INFO5992 Understanding IT Innovations

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

Semester 1, 2025

THE UNIVERSITY OF SYDNEY

Acknowledgement of Country

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UoS Semester Outline

Week	Learning Outcomes	Lectures
Module 2: Innovation Framework		
Week 01	L01, LO2, LO3	Unit of Study Introduction, Administrivia, Definition of IT Innovation, Importance of Innovation to a Country, General Purpose Technologies, Overview of Emerging Technologies
Week 02	LO4, LO5	Innovation Frameworks I: Dynamics of IT Innovation, Dominant Design
Week 03	LO6	Innovation Frameworks II: Disruptive Innovation, Innovator's Dilemma, Value Chain & Value Network
Module 2: Development of Key Intellectual Property in the Modern Age		
Week 04	LO7	Introduction to Open Innovation and Closed Innovation Distributed Innovation I: Product Platforms, Web APIs
Week 05		Distributed Innovation II: Crowdsourcing, Free and Open- Source Software, Open Data
Week 06		Distributed Innovation III: Platform Ecosystems, User Innovation
Module 3: Commercialisation Process and Business Strategies for Emerging Technologies		
Week 07	LO8	Commercialisation I: Startup vs Traditional Companies, Lean Startup Methodology and Agile Development
Week 08		Commercialisation II: Customer Development Process, Value Proposition Canvas
Mid semester break		
Week 09	LO8, LO9	Commercialisation III: Innovation Management, Business Model Canvas Commercialisation IV: Capital & Fundraising for IT Innovation
Week 10	LO11, LO12	Organisational Cultures and Structures Supporting Innovation, Judging IT Innovation
Module 4: Innovation At-Scale		
Week 11	LO10	Innovation Ecosystem: Silicon Valley and Australia
Week 12	N/A	Course Review | Innovation Pitch Presentation
Week 13	N/A	Innovation Pitch Presentation
Final Exam		

Agenda – Week 3

Section One (1st Half)	Section Two (2nd Half)
Disruptive Innovation	**Innovator's Dilemma & Ambidexterity Strategy**
1.1 Disruptive Innovation Model	2.1 Innovator's Dilemma
1.2 Low-End Disruption	2.2 Case Study: Cognitive Computing
1.3 New Market Disruption	
1.4 Value Chain & Value Network	
Integrated case studies include Netflix, Uber, Google Cloud (ML), Tesla and Amazon Kindle	

Disruptive Innovation

Section 1

Disruptive Innovation Model

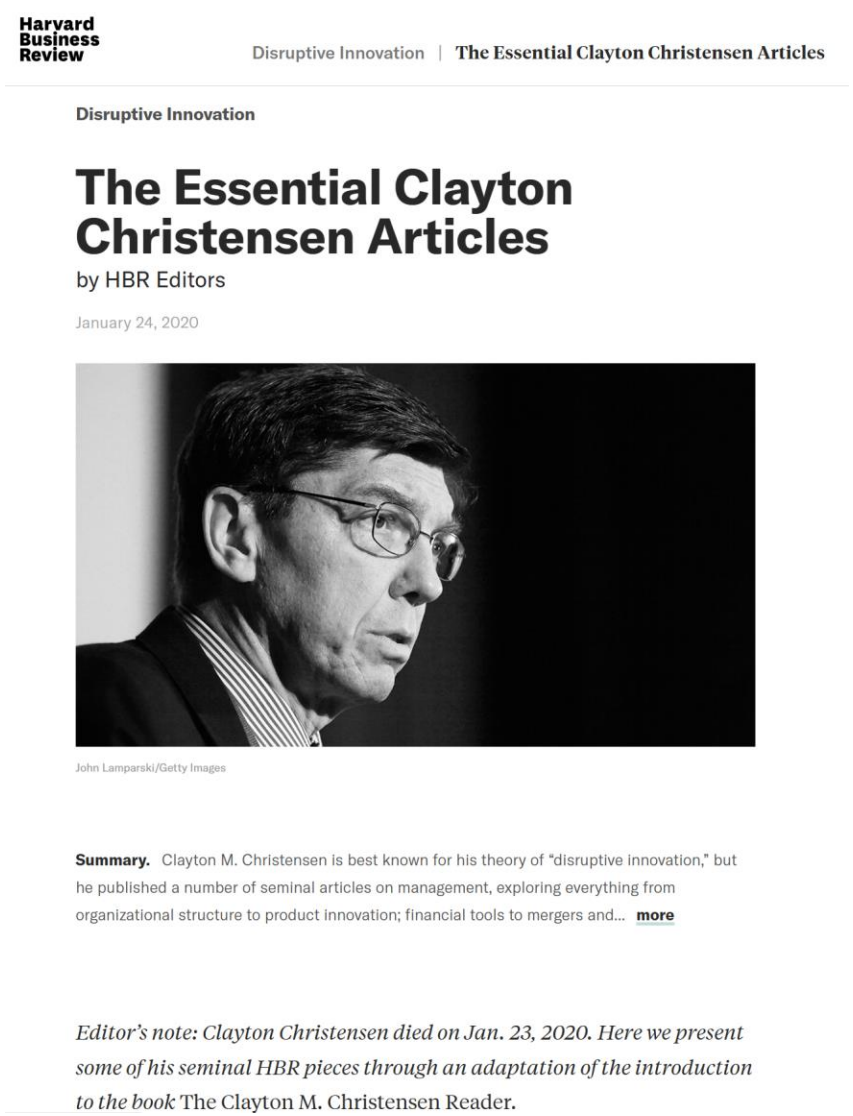
Section 1.1

"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)

Latest updates



Harvard Business Review

Disruptive Innovation | The Essential Clayton Christensen Articles

Disruptive Innovation

The Essential Clayton Christensen Articles

by HBR Editors

January 24, 2020

John Lamparski/Getty Images

Summary. Clayton M. Christensen is best known for his theory of "disruptive innovation," but he published a number of seminal articles on management, exploring everything from organizational structure to product innovation; financial tools to mergers and... more

Editor's note: Clayton Christensen died on Jan. 23, 2020. Here we present some of his seminal HBR pieces through an adaptation of the introduction to the book The Clayton M. Christensen Reader.

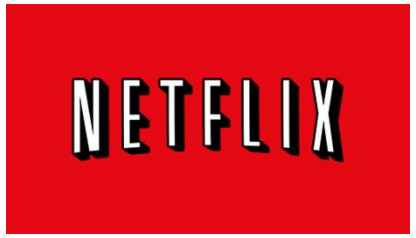
The Essential Clayton Christensen Articles (hbr.org) (Mar'25)

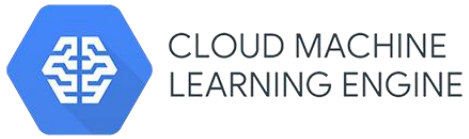
Clayton Christensen Books (Mar'25)

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





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
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. 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.	Disrupters create a new market where none existed – meaning finding a way to turn non-consumers into consumers.

Industry Examples of Low-End Disruptions

- **Chromebooks in Education:**
  - Chromebooks, initially positioned as low-cost laptops with a focus on web-based applications, disrupted the education technology sector
  - Provided a more affordable alternative to traditional laptops and desktops, enabling schools to access digital learning resources at a lower cost

- **Mobile Wallets for Financial Services:**
  - Mobile wallets like PayPal, Cash App, and Venmo started as simple digital payment solutions for peer-to-peer transactions
  - Disrupted traditional banking and payment systems by offering a convenient and low-cost way for individuals to send and receive money digitally

Industry Examples of Low-End Disruptions

- **Telemedicine for Basic Healthcare Services:**
  - Telemedicine platforms initially focused on providing basic healthcare services remotely
  - Disrupted traditional healthcare models by offering a more affordable and accessible way for patients to consult with healthcare professionals, especially for non-emergency services

- **Online Learning Platforms for Skill Development:**
  - Online learning platforms like Coursera and Udemy began by offering affordable courses on a wide range of subjects
  - Disrupted traditional education models by providing cost-effective skill development opportunities for individuals, allowing them to acquire new skills and advance their careers through digital education

Industry Examples of New-Market Disruptions

- **No-Code Development Platforms (e.g., Bubble, Webflow):**
  - These platforms empower non-programmers to build web applications and digital products without needing to write code
  - Creating a new market segment for entrepreneurs and small business owners who previously could not enter software development

- **Remote Work Collaboration Tools (e.g., Zoom, Slack):**
  - Work and collaborate remotely and connect with people
  - The rapid shift to remote work, accelerated by the COVID-19 pandemic, led these platforms to serve a newly emergent market of workers and organisations that had previously relied on in-person interactions

Industry Examples of New-Market Disruptions

- **Commission-Free Trading Platforms (e.g., Robinhood):**
  - Trade the stocks on Robinhood with commission-free investing & advanced trading tools
  - Robinhood and similar platforms introduced stock trading to a new market of retail investors previously intimidated by high fees and complex trading systems
  - By removing traditional barriers, these platforms democratised investment for a whole new class of users

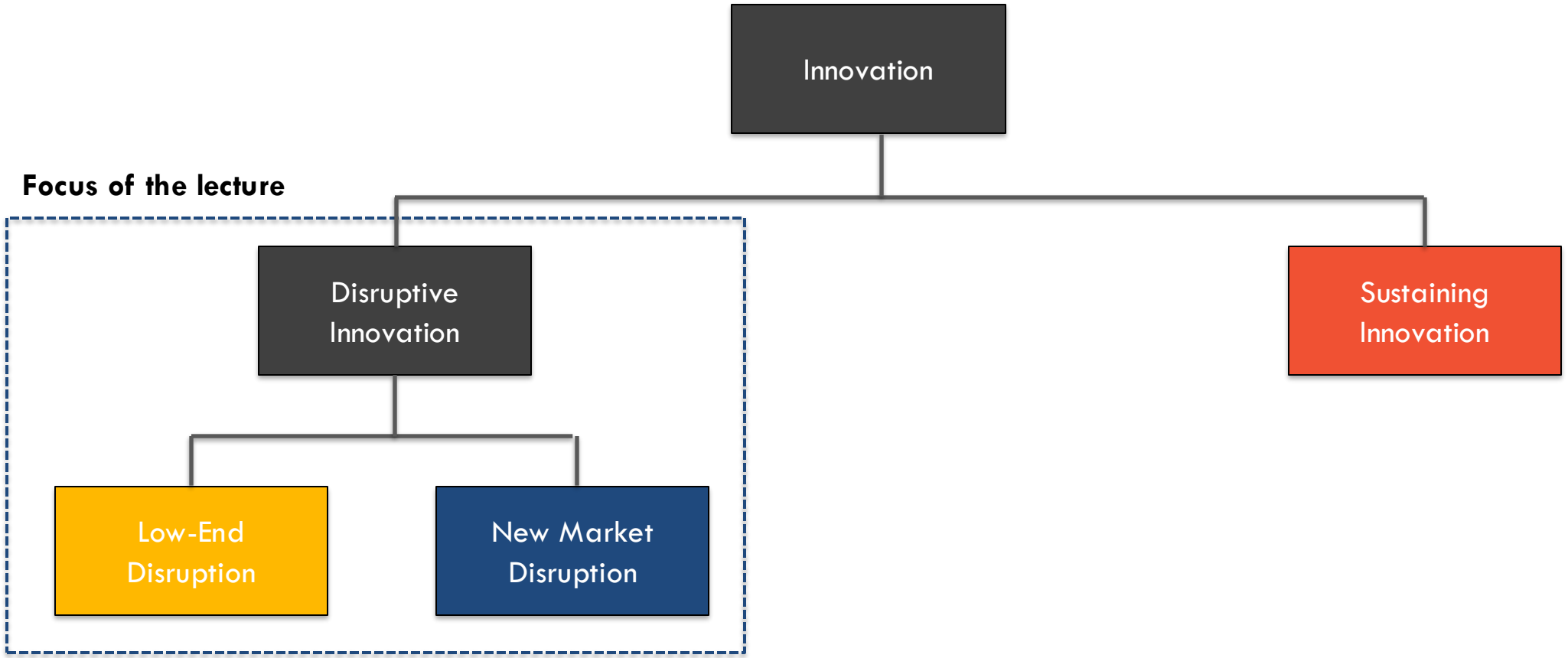
Disruptive Innovation

- According to Christensen, innovations can be either disruptive or sustaining

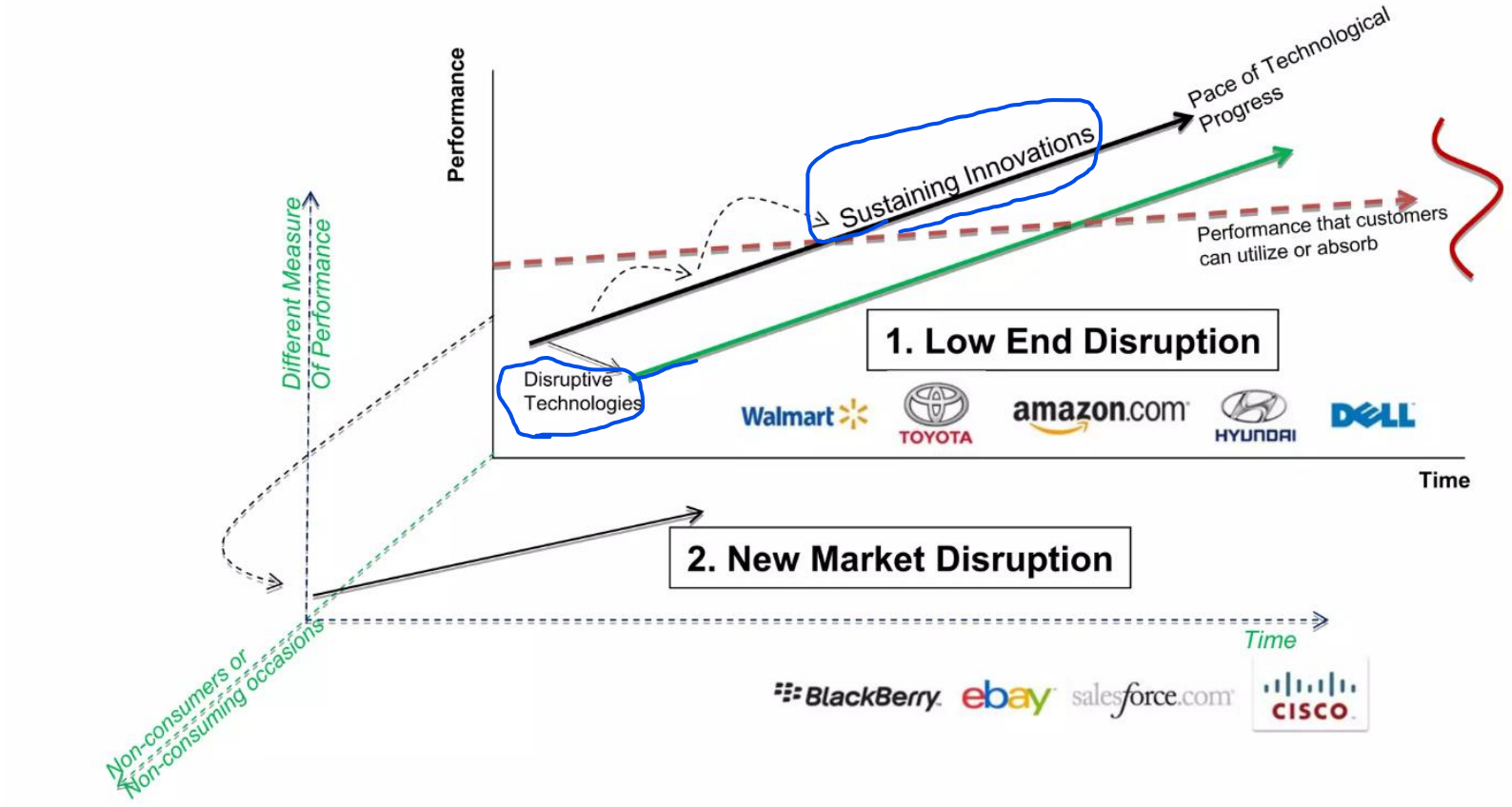
- "**Disruptive innovations**" – Target markets overlooked by incumbents
  - i.e. Target overserved or unserved markets

- "**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

Structure of the Framework



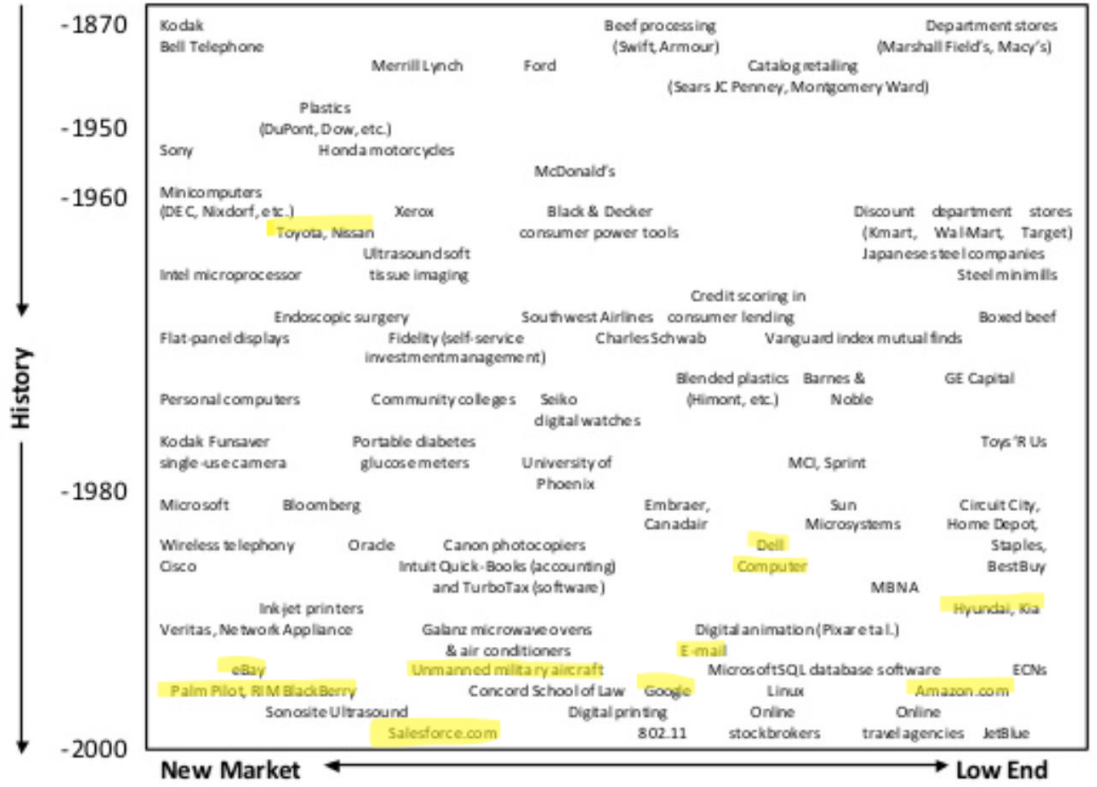
Two Types of Disruptive Innovation



https://www.slideshare.net/PhilHogg/p-hogg-disruptive-technologies-alliances (Mar'25)

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

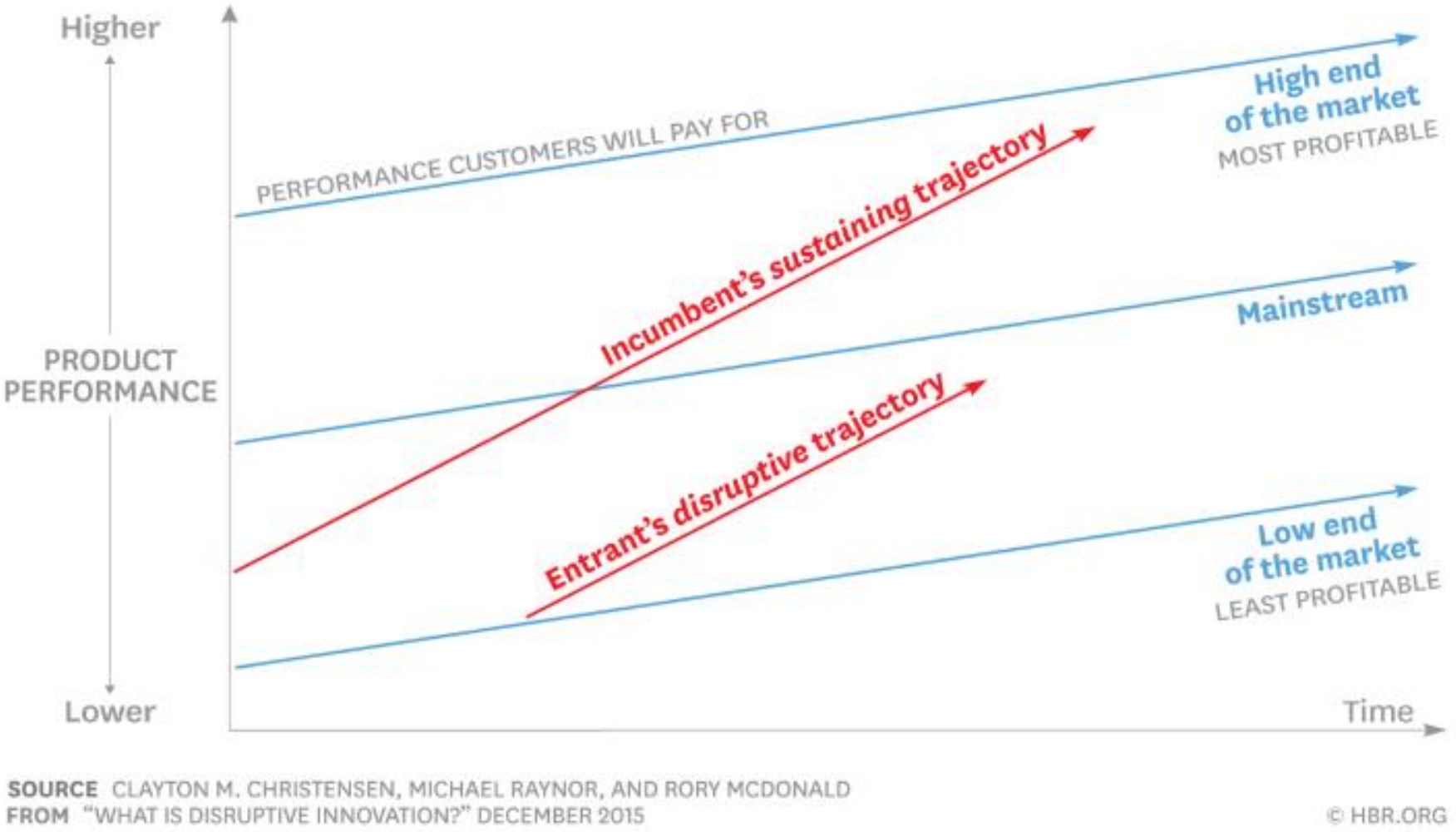


- Christensen, C.M. and Raynor, M.E. 2003, 48

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

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 some other segments.

Entrants that provide disruption 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, they tend to not 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 – Low end disruption ?

NETFLIX	UBER	CLOUD MACHINE LEARNING ENGINE	TESLA	amazonkindle
Yes	Yes & No (Taxi vs limousines)	No	No	Yes & No (Cheaper alternative to iPad; replacing books)

New Market Disruption

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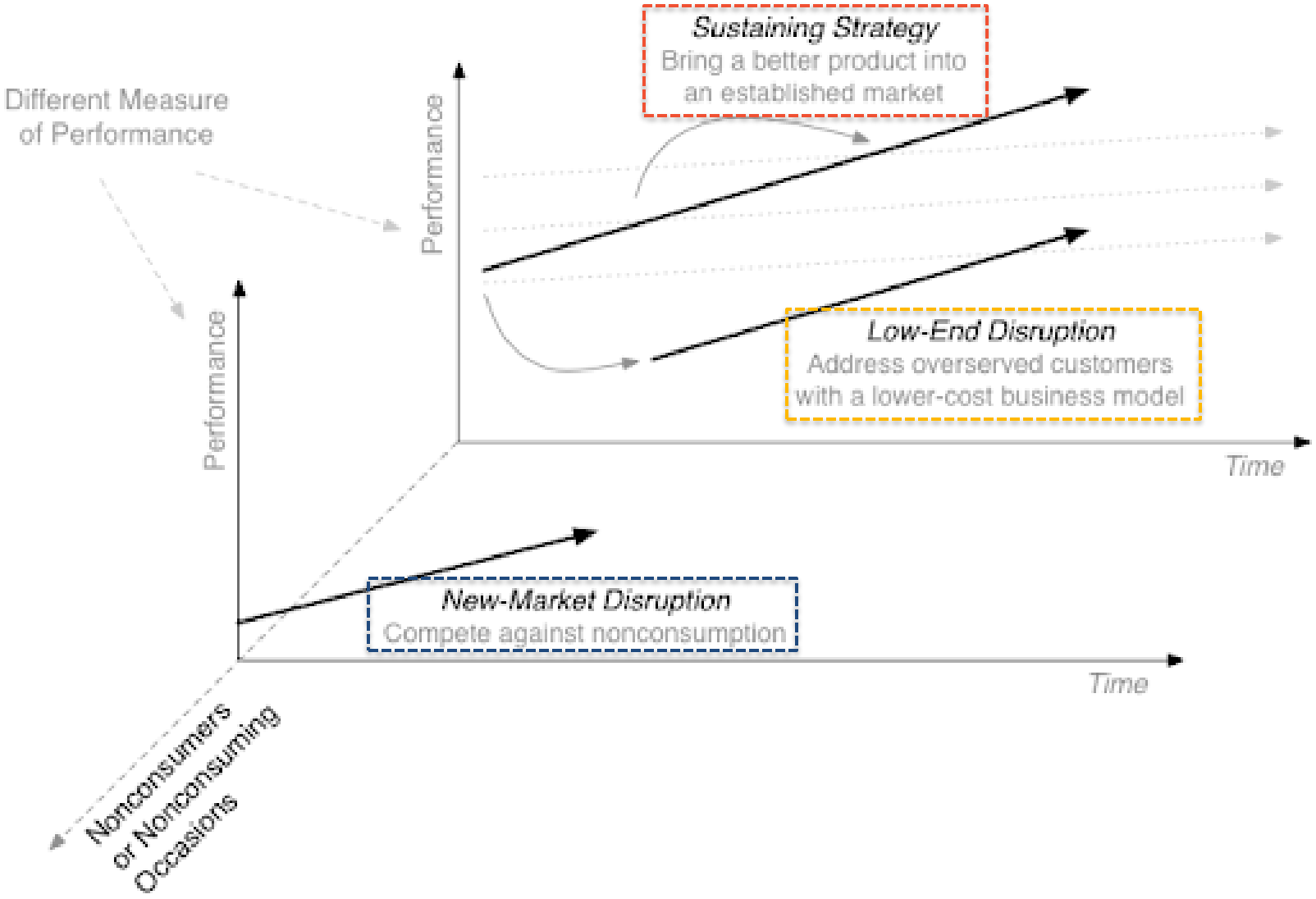
Disruptive Innovation Model – New Market Disruption

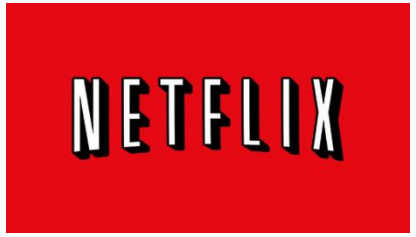


New Market Disruption

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

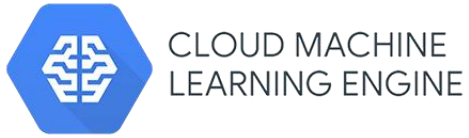
- Conversion of non-consumers into consumers
- Initially caters to the new market
- As it improves quality, it is able to induce consumers to defect from the existing market into the new market that it created

Case Studies – new market disruption ?



No

No



Yes

Yes

No

Value Chain & Value Network

Section 1.4

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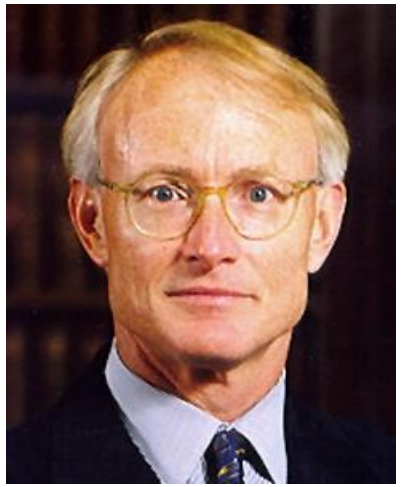
Disruptive Innovation affects "Value Chain"



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

- 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

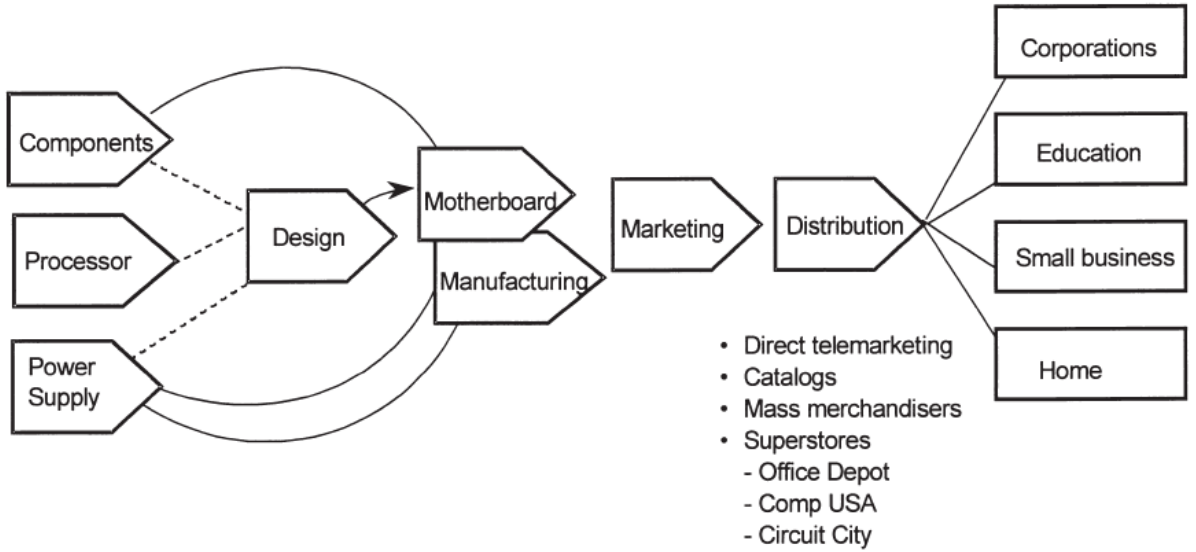
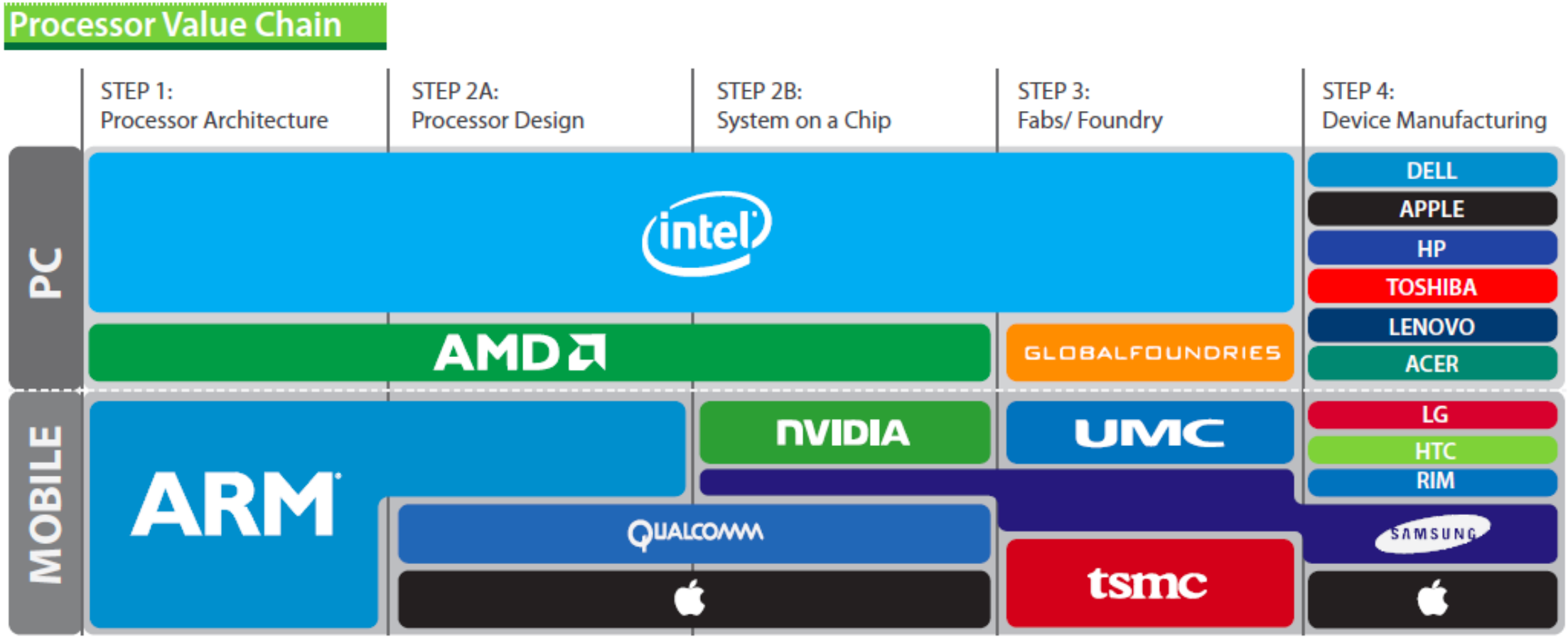


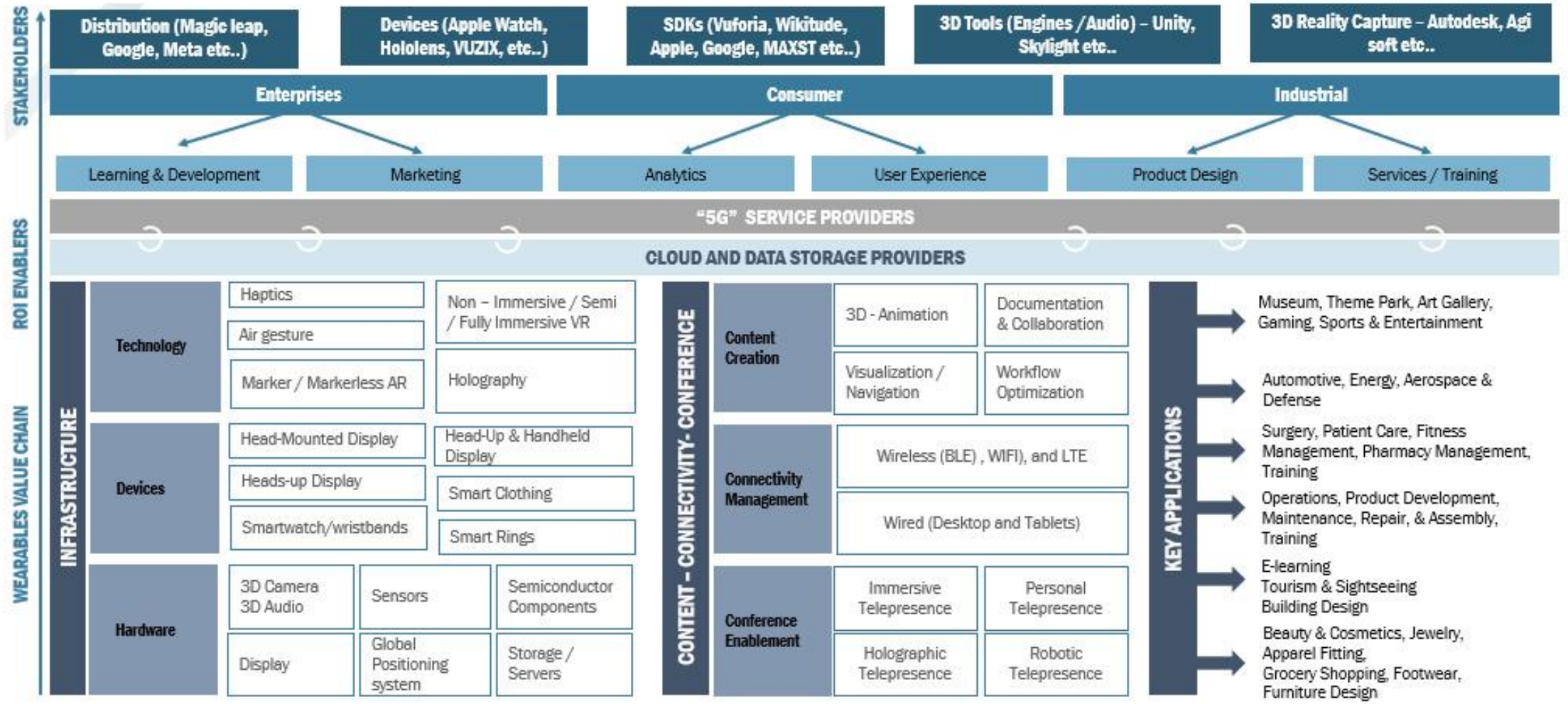
FIGURE 5. Building toward enacted value chain; a typical computer firm.

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

Example industry value chain: Microprocessors

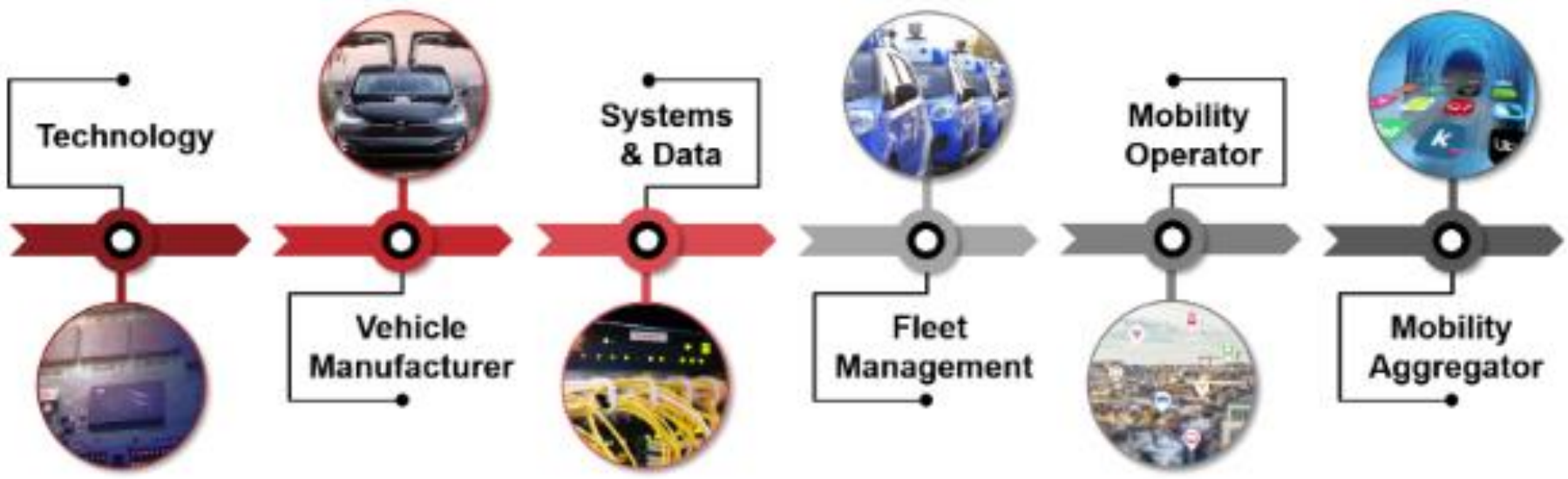


Example industry value chain: Wearable Technology (2013)



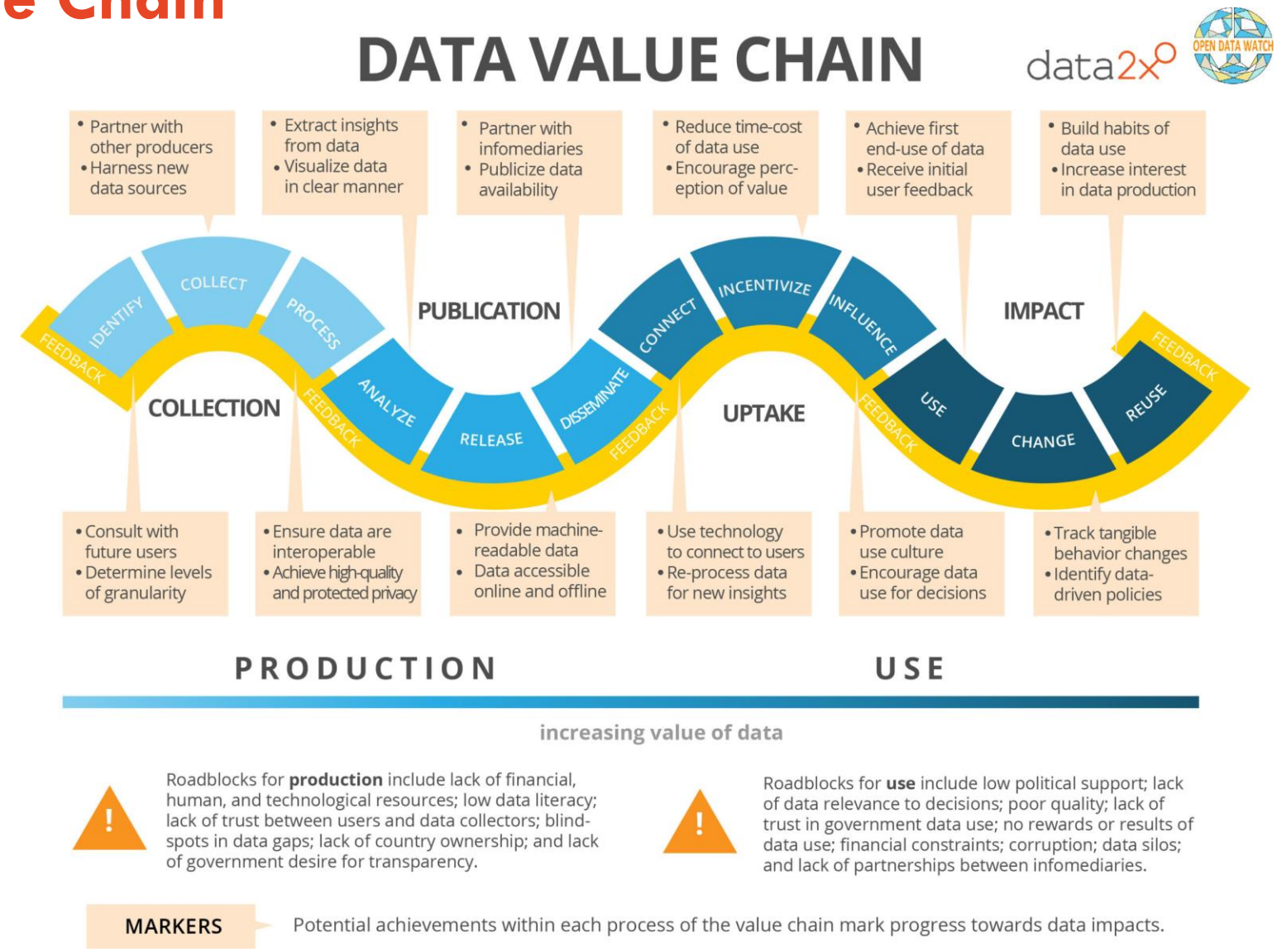
https://www.marketsandmarkets.com/practices/Wearables.asp?gclid=EAIaIQobChMI1J7kuMXh9gIVkmxvBB0aeQ-uEAAYASAAEgI1NvD_BwE (Mar'25)

Example industry value chain: Autonomous Vehicles (2016)



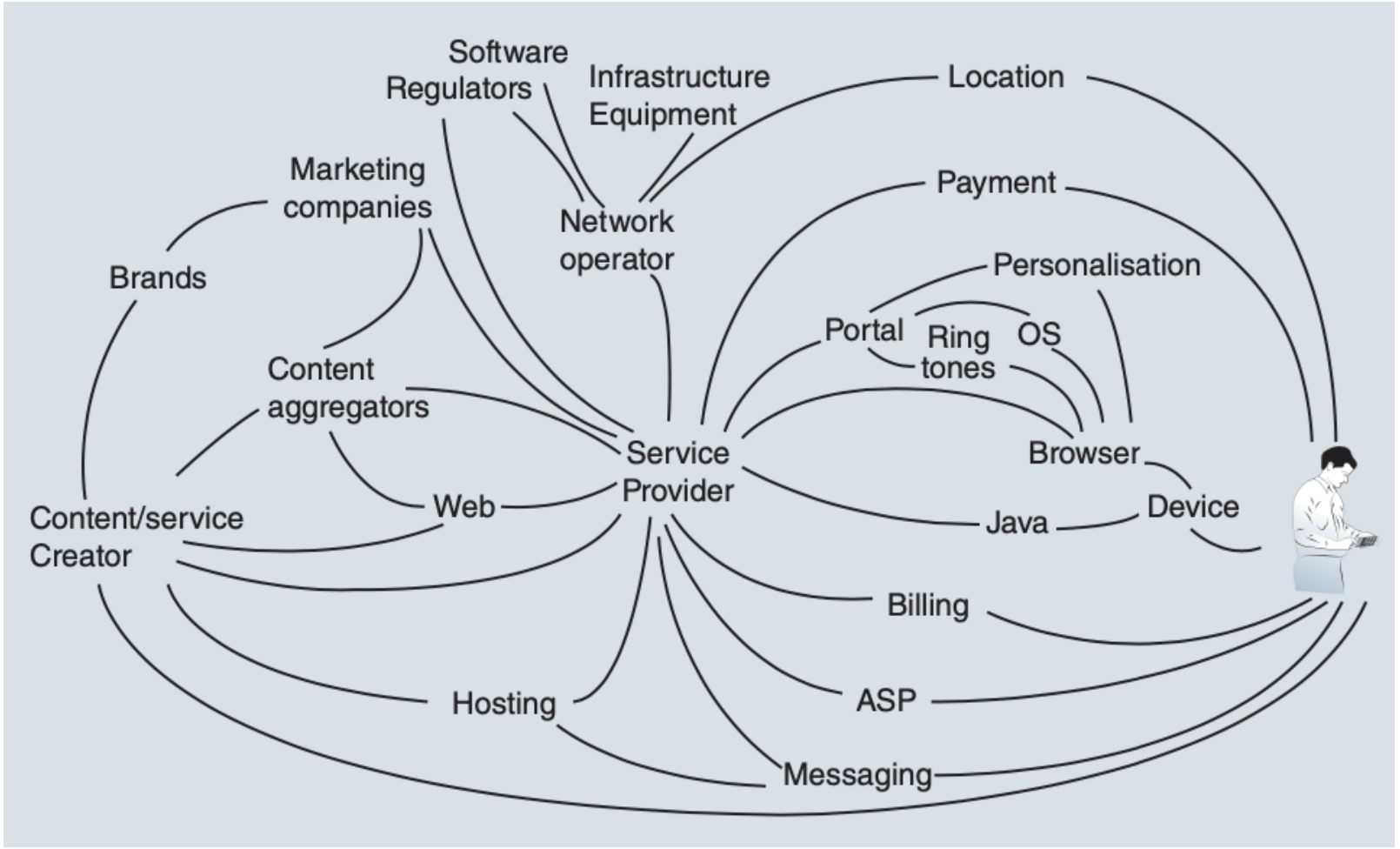
https://www.dhl.com/au-en/home/insights-and-innovation/thought-leadership/white-papers/new-auto-mobility-value-chain.html (Mar'25)

Data Value Chain

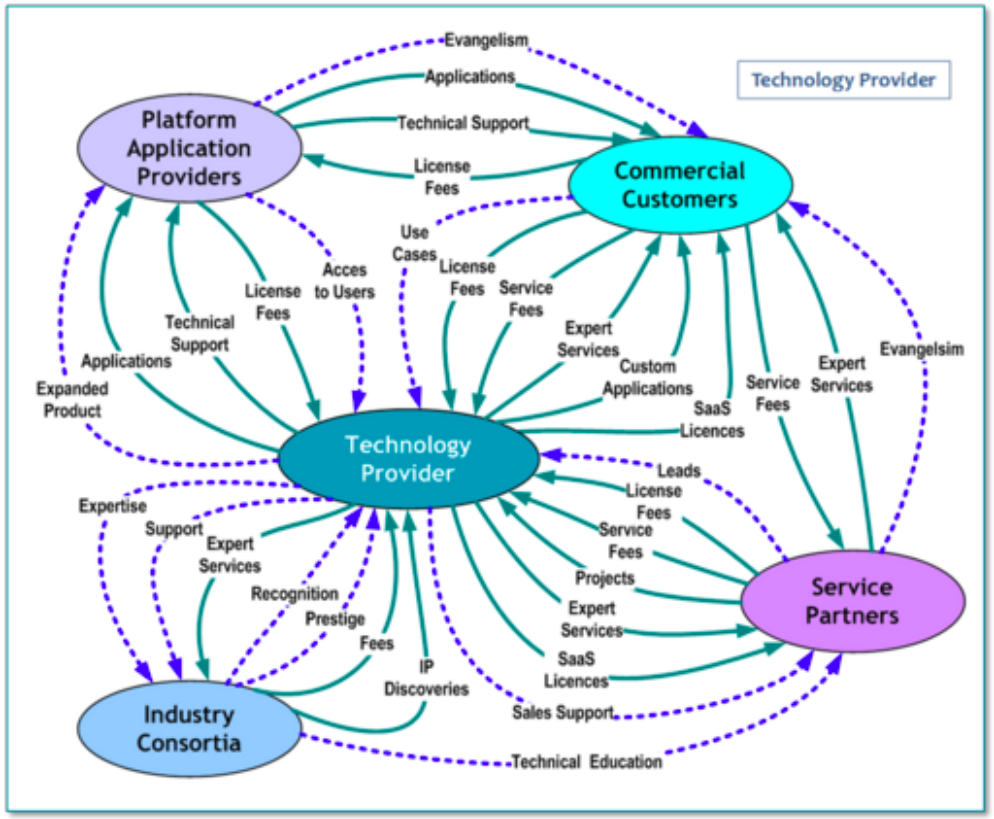


https://opendatawatch.com/publications/the-data-value-chain-moving-from-production-to-impact/ (Mar'25)

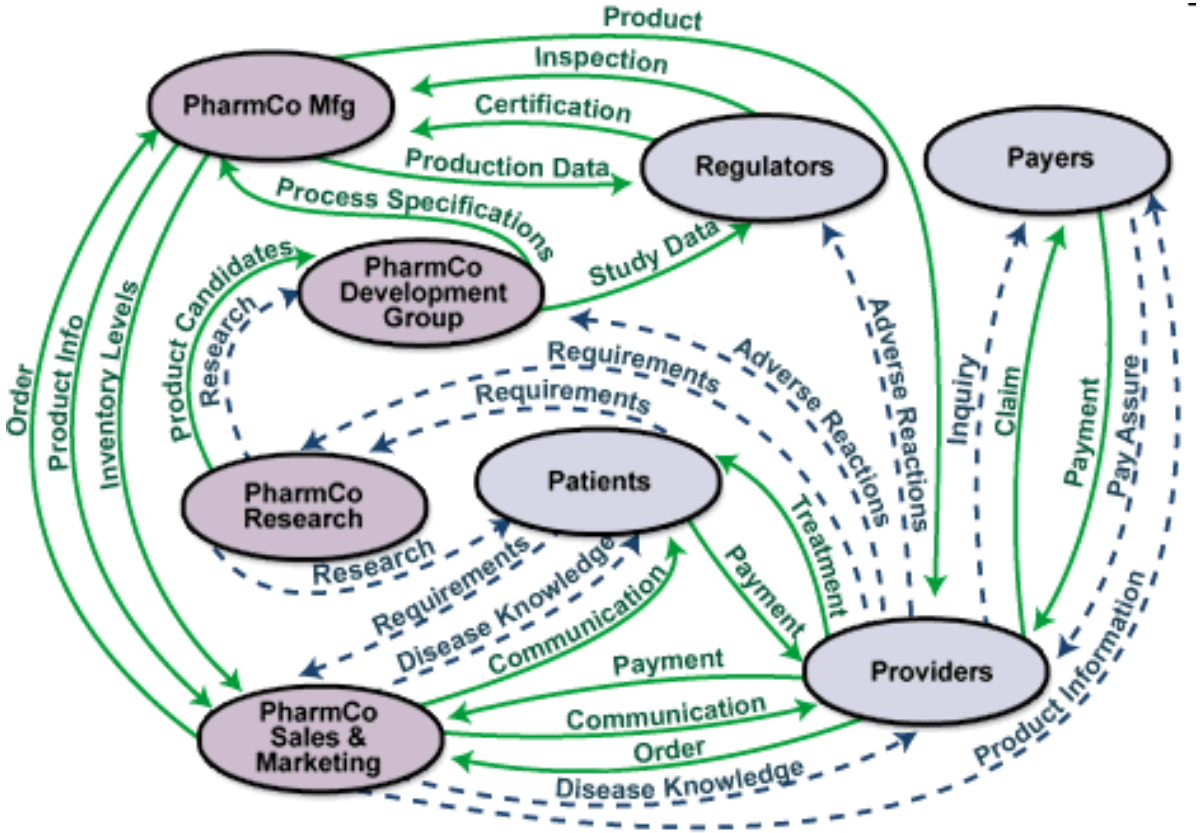
From Value Chain to Value Network



Value Network Analysis



Value Network Analysis (VNA)
https://vdmbee.com/2014/07/vdml-roots-value-network-analysis/ (Mar'25)

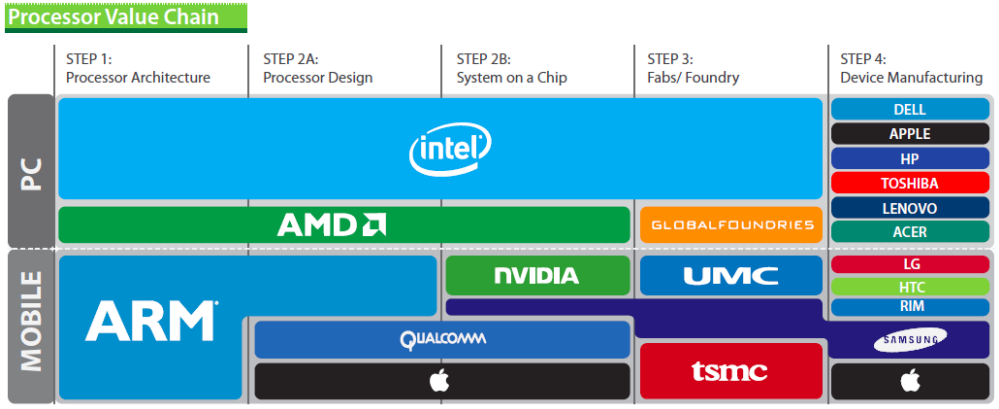


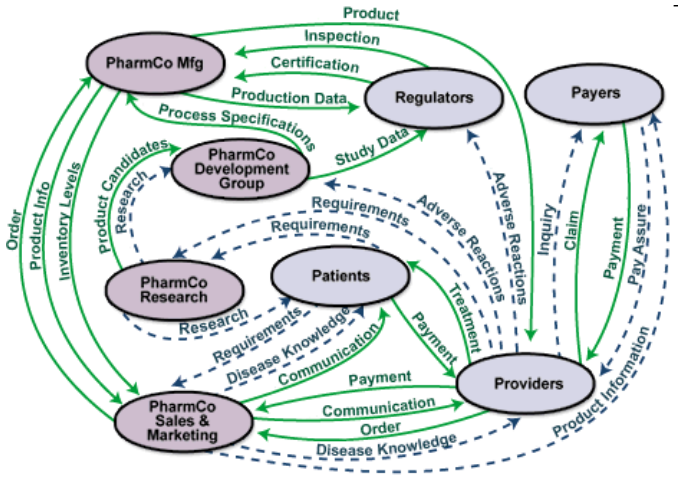
Example: Health Care Value Network

Ricciotti, F. (2020). From value chain to value network: a systematic literature review. *Management Review Quarterly*, *70*(2), 191-212.

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





Health Care Value Network

Disruptive innovators and value networks

- Recap: "value network" – Similar concept to "industry value chain" but usually **more focused on the whole system** rather than for a specific product/service type

- "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)*

Summary of "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.

Back to "Disruptive Innovation"

- "Disruptive innovations" disrupt markets

- They create new markets or change the **value network (including industry value chain)** in an existing market.

Section 2

Innovator's Dilemma

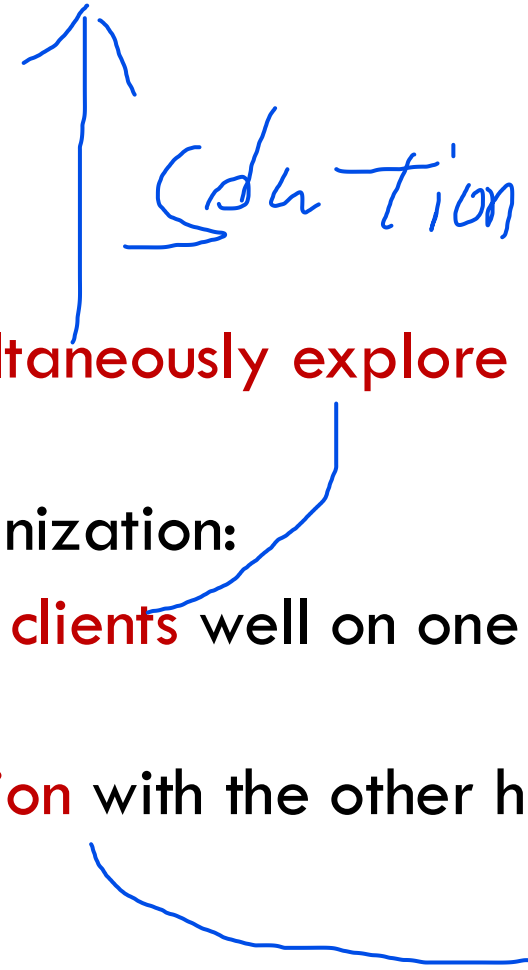
“The Innovator’s Dilemma”

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
  - Blockbuster and online movie streaming

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")

- Discussed more in later Lectures

Case Study – Cognitive Computing

Section 2.2

Maximize the value of your organization's physical space

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

Learn more about this capability >

https://www.microsoft.com/cognitive-services/en-us/computer-vision-api (Mar'25)

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

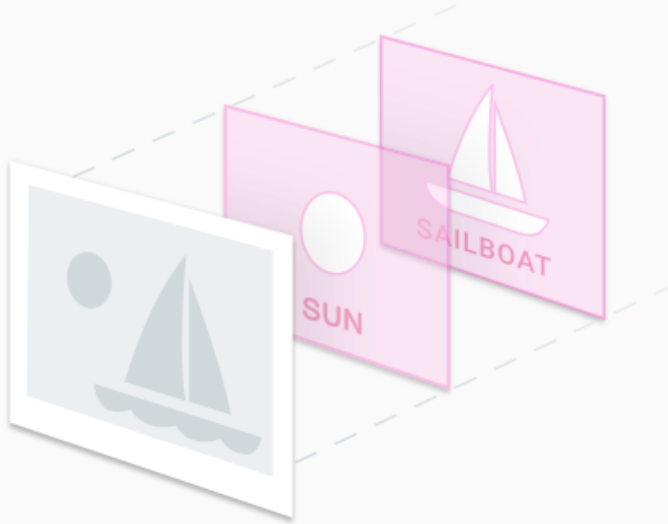
Derive insight from images with our powerful Cloud Vision API

TRY IT FREE

VIEW DOCUMENTATION

Powerful Image Analysis

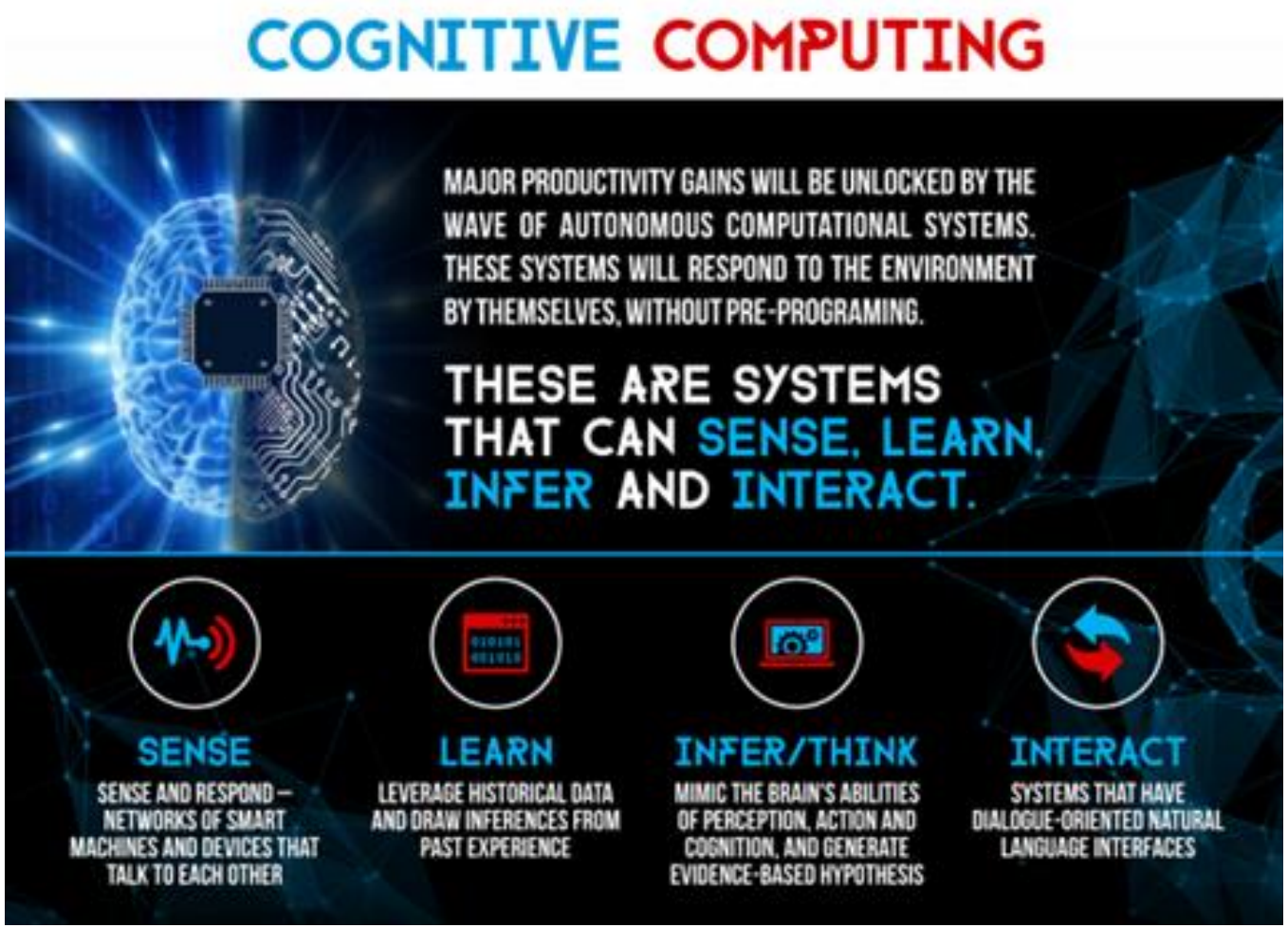
Google Cloud Vision API enables developers to **understand the content of an image** by encapsulating **powerful machine learning models** in an easy to use REST API. It quickly **classifies images** into thousands of categories (e.g., "sailboat", "lion", "Eiffel Tower"), **detects individual objects 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/

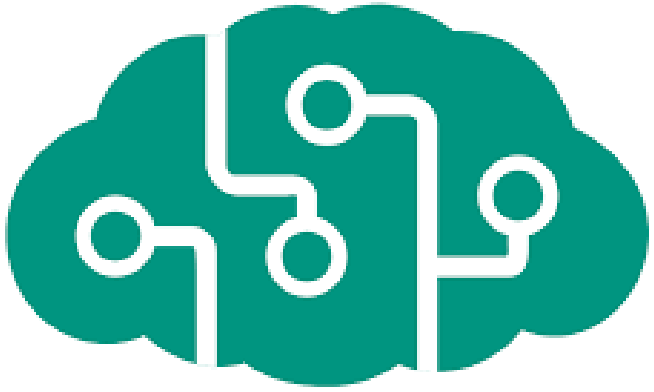
Cognitive computing

- 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.



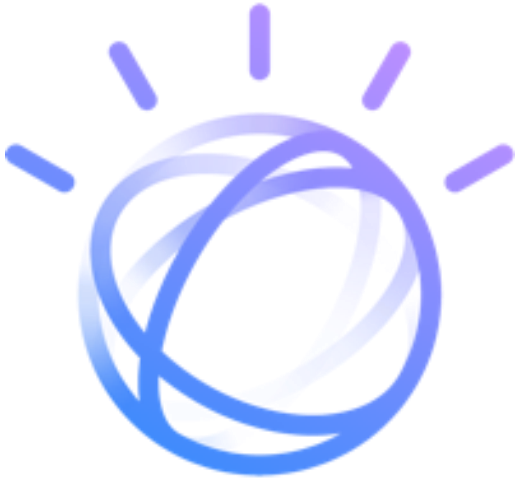
https://cognizant.com/us/en/glossary/cognitive-computing (Mar'25)

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/ (Mar'25)

Is Cognitive Computing…

- Disruptive Innovation?

- Low End Disruption? High End?
- Who are the Incumbents? Entrants?

- The organization concentrate on serving clients well on one hand (“exploit”)?
- The organization concentrate on innovation with the other hand (“explore”)?

- Value Chain?
- Design Category? Dominant design ?