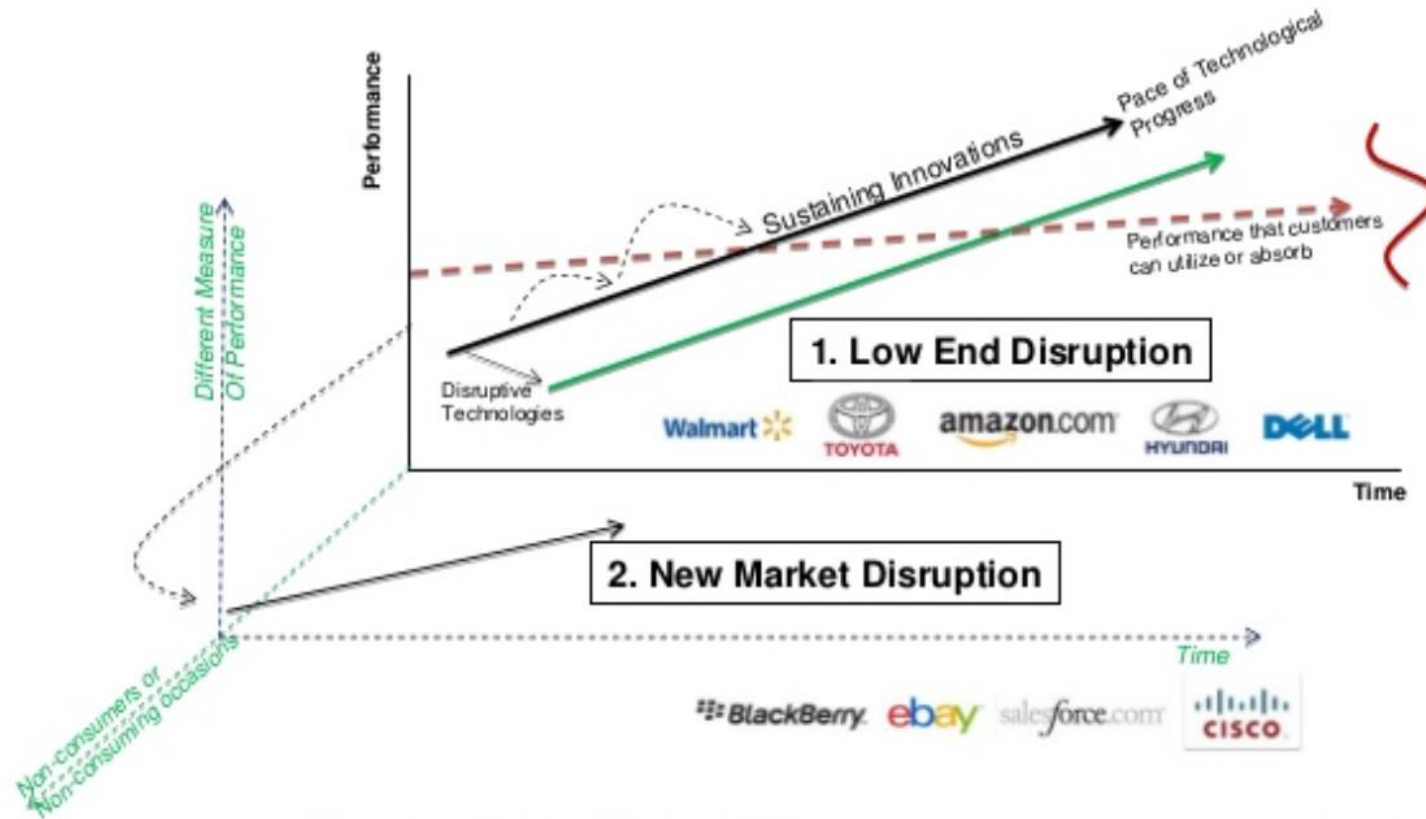
Structure of the Framework



Disruptive Innovation

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

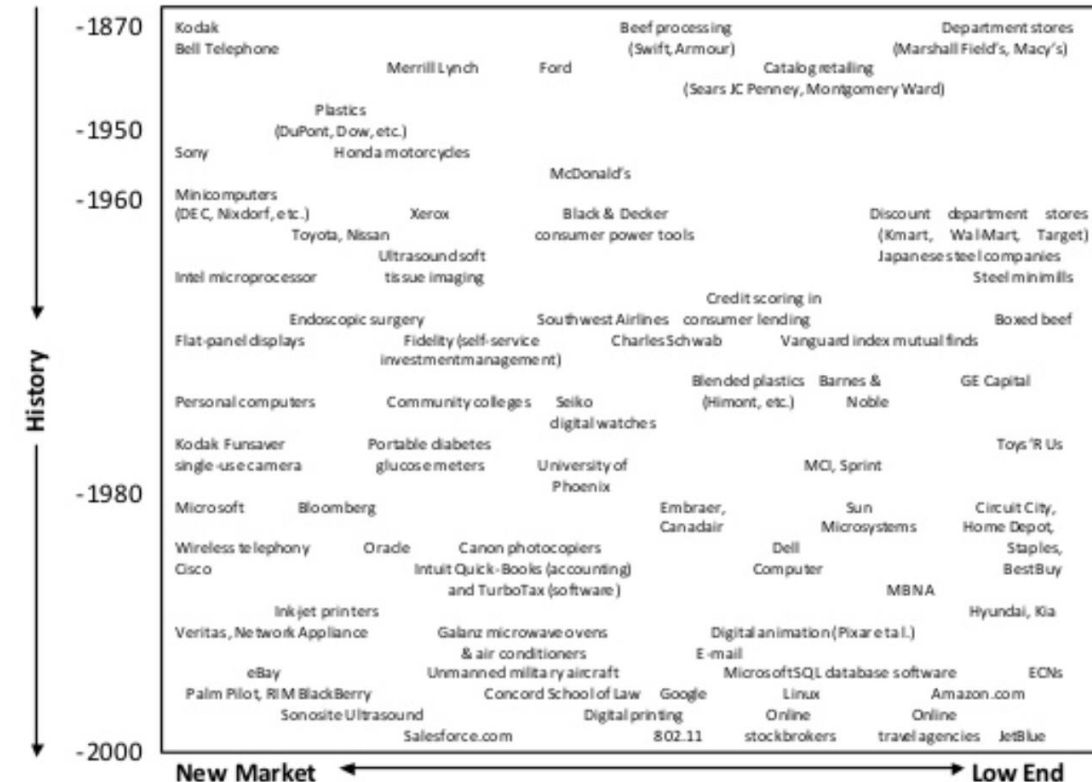
Two Types of Disruptive Innovation



<https://www.slideshare.net/PhilHogg/p-hogg-disruptive-technologies-alliances>

Types of disruptive innovation

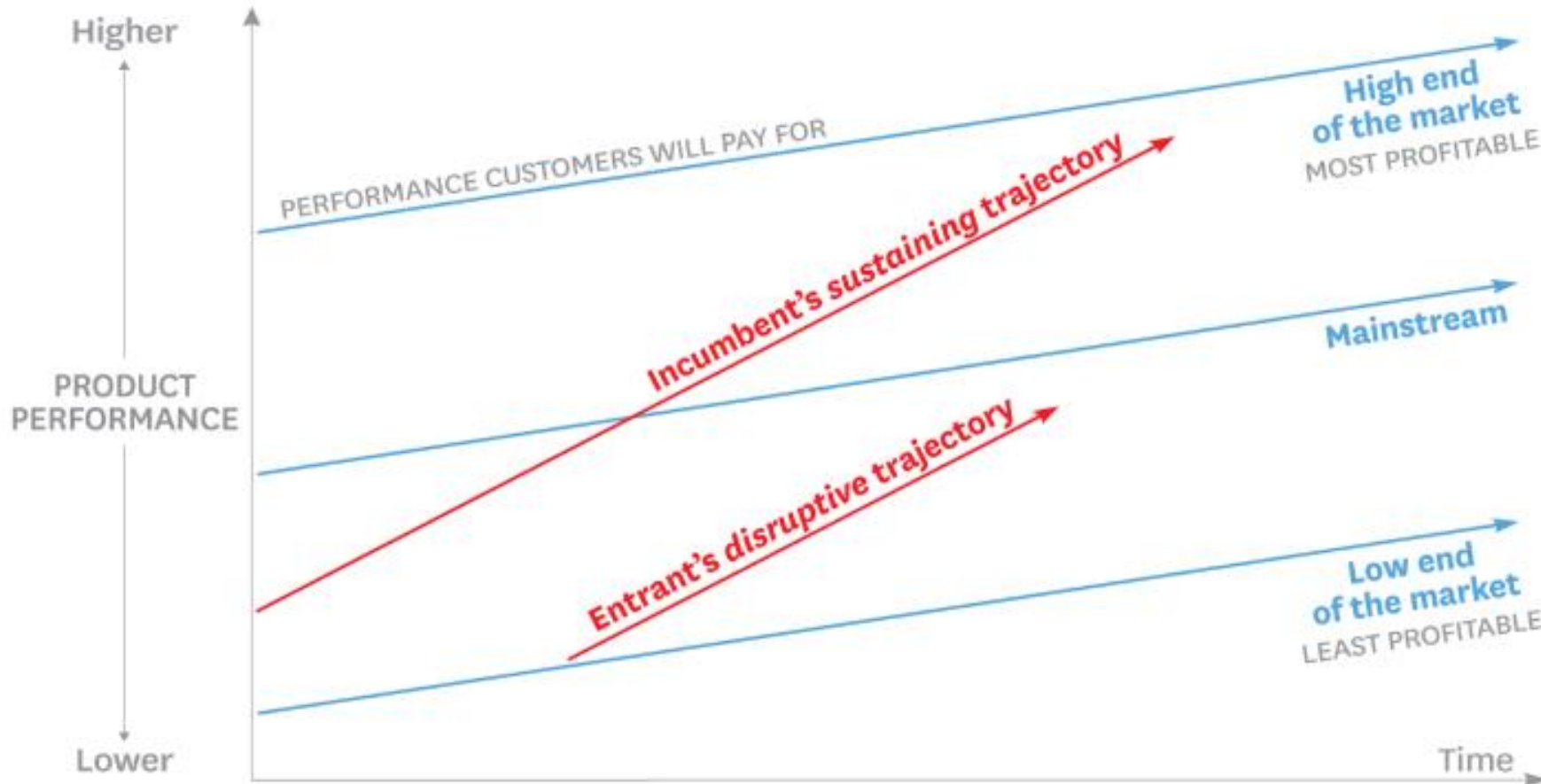
- Christensen distinguishes between:
- **“low-end disruption”** – there are customers who do not need the full functionality or performance of products already on the market so cheaper alternatives can take over.
- **“new-market disruption”** – there are customers who have needs that were not being addressed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



Low-End Disruption

Section 1.2

Disruptive Innovation Model – Low End Disruption



The diagram contrasts *product performance trajectories* (red) with *customer demand trajectories* (blue)

Red: How products or services improve over time

Blue: Customers' willingness to pay for performance

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

© HBR.ORG

How Does Low End Disruption Happen?

Incumbents focus on improving their products and services for their most demanding (and usually most profitable) customers, they exceed the needs of some segments and ignore the needs of others.

Entrants that provide disruptive begin by successfully targeting those overlooked segments, gaining a foothold by delivering more-suitable functionality – frequently at a lower price. Incumbents, chasing higher profitability in more-demanding segments, tend not to respond vigorously.

Entrants then improve their quality and move upmarket, delivering the performance that incumbents' mainstream customers require, while preserving the advantages that drove their early success. When mainstream customers start adopting the entrants' offering in volume, that marks the end of the process of disruption.

Case Studies



Yes



Yes & No
(Taxi vs limousines)



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No



No

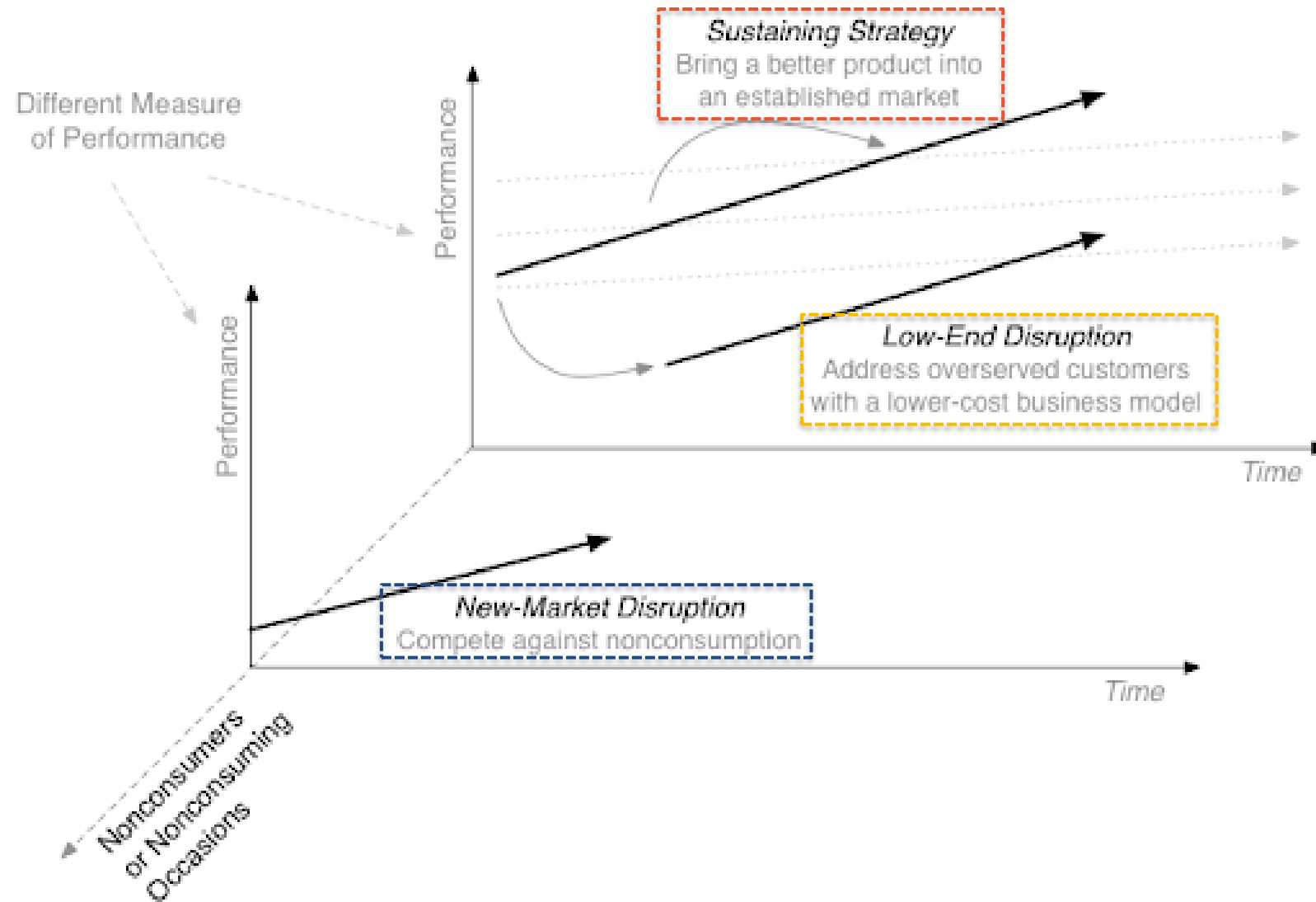


Yes

New Market Disruption

Section 1.3

Disruptive Innovation Model – New Market Disruption



New Market Disruption

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

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

Case Studies



No



No



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Yes



No



No

Value Chain & Value Network

Section 1.4

Disruptive Innovation affects “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 – industry value chain – 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

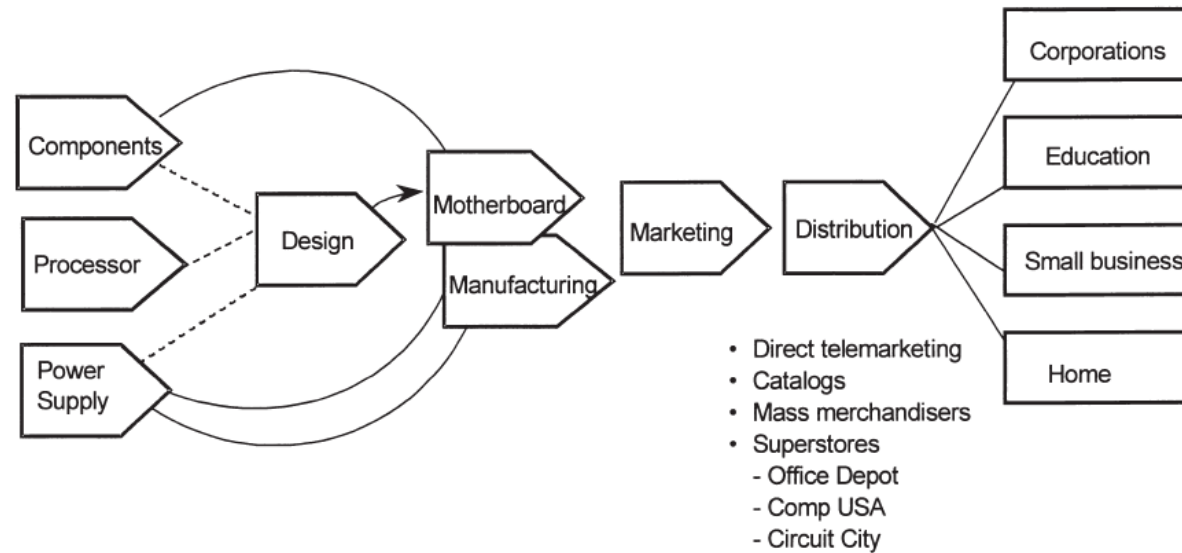
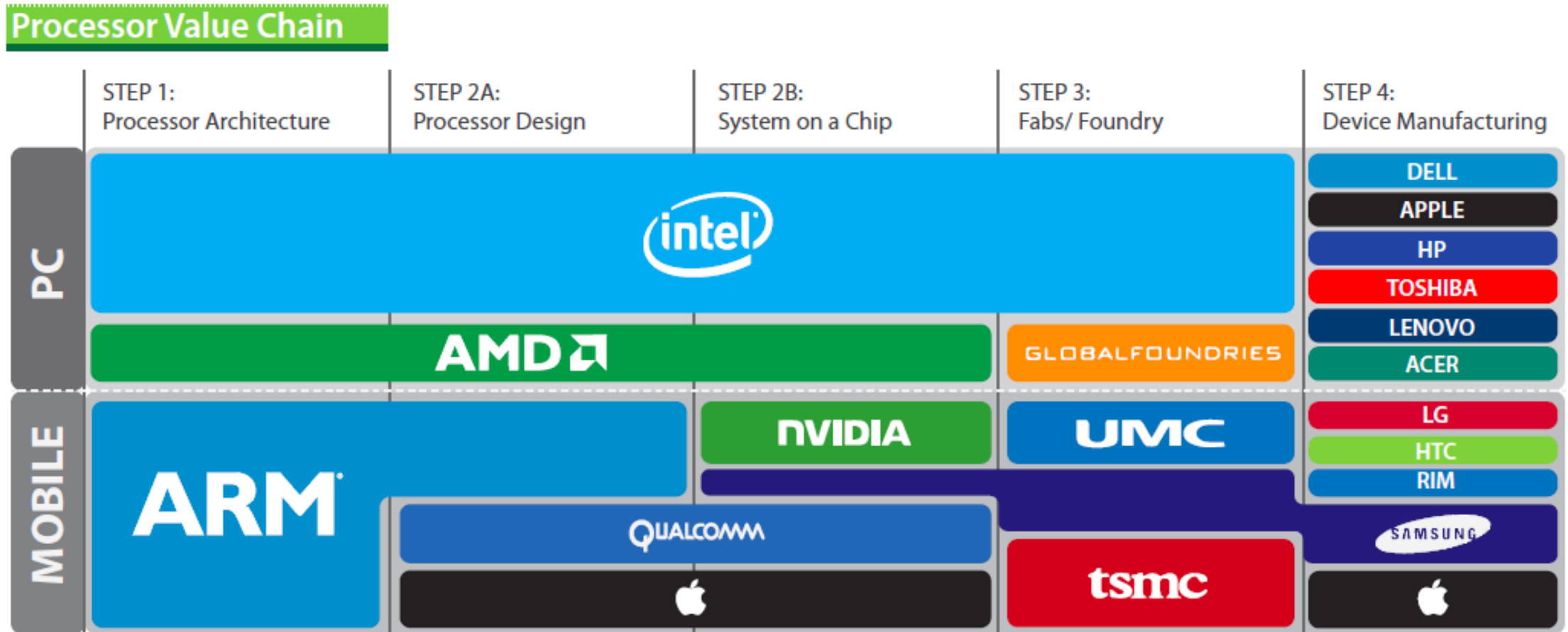


FIGURE 5. Building toward enacted value chain; a typical computer firm.

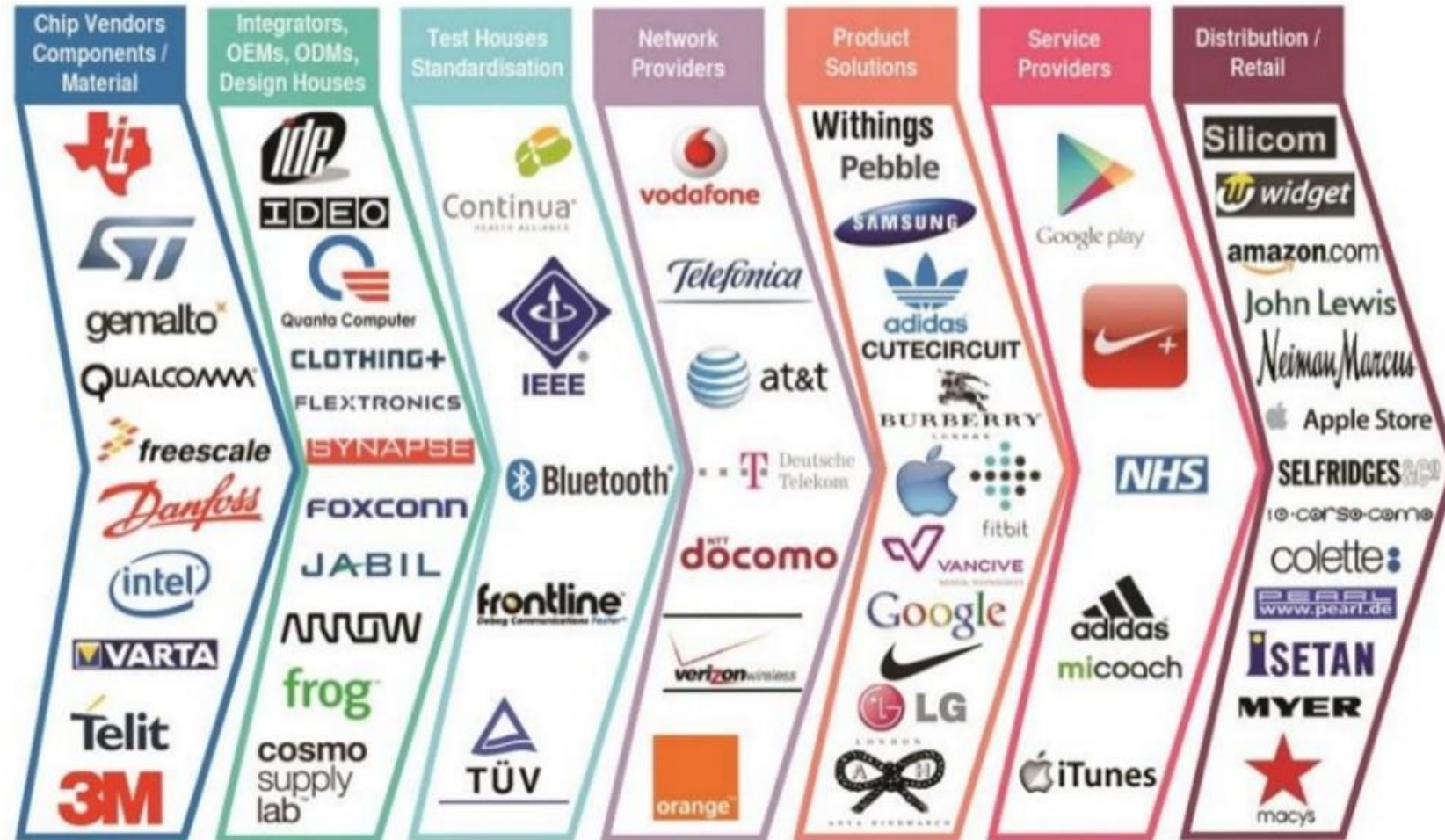
Source of figure: Kothandaraman and Wilson, “The Future of Competition: Value-Creating Networks” (2001)

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)



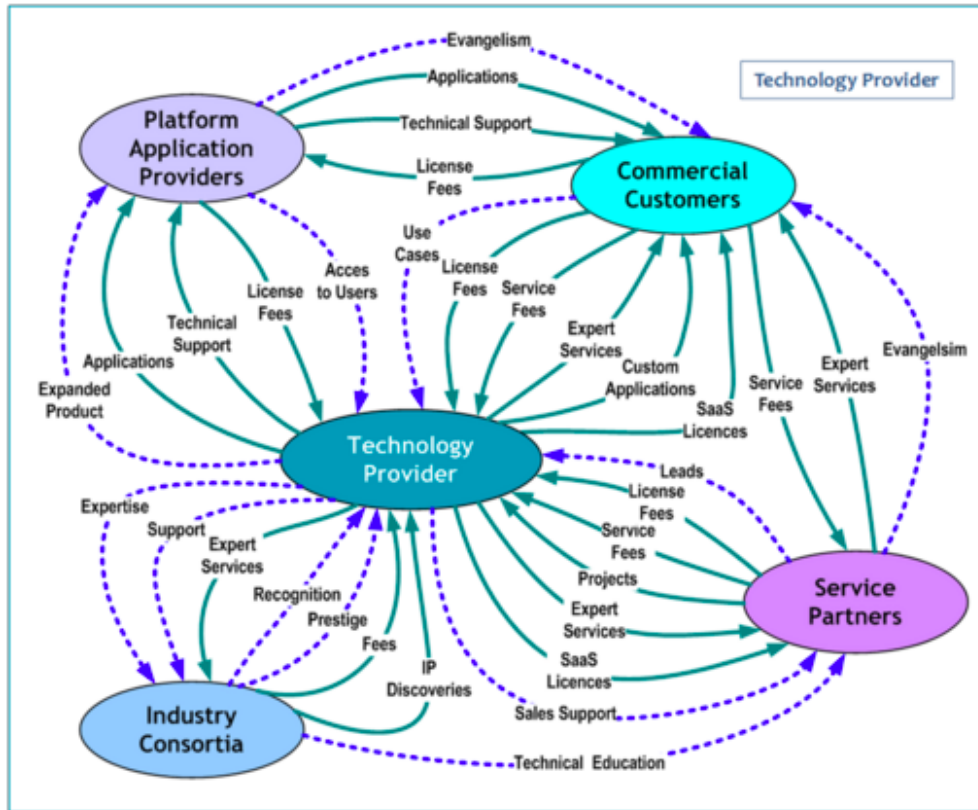
<http://www.slideshare.net/JohannaMischke/convergence-between-cloud-internet-of-things-and-wearable-technologies>

Example industry value chain: Autonomous Vehicles (2016)

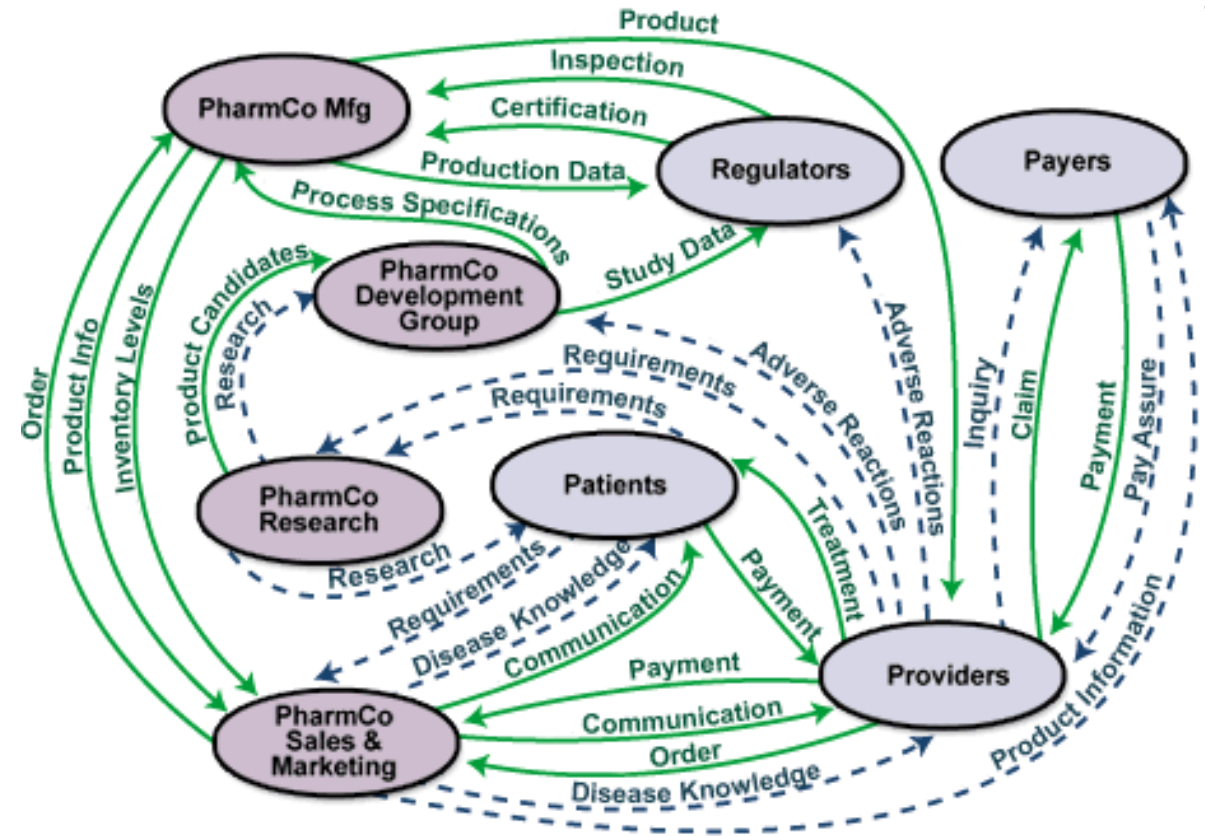


<https://www.engineering.com/IOT/ArticleID/13270/What-Tech-Will-it-Take-to-Put-Self-Driving-Cars-on-the-Road.aspx>

Value Network Analysis



Source of figure: Verna Allee
http://www.vernaallee.com/value_networks/Understanding_Value_Networks.html

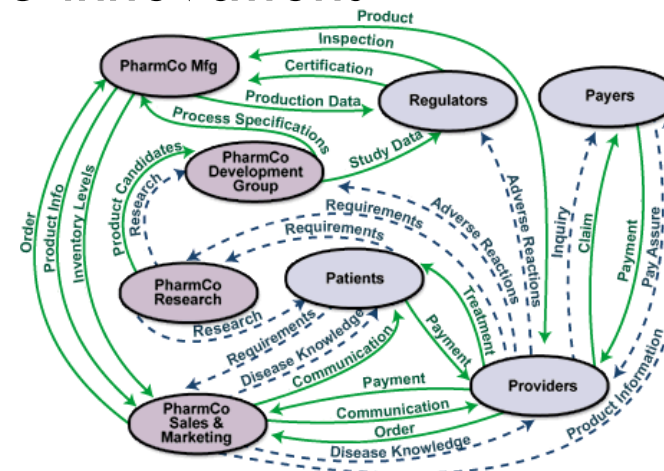
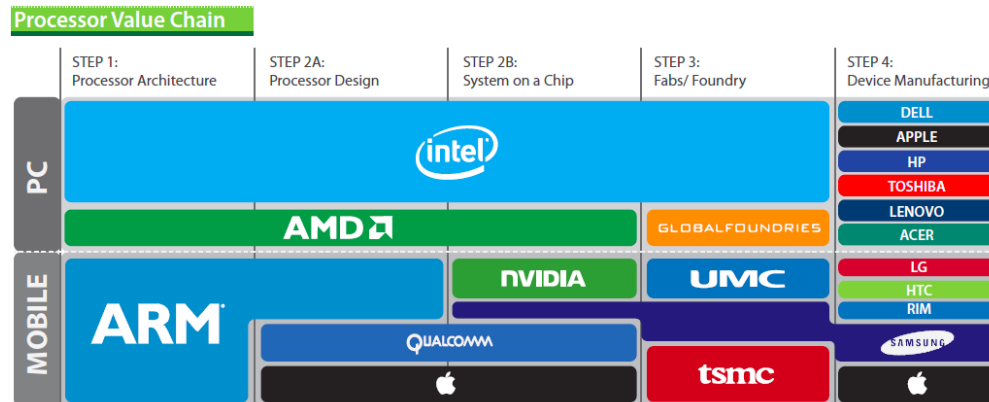


Example: Health care value network

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

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

Back to “Disruptive Innovation”

Low-End Disruption

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

New Market Disruption

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

Section 2

Innovator's Dilemma

Innovator's Dilemma

Section 2.1

“The Innovator’s Dilemma”

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

Ambidexterity Strategy

Section 2.2

Ambidexterity Strategy

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

Case Study – Cognitive Computing

Section 2.3

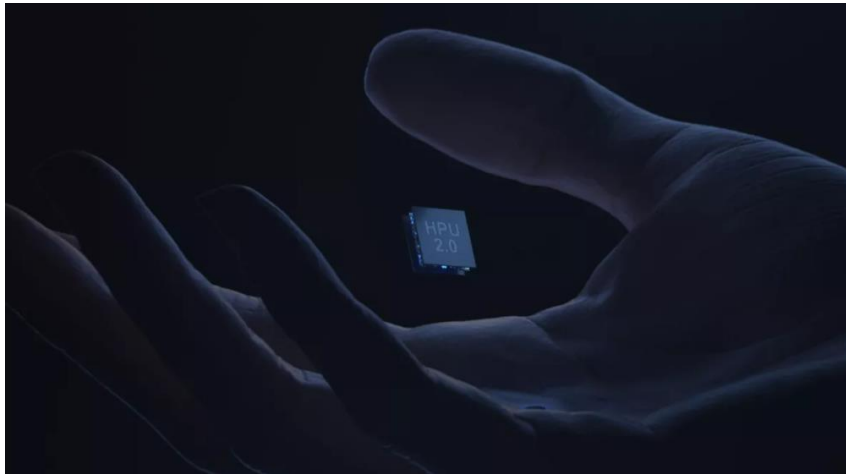
About Calendar.help



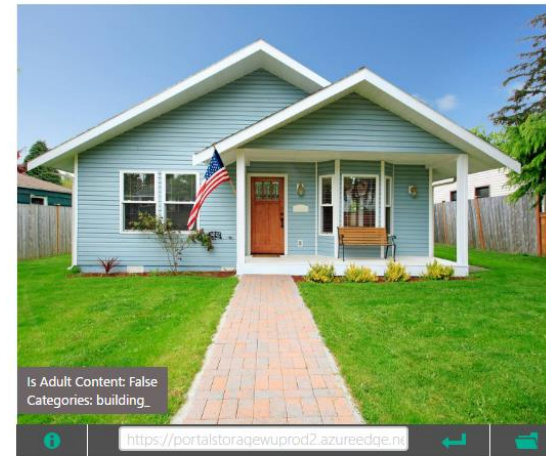
Calendar.help does one thing really well: schedule your meetings.

With the speed of artificial intelligence and the personal touch of a human assistant, Calendar.help takes care of business.

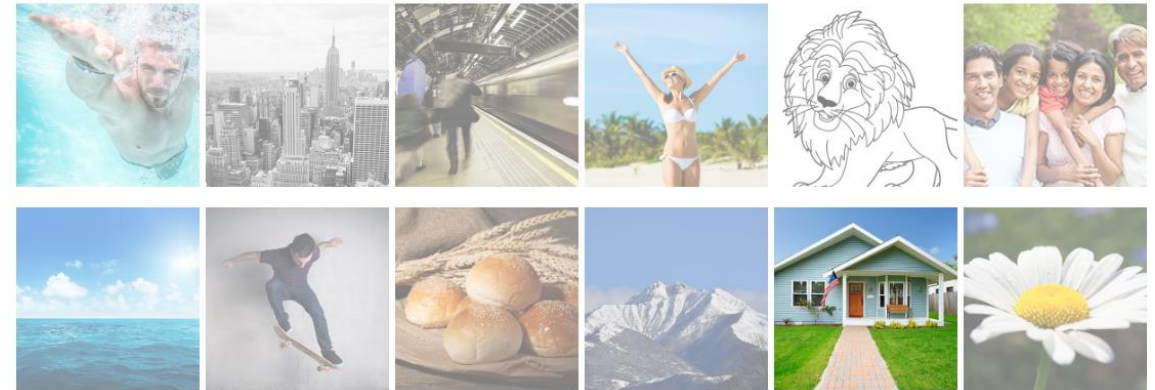
<https://calendar.help/about>



<https://www.theverge.com/2017/7/24/16018558/microsoft-ai-coprocessor-hololens-hpu>



Features:	
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Image Format	Jpeg
Image Dimensions	1500 x 1155
Clip Art Type	0 Non-clipart



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

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

Discover Emotion API in action



Detection result:
4 faces detected

JSON:

```
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      "contempt": 1.52679547E-09,
      "disgust": 1.60232943E-07,
      "fear": 6.00660363E-12,
      "happiness": 0.9999998,
      "neutral": 9.449728E-09,
      "sadness": 1.23025981E-08,
      "surprise": 9.91396E-10
    }
  },
  {
    "faceRectangle": {
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<https://azure.microsoft.com/en-gb/services/cognitive-services/computer-vision/#analyze>

CLOUD VISION API

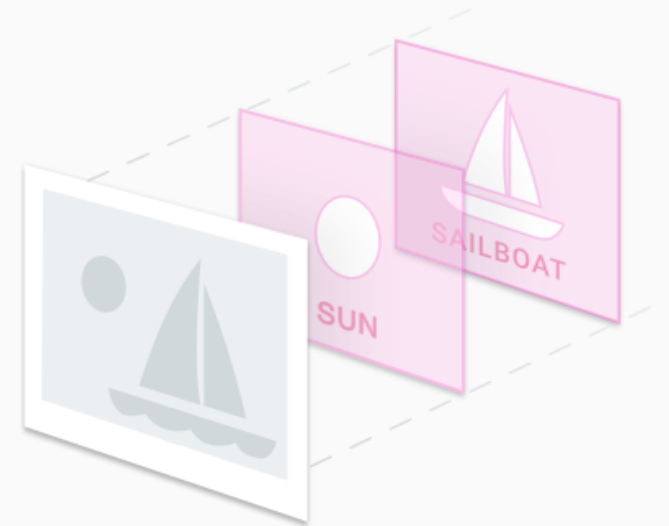
Derive insight from images with our powerful Cloud Vision API

 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/>



Visual Recognition

Quickly and accurately tag, classify and train visual content using machine learning.

Get started free

Already using Visual Recognition? [Log in](#)

To get started, you will create a Lite Plan (no charge) instance of the Visual Recognition service, which is capped at 250 Events per day. Your Lite plan instance will be deleted after 30 days of inactivity if you do not upgrade your account to a subscription plan. Details of subscription options are available [here](#). You may upgrade your account at any time. By continuing, you agree to the [Terms](#).

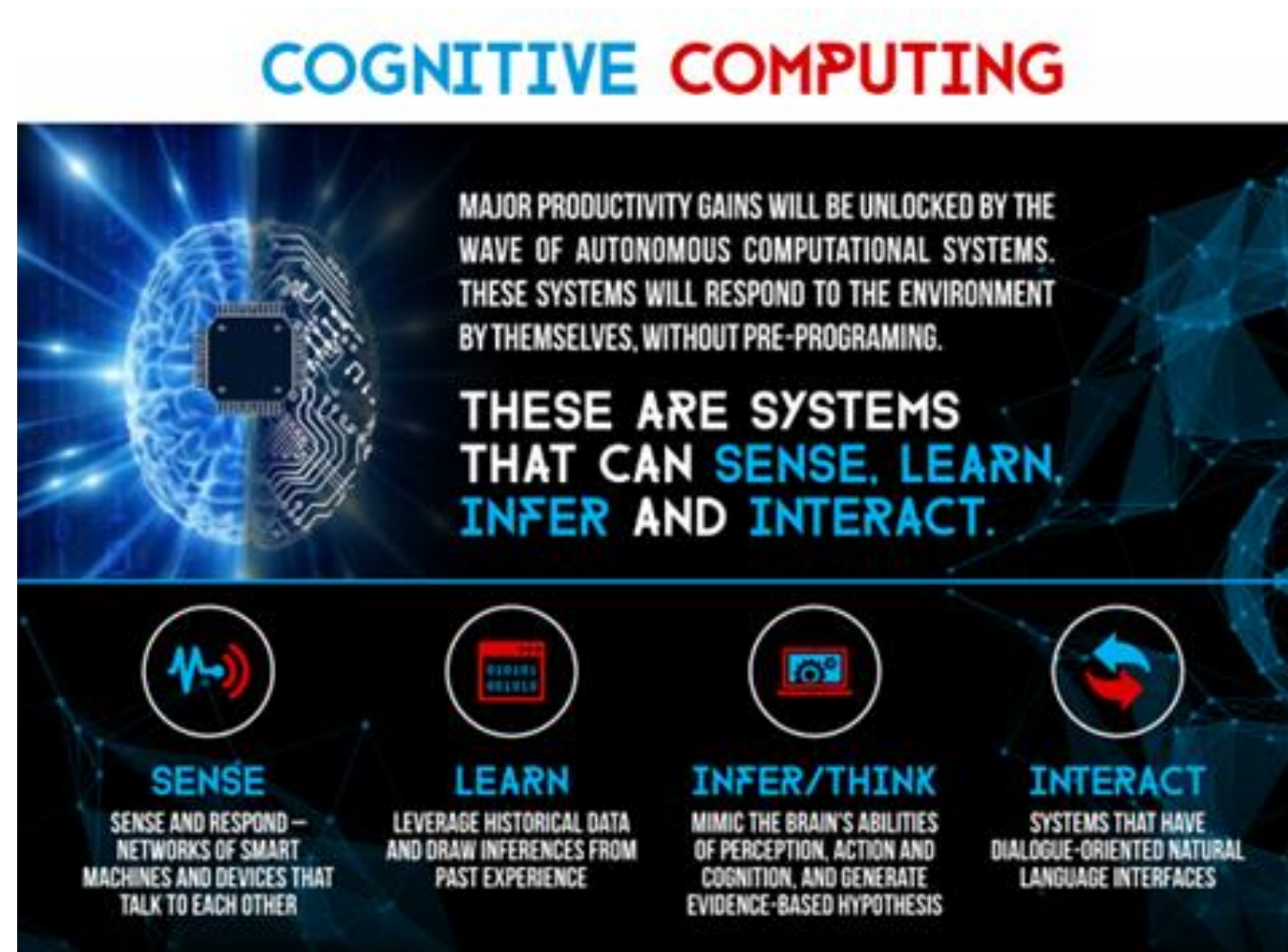
<https://www.ibm.com/watson/services/visual-recognition/>
<https://www.ibm.com/watson/services/visual-recognition/demo/#demo>



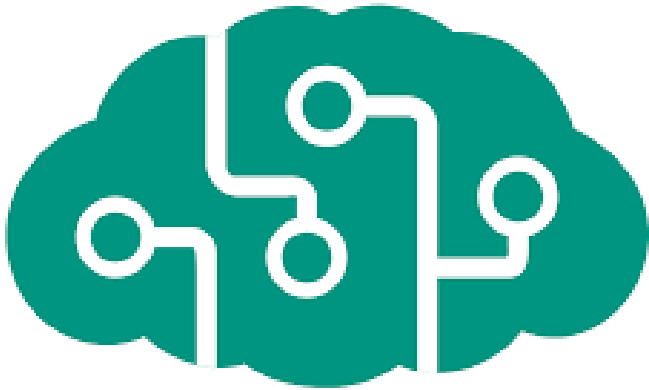
Let's talk

Cognitive computing

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



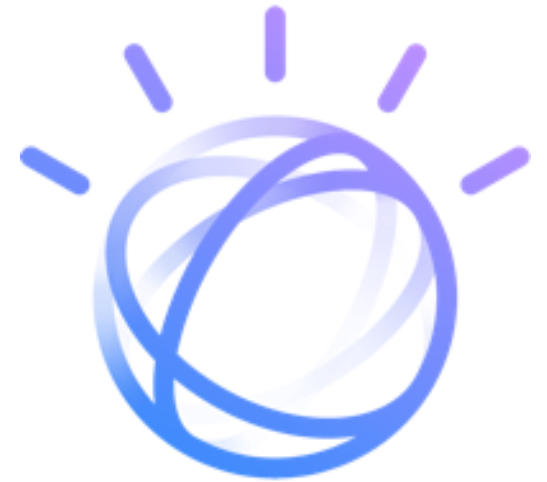
Cognitive service providers



 Microsoft Azure



 Google Cloud



IBM Watson™

<https://azure.microsoft.com/en-gb/services/cognitive-services/>

<https://cloud.google.com/products/ai/>

<https://www.ibm.com/watson/products-services/>

Cognitive Service Example – Azure Video Indexer

The screenshot displays the Azure Video Indexer web interface. On the left, a video player shows a dark scene with a person's face. Below the player, the video title is "Visual Studio 2017 Launch", it is marked as "Public", and was "Created 2 years ago by Video Indexer". Action buttons for "Embed", "Download", and "Report" are visible.

The right-hand sidebar provides detailed analysis insights:

- Insights** and **Timeline** tabs are at the top.
- A **Search** bar is present.
- 102 People**: A list of detected faces. One person is highlighted with a green circle. Below the list, a specific entry for "Brian Harry" is shown, noting he "Appears in 5.09% of video". A timeline bar at the bottom of this section shows his appearance throughout the video.
- 80 Labels**: A list of detected objects and scenes, including "person", "indoor", "screenshot", "man", "monitor", "computer", "laptop", "standing", "screen", and "curtain". A timeline bar below shows the temporal distribution of these labels.
- 36 Named entities**: A list of detected entities, including "Microsoft Visual Studio", "Microsoft", "Android", "Java", "Team Foundation Server", "Docker", and "MSBuild". A timeline bar below shows their temporal distribution.
- 2 Emotions**: A section for detected emotions.

At the bottom of the interface, there are links for "Pricing", "Privacy Statement", "Service Agreement", "Feedback", "Documentation", "API Reference", and "© Microsoft".

Using cognitive service in Uber

