



# The Future of Technology and Society

Chapter 1 – Technology Evolution and Business Strategy

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# AGENDA

## REVIEW

1. Disruptive Innovation
2. Overview of Future Technologies

“

“In the end, all technology revolutions are propelled not just by discovery, but also by business and societal need. We pursue these new possibilities not because we can, but because we must.”

John Kelly, III. IBM Research (2015)

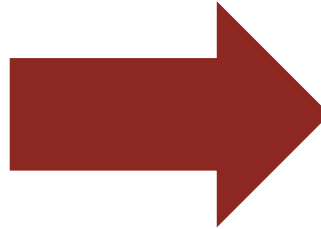


# About This Course

- New technologies
- New application areas



Disruptive  
innovation



Future of  
Society &  
Business



- New Services
- New Experiences
- Societal Impact & Social Good



- New markets, new value networks
- New revenue streams

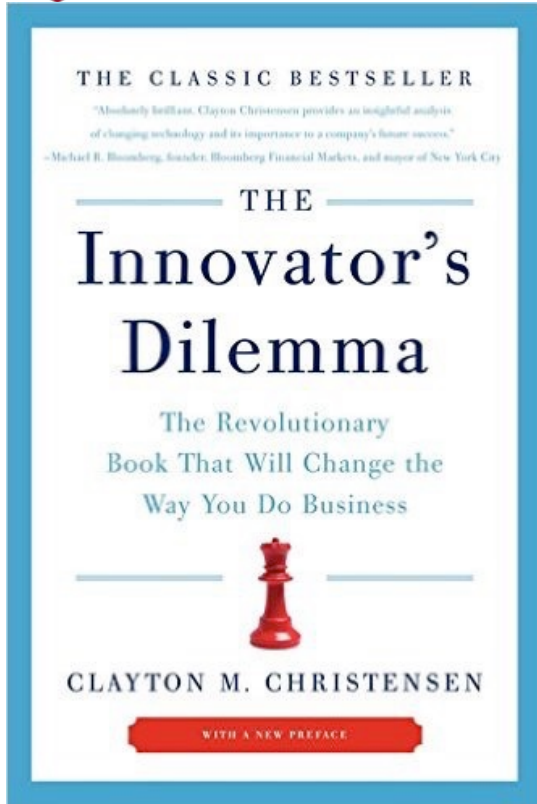
- R&D in large companies
- Risky technology



- How to promote strategies for innovation?
- How to prepare business to take advantage of disruptive technologies?
- What are the new business strategies to profit from the new wave of technology evolution?



# 1 - Disruptive Innovation



The innovator's dilemma: doing the right thing is the wrong thing. This dilemma rears its head when a type of innovation that we've termed disruptive technology arises at the low end of the market, in the simplest, most unassuming applications."

Managers are the large company's main resistance against disruptive innovation; they tend to favour predictable, safe sustaining innovation.

**This is the main cause of great firms to fail!**

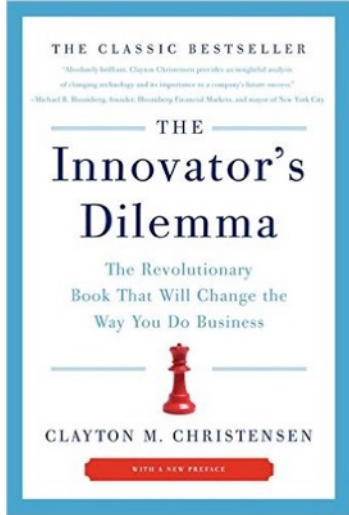


# Innovator's Dilemma - Video Digest



Book Video Summary: <https://www.youtube.com/watch?v=yUAAtIQDllo8>

# Innovator's Dilemma - My Notes



My Notes

## Key points:

1. Market progress is separate from technology progress. Customers do not always know what they need.
2. Disruptive technology needs a new market. Old customers are less relevant.
3. Disruptive technology is a marketing problem, not a technological one.
4. Organizations have narrow capabilities. New markets enabled by disruptive technologies require very different capabilities.
5. Disruptive innovations reward leaders. It is not wise to always be a leader or always a follower.
6. Small entrant firms enjoy protection because they are doing things that do not make sense to the industry leaders.



# Sustaining vs Disruptive Innovation

## Sustaining Innovation



Improve performance of existing solutions  
Contribute to existing market  
Promote impact on user experience and revenue stream

Low-Risk

Predictable marketing

Acceptable margins

Large-companies are usually very good at them



If you are a good manager, which one would you take?

## Disruptive Innovation



Create new market and value network  
Disrupts an existing market  
Promote significant societal impact

High-Risk

Unpredictable marketing

Low-end margins (at beginning)

Large-companies are not good at them

# Examples of Disruptive Innovation

Category	Disrupted Innovation	Market Disrupted
<b>Academia</b>	Wikipedia	Traditional encyclopaedias
<b>Communication</b>	Telephony	Telegraphy
	Mobile Telephony	Wired Telephony
<b>Computing</b>	Personal Computers	Minicomputers
	Mobile Computers	Personal Computers
	Smartphones	Personal Computers, Laptops, PDAs
<b>Display</b>	LED	Light Bulbs
	LCD LED	CRT
<b>Transportation</b>	Automobiles	Rail Transport
	Self-driving Cars	Man-maned Cars
<b>Media</b>	Word Processing	Typewriter
	Digital Content	Printed Content e.g. news papers
	Internet Content	TV Content



Radio Shack cell phone: <https://www.youtube.com/watch?v=694TX2lQ7Uo>



# How good companies fail with Disruptive Innovation?

## IBM

IBM Simon Personal Communicator  
\$899 -> \$599



~50,000 units sold 1994  
Decommissioned 1995

(1) Disruptive technology is often first developed inside established firms.

(2) Marketing people poll existing customers; management shelves project.



~4.4M units sold 2002  
~50M units 2002-2010

(3) New companies form. New markets are created for new products.

(5) New entrants move upmarket.

NOKIA

1999



2002



2010-11



(4) Established firms improve existing products.

(6) Established firms jump on the bandwagon late.

IBM Simon PDA: [https://www.youtube.com/watch?v=wIPgf-r6\\_-4](https://www.youtube.com/watch?v=wIPgf-r6_-4)

# Principles of Disruptive Innovation

Principle	How to harness it favourably?
<b>#1 Resource Dependency:</b> companies depend on customers and investors for resources; customers drive internal decision making Risk: avoid entering disruptive innovation as there is no customers' demand.	Embed projects to develop and commercialize disruptive technologies within an organization whose customers need them.
<b>#2 Growth need:</b> large companies are not interested in small emerging markets. Risk: wait too long before entering innovative technology market.	Place projects to develop disruptive innovation in organizations small enough to get excited about small opportunities.
<b>#3 Unknown market:</b> the ultimate use for disruptive technology is unknown in advance	Plan to fail early and inexpensively in the search of a market for disruptive technology.
<b>#4 Organization's capabilities define its disabilities:</b> value resides in processes and values.	Apply some resources from mainstream organization to address disruptive technology.
<b>#5 Technology supply may not equal market demand.</b>	Find or develop new markets when commercialize disruptive technologies, instead of searching for a technology breakthrough so that disruptive technology could compete as sustaining technology in mainstream markets.

## Common Implementation (Alternative Business Models)



form small organization unit with allocation of mainstream



rely on small enterprise to promote the innovation



## 2 – Overview of Future Technology

# Visions about the Future



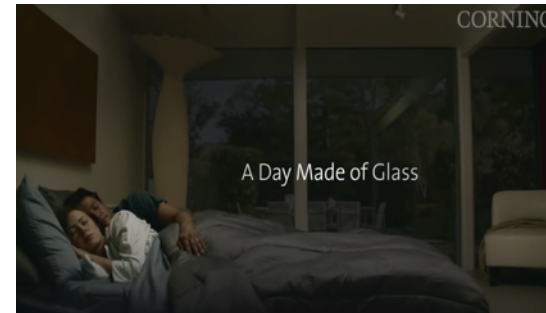
<https://www.youtube.com/watch?v=9Tw-f3i-08k>



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

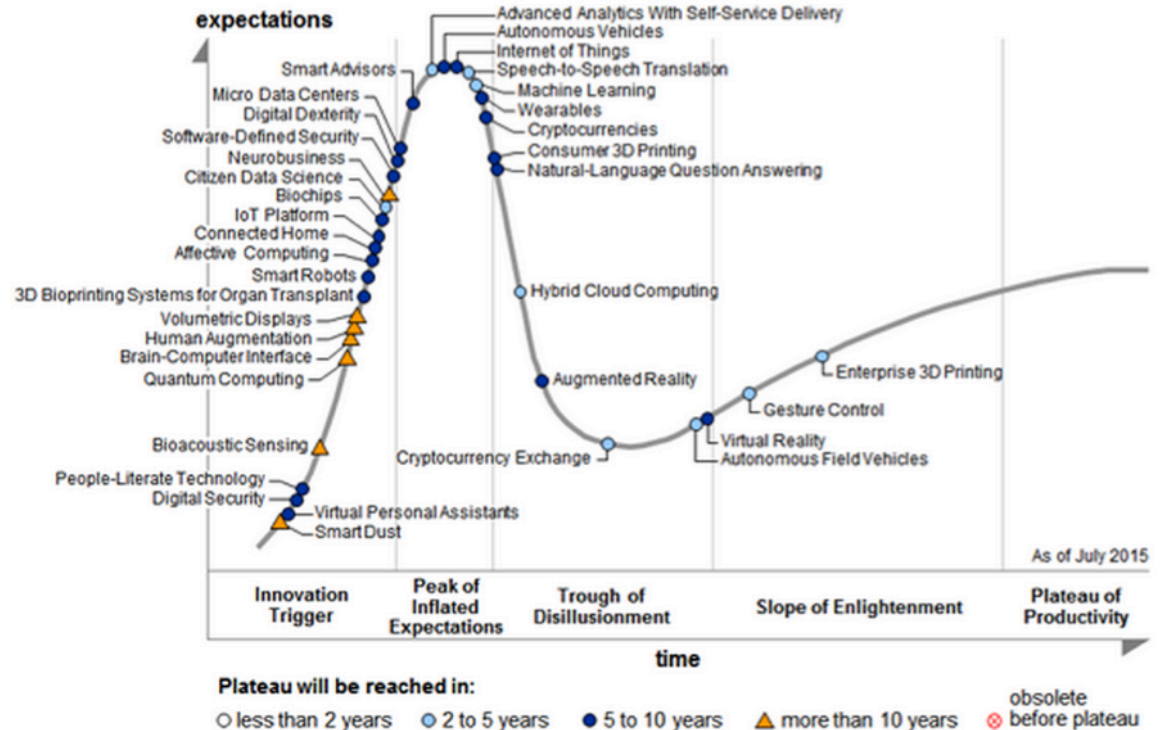


<https://www.youtube.com/watch?v=XylvSIY0MTM>



[https://www.youtube.com/watch?v=6Cf7IL\\_eZ38](https://www.youtube.com/watch?v=6Cf7IL_eZ38)

## Gartner's 2015 Hype Cycle for Emerging Technologies



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



# Case: Gartner Top-10 Technology Trends

## Gartner Special Report

Top 10 Strategic Technology Trends for 2016

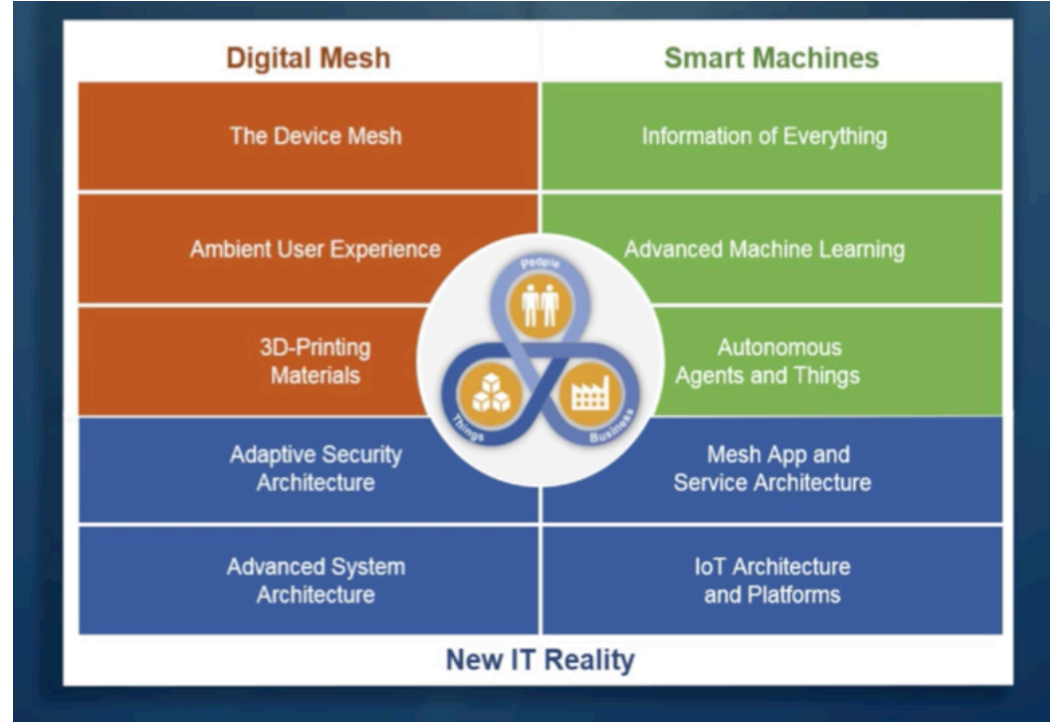


## Digital Business

Delivering new and advanced services to internal users and customers

## Algorithmic Business

Using algorithms to encapsulate knowledge and analysis of data





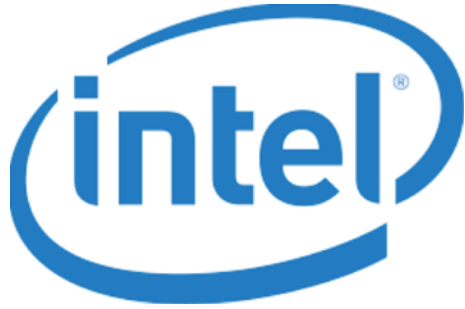
# Case: IBM Technology Topics



## IBM Technology Themes (2016)

1. Healthcare IoT & Analytics
2. Internet of Things Security
3. Industrial IoT
4. Enterprise Personal Intelligence / Analytic Agents
5. Cognitive Computing for Education and Personalized Learning
6. Future of Energy (production, distribution, storage)
7. Data Visualization and Curation at Scale
8. The Data Economy
9. Environmental Sustainability

# Case: Intel Technology Topics



## Intel Technology Trends (2016)

1. Internet of Things
2. Healthcare; personalised care; wearables; Collaborative care
3. Personal Computing; digital mesh
4. 3D visualisation and Virtual Reality
5. Education; game-infused learning; real-time insights
6. 3D printing



# Case: Samsung Technology Topics

## SAMSUNG



### Samsung Technology Trends

1. Human-centred IoT
2. Virtual Reality & Augmented Reality
3. IoT Infra/Sensors
4. Ambient Intelligence
5. Future 4G/5G Communication
6. Smart Environment
7. Personal Advisor
8. IoT Convergence

Source:

<https://news.samsung.com/global/samsung-electronics-announces-vision-for-a-human-centered-internet-of-things-planning-1-2-billion-for-u-s-research-and-development-of-iot>



# What are the technology intersections?

	Gartner	IBM	Intel	Samsung
<b>IoT</b>	IoT; IoT Platforms	Healthcare IoT; IoT Security; Industrial IoT	IoT; Digital Mesh	Human-centred IoT; IoT Infra; IoT Convergence
<b>Computation Intelligence</b>	Advanced analytics; machine learning	Cognitive Computing; Analytic Agents		Ambient intelligence; Personal Advisors
<b>Augmented Interfaces</b>	Virtual reality; augmented reality	Data Visualization	3D visualisation and Virtual Reality	Virtual Reality; 3D Glasses
<b>Ambient Intelligence</b>	Ambient User Experience	Personal Computing; digital mesh	Personalised care; wearables; digital mesh	Human-centred IoT; Ambient Intelligence
<b>Social Bots</b>	Smart advisors; Virtual Personal Assistants	real-time insights		Personal Advisors
<b>Citizen Data Science</b>	Information of Everything	Healthcare IoT	Personal Computing; digital mesh	Human-centred IoT



# Perspectives for Disruptive Innovation

How to combine these technologies to business models  
leading to **Disruptive Innovation**?

IoT

Computation  
Intelligence

Augmented Interfaces

Ambient Intelligence

Social Bots

Citizen Data Science

Disruptive Innovation



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[https://www.youtube.com/watch?v=VKEB\\_-ODqLM](https://www.youtube.com/watch?v=VKEB_-ODqLM)





Thank you  
고맙습니다

Presentation at:  
<http://www.fernandokoch.me/fts-ku>  
password: kumot2016



Please email questions to:  
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