Swansea University
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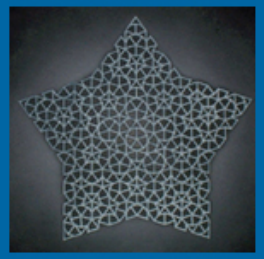
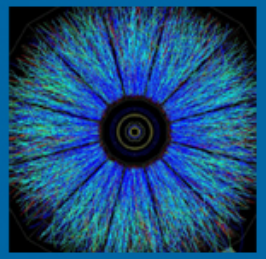
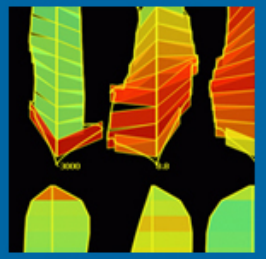
CS-130 Professional Issues
Core Concepts: Emergence, Convergence and Pervasiveness

Learning Goals

What characterises the period of *emergence* in a new disruptive technologies life cycle?

What are the differences between *vertical* and *horizontal convergence*?

Why does *convergence* follow emergence of a new technology?

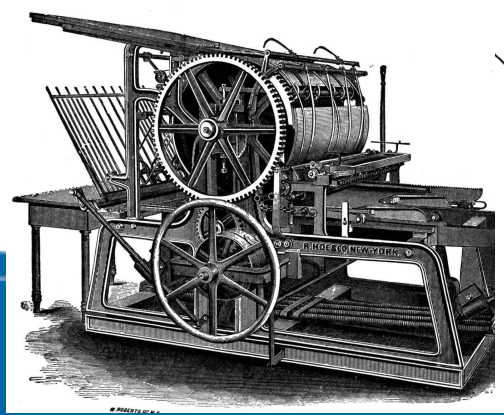
What does it mean when a technology becomes *pervasive*?

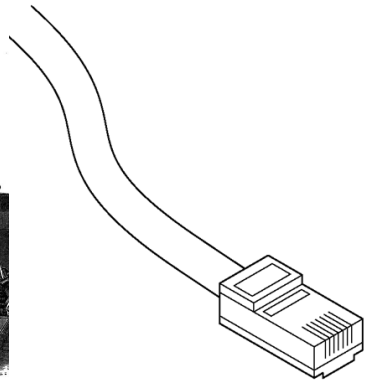
How old is ICT?

Emergence

Emergence – The time in which a technology comes into being and the effects that it has on society

- Emergence is a period of change for society as new technology creates new opportunities and problems
- The scale varies from technology to technology
- *Disruptive technology* has a particularly chaotic period of emergence





Case Study One: The Printing Press

Before the printing press, we have few ways to share information

- Stories and ideas passed down by word of mouth
  - These are Interpreted and Filtered with little to no permanence

Books are few and are written by hand

- They were full of mistakes made in transcription
- The books could only be afforded by rich or big organisations (the church)

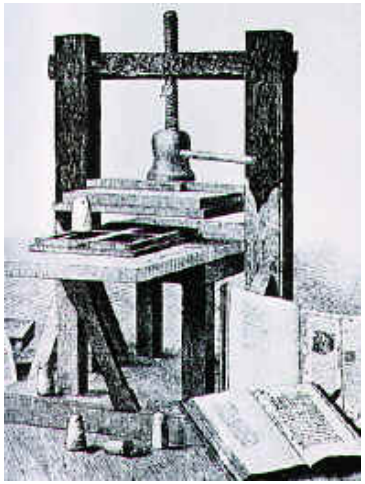
It was easy for authority to censor ideas or information

- Arrest speaker
- People only knew what authority wanted them to know

A note on dates going forward because they are inherently fuzzy!

(A recognisable precursor) All key technologies in place – End or collapse of first major market expansion

Case Study One: Emergence of The Guttenburg Printing Press (1234) 1440-1540



Easy to mass produce ideas, unfiltered by messenger

Requires and produces mass literacy

Easier for workers to organise

Difficult for authority/power to control/challenge

People able to contest ideas and interpretations

Readers “witness” events thousands of miles away

Case Study Two: Emergence of The Electric Telegraph – (1642) 1837-1852

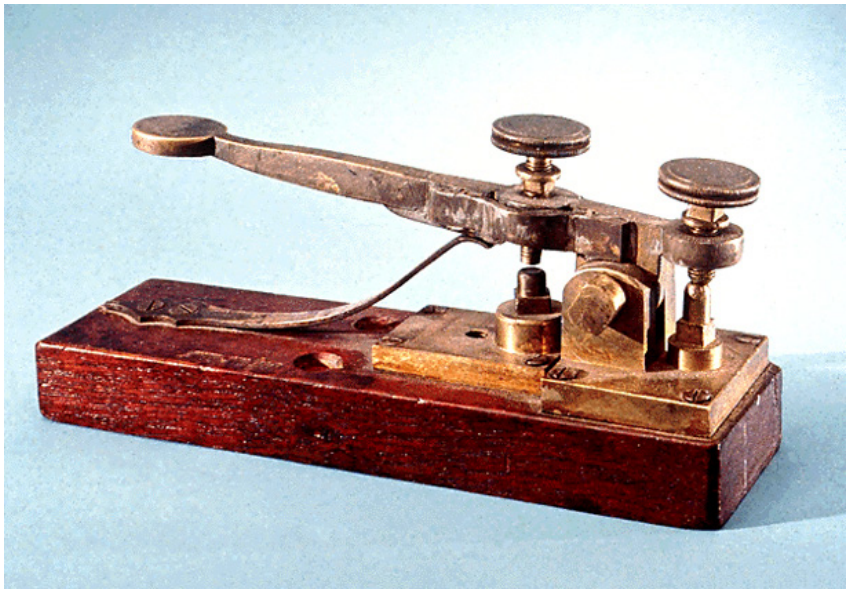
Almost instantaneous, almost mass communication

Required expert operators

Expensive investment in lines and training

Still required manual transportation over “last mile”

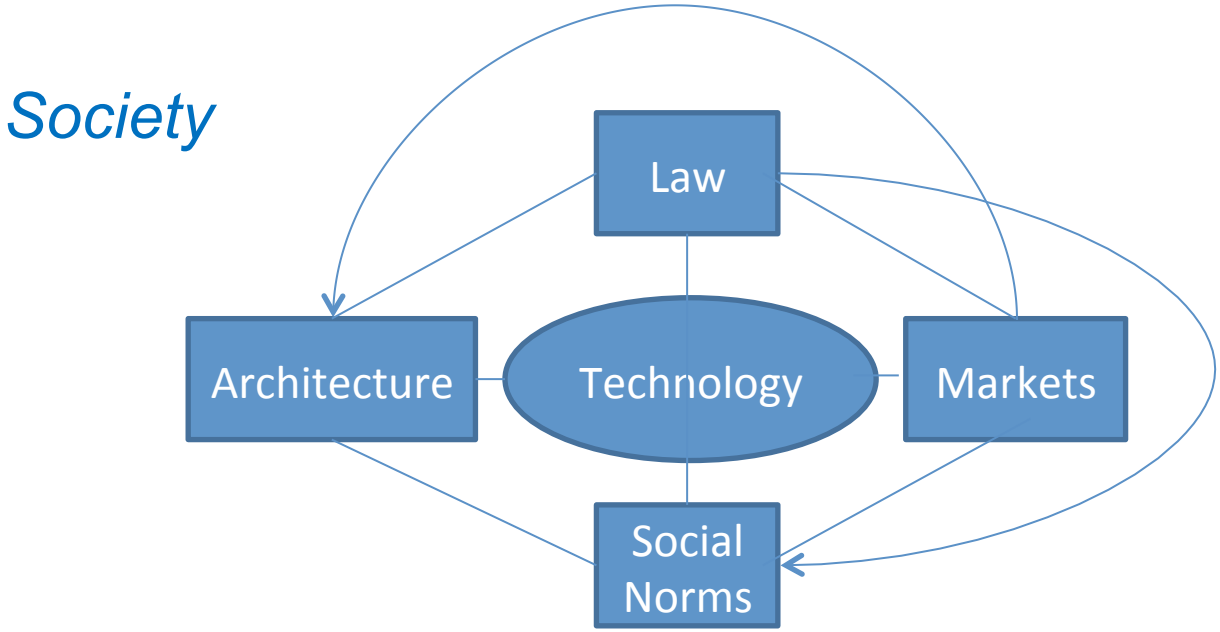
Date of invention vs. deployment



At least two people other than the originator knew (or could know) content

- Remember this when we discuss online security!

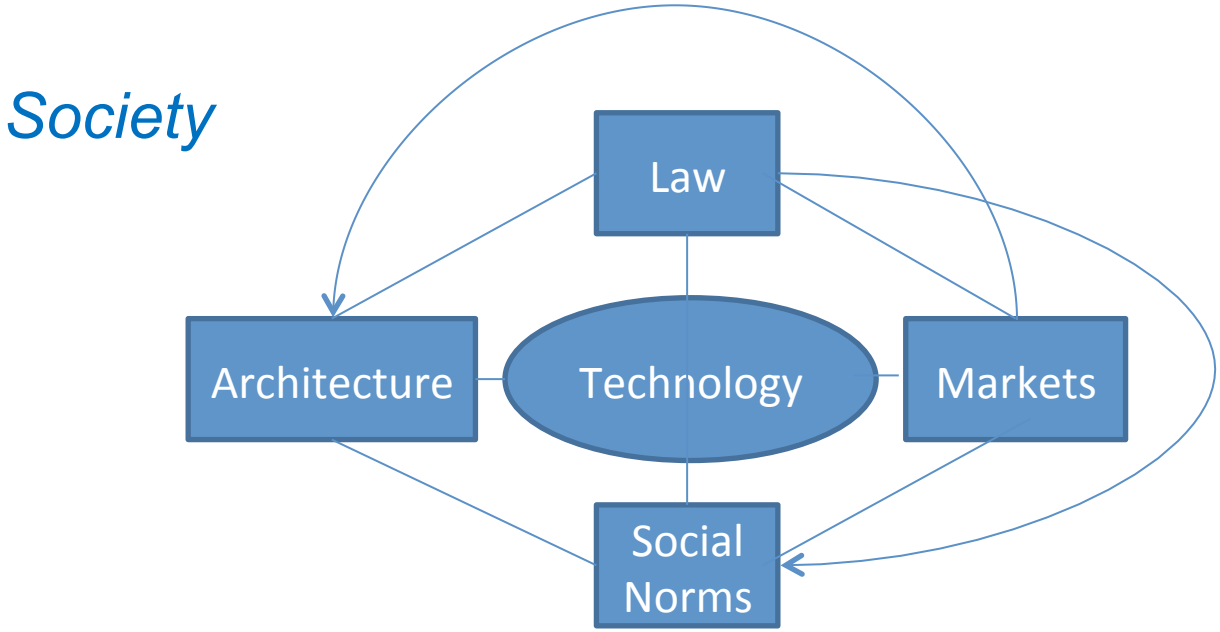
Lessig's Four Modalities Analysis



The Telegraph: Changes from Technology

What changes do you think the Telegraph might have brought about in the world?

Lessig's Four Modalities Analysis



The Telegraph: U.S. vs. the UK

What part of Lessig's model caused the success of the telegraph system in the United States but not in the United Kingdom?

Case Study Three: The Telephone (1844) 1876-1890s

Interactive conversation over large distance.

Both parties had to be physically present to send and receive message

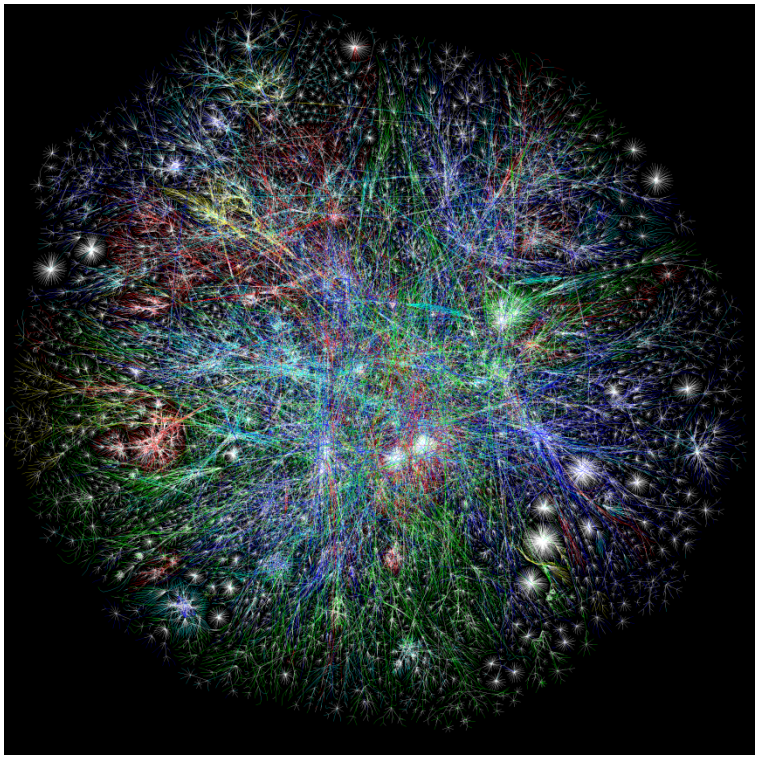
Privacy: Operator needed to connect calls.

Party lines to save money, could listen to neighbour's calls

Lower cost/greater standard of living. More people owned own phone. Automatic line-switching meant more privacy

Irritating – junk calls can't be "binned". Modern phones inform receiver who's calling

Case Study Four: The Internet (1973) 1990-2003



Instant many to many communication

Allowed any form of messaging. Voice, video,
text etc

Combines television, telephone and almost everything in one medium

Mobile (cell) phone makes it available “in your pocket”

Difficult to censor

After Emergence, Convergence

In business and economics, convergence is the reduction of players in the market place

Vertical convergence – the consolidation of supply chains

Horizontal convergence – the consolidation of many businesses into one OR the convergence of two related marketplaces

Convergence

What examples of horizontal and vertical convergence can you think of?

Vertical convergence in a digital medium

How does a digital company consolidate it's supply side and it's distribution side?

Corporate Productivity vs. Individual Creativity

The early days of a technology (it's emergence) are an amazing time for innovative small companies that can respond

- This leads to a *First Mover Advantage* for creative companies

However, as a technology becomes more mainstream larger companies get's their heads around it

The economies of scale come into play and big businesses or organisations advantages become the deciding factor

Pervasive or Ubiquitous technology

Eventually new technology permeates a society, it's presence is assumed rather than questioned

- This can be a good way to judge if a technology is truly disruptive – does it eventually become pervasive?
  - One drawback to this approach to judging it though….

The time between technology emerging and becoming pervasive can be enormous but it is getting shorter and shorter

- We are still in the emergence of Pervasive Computing

Thinking of examples….

In groups try to think of examples of a technology that has become pervasive in the last 5, 30 and 60 years

Learning Goals

What characterises the period of emergence in a new disruptive technologies life cycle?

What are the differences between vertical and horizontal convergence?

Why does convergence follow emergence of a new technology?

What does it mean when a technology becomes pervasive?

Learning Goals

What characterises the period of emergence in a new disruptive technologies life cycle?

- Rapid change in society, wide scale disruption, the emergence of new players and new technologies

What are the differences between vertical and horizontal convergence?

- Vertical: supply chains become consolidated
- Horizontal: players in Marketplace become consolidated

Why does convergence follow emergence of a new technology?

- Eventually economies of scale outstrip first mover advantage

What does it mean when a technology becomes pervasive?

- The presence of a technology becomes assumed