Theories of technology

mgmt 3601

unit 04.2

Overview

- Questions about technology
  - Does it have its own inherent value?
  - Is its development in our control?
- Feenberg's table
- Other approaches
  - Social Construction of Technology (SCOT)

From previous lectures

- Fordism and Taylorism
  - The goal of technology is efficiency
- Moore's law & related laws
  - Increasing efficiency and power
    - More computing power
    - Higher speed
    - Decreasing cost
    - Decreasing size

	pre industrial	industrial	post industrial
resources	raw materials	financial capital	human capital
transformational power	natural power: - water wheel - wind mill - animals	mechanical power: - steam - electricity - oil - nuclear power	information and knowledge processing: - programming - algorithms - data transmission
labour	physical labour	division of labour	networked labour

Post-Fordist / Post-industrial / Informationalism

- When technology becomes information technology, does this fundamentally change what technology is?

Directions of development

- Utopia

- Dystopia
    - As we discussed last time

Questions

1. Do humans or society have any control over how technology develops?

2. Does technology have an inherent or implicit value or ideology?

Value-neutral vs. value-laden

- Value-neutral
  - Technology has no predefined impact on human beings or human society
- Value-laden
  - Technology has an inherent value

- *e.g. if one argued that technology development leads inevitably to increased concentration of wealth in the top 1% or that it inevitably leads to a divided society*

Autonomous vs. Human-controlled

- Autonomous
  - We cannot decide how technology will develop
  - The next stage in development is predetermined
- Human-controlled
  - We decide how technology will develop
  - Human intentions and choices determine how technology develops

Technology	Autonomous: We have little control over how technologies are developed and diffused	Human-controlled We make important decisions that determine how technologies are developed and diffused
Value-neutral The end uses of technology are independent of the technology itself	**Determinism** (Marxist view) Technology proceeds on its own but is independent of the structure of society	**Instrumentalism** (neo-liberal view) Technology is an instrument we an use to achieve desired social ends
Value-laden The end uses of technology are inherent in the technology itself	**Substantivism** Technology determines the shape of society – shaping society according to the ends of technology	**Critical theory** By understanding technology, we have the power to manage technology and control its ends

Based on Quan-Haase *Technology and Society* p. 43 Feenberg http://www.sfu.ca/~andrewf/komaba.htm

Instrumentalism

Technology is	Autonomous	Human-controlled
Value-neutral	Determinism	**Instrumentalism**
Value-laden	Substantivism	Critical theory

- Neo-liberal view
- Technology is simply a tool for our benefit
  – e.g. "guns don't kill people—people kill people"
- Progress is good and under human control
- *Nature exists to be exploited and used*

Instrumentalism

Technology is	Autonomous	Human-controlled
Value-neutral	Determinism	**Instrumentalism**
Value-laden	Substantivism	Critical theory

- Neo-liberal view

- Dominant view
  - View of large tech companies – FAANGs &c.
    - Facebook, Apple, Amazon, Netflix and Google
  - View of many governments
    - Technology development brings jobs and opportunities

Instrumentalism

Technology is	Autonomous	Human-controlled
Value-neutral	Determinism	**Instrumentalism**
Value-laden	Substantivism	Critical theory

- example – Facebook revolutions
- The overthrow of Mubarak in Egypt (2011)
- Tunisian revolution (2011)
- The technology gave people the power to organize and overthrow governments

Instrumentalism

Technology is	Autonomous	Human-controlled
Value-neutral	Determinism	**Instrumentalism**
Value-laden	Substantivism	Critical theory

- Japan Meiji period of rapid change ~1870 – 1920
  - Rapid industrialization and modernization and a belief that traditional values could still be maintained

Determinism

Technology is	Autonomous	Human-controlled
Value-neutral	**Determinism**	Instrumentalism
Value-laden	Substantivism	Critical theory

- Marxist view *(dialectical materialism)*
- Technological advance is the driving force of history
- Technology shapes society to requirements of efficiency and progress
- We must adapt to technology as the most significant expression of our humanity

Determinism

Technology is	Autonomous	Human-controlled
Value-neutral	**Determinism**	Instrumentalism
Value-laden	Substantivism	Critical theory

Post World War I – *politically neutral technology*

- The Soviet Union industrializes rapidly (communist)
- The USA continues industrialization (capitalist)
  - Both become less agrarian and more industrial
  - Both are leaders in science, technology, space, and military technology (the Cold War)
  - Efficiency and progress are the only *values* of technology

Substantivism

Technology is	Autonomous	Human-controlled
Value-neutral	Determinism	Instrumentalism
Value-laden	Substantivism	Critical theory

- Substantivism is pessimistic
- Dystopian view
- The autonomy of technological progress is "threatening and malevolent" (Feenberg 2003)

Substantivism

Technology is	Autonomous	Human-controlled
Value-neutral	Determinism	Instrumentalism
Value-laden	Substantivism	Critical theory

- The substantivist view is that choosing a technology is not simply choosing efficiency or convenience—it is choosing a way of life determined by that technology
- Technology does not serve our values or goals—we end up serving the goals and values of technology

Substantivism

Technology is	Autonomous	Human-controlled
Value-neutral	Determinism	Instrumentalism
Value-laden	Substantivism	Critical theory

- View 1: technology will lead to democracy
  - Technology has a built-in democratic value
- View 2: technology is a threat to democracy
  - Technology has a built-in power for those in control of the technology

Substantivism

Technology is	Autonomous	Human-controlled
Value-neutral	Determinism	Instrumentalism
Value-laden	Substantivism	Critical theory

Martin Heidegger

– We are constantly obeying the dictates of technical systems in which we are enrolled; we tend to see ourselves more and more as devices regulated by medical, psychological, athletic and other functional disciplines (Feenberg 2003)

Traditional values cannot survive the challenge of technology (Feenberg 2003) Traditional values are replaced by the values inherent in technology

Substantivism

Technology is	Autonomous	Human-controlled
Value-neutral	Determinism	Instrumentalism
Value-laden	Substantivism	Critical theory

"In the most extreme imagination of substantivism, a Brave New World such as Huxley describes in his famous novel overtakes humanity and converts human beings into mere cogs in the machinery" (Feenberg, 2003)

Determinism / Substantivism

Technology is	Autonomous	Human-controlled
Value-neutral	Determinism	Instrumentalism
Value-laden	Substantivism	Critical theory

- Determinism
  - Optimistic
- Substantivism
  - Optimistic or Pessimistic

Critical theory

Technology is	Autonomous	Human-controlled
Value-neutral	Determinism	Instrumentalism
Value-laden	Substantivism	Critical theory

- Technology is in some sense controllable
- Technology also has built-in values which threaten human and social values

Critical theory

Technology is	Autonomous	Human-controlled
Value-neutral	Determinism	Instrumentalism
Value-laden	Substantivism	Critical theory

- Critical theory sees the catastrophic consequences of technology that substantivism sees, but still sees a promise of freedom through technology
- Understands we need to find ways to control technology

Critical theory

Technology is	Autonomous	Human-controlled
Value-neutral	Determinism	Instrumentalism
Value-laden	Substantivism	Critical theory

- Technology is like climate change
  - Something that follows a predetermined course
  - Something we can work to change and control if we act

Critical theory

Technology is	Autonomous	Human-controlled
Value-neutral	Determinism	Instrumentalism
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- Andrew Feenberg
- "What human beings are and will become is decided in the shape of our tools no less than in the action of statesmen and political movements. The design of technology is thus an ontological decision fraught with political consequences. The exclusion of the vast majority from participation in this decision is profoundly undemocratic" (*Transforming Technology,* p.3).

conclusion

Technology is	Autonomous	Human-controlled
Value-neutral	Determinism	Instrumentalism
Value-laden	Substantivism	Critical theory

- Which position seems reasonable to you?

Other approaches

- *Relying on a critical theory perspective*
    - Science and Technology Studies (STS)
    - Social Construction of Technology (SCOT)
    - Actor Network Theory (ANT)

Science and Technology Studies (STS)

- Technology is value laden
- Technology shapes culture, politics, and social values
- Technology is shaped by culture, politics, and social values
- STS works at both micro and macro level
  - e.g. study of MySpace bands

Actor Network Theory (ANT)

- Importance of webs of relationships (networks)

  "everything in the world is a continuously generated effect of the webs of relations within which they are located"

- Webs include technologies but also people and ideas

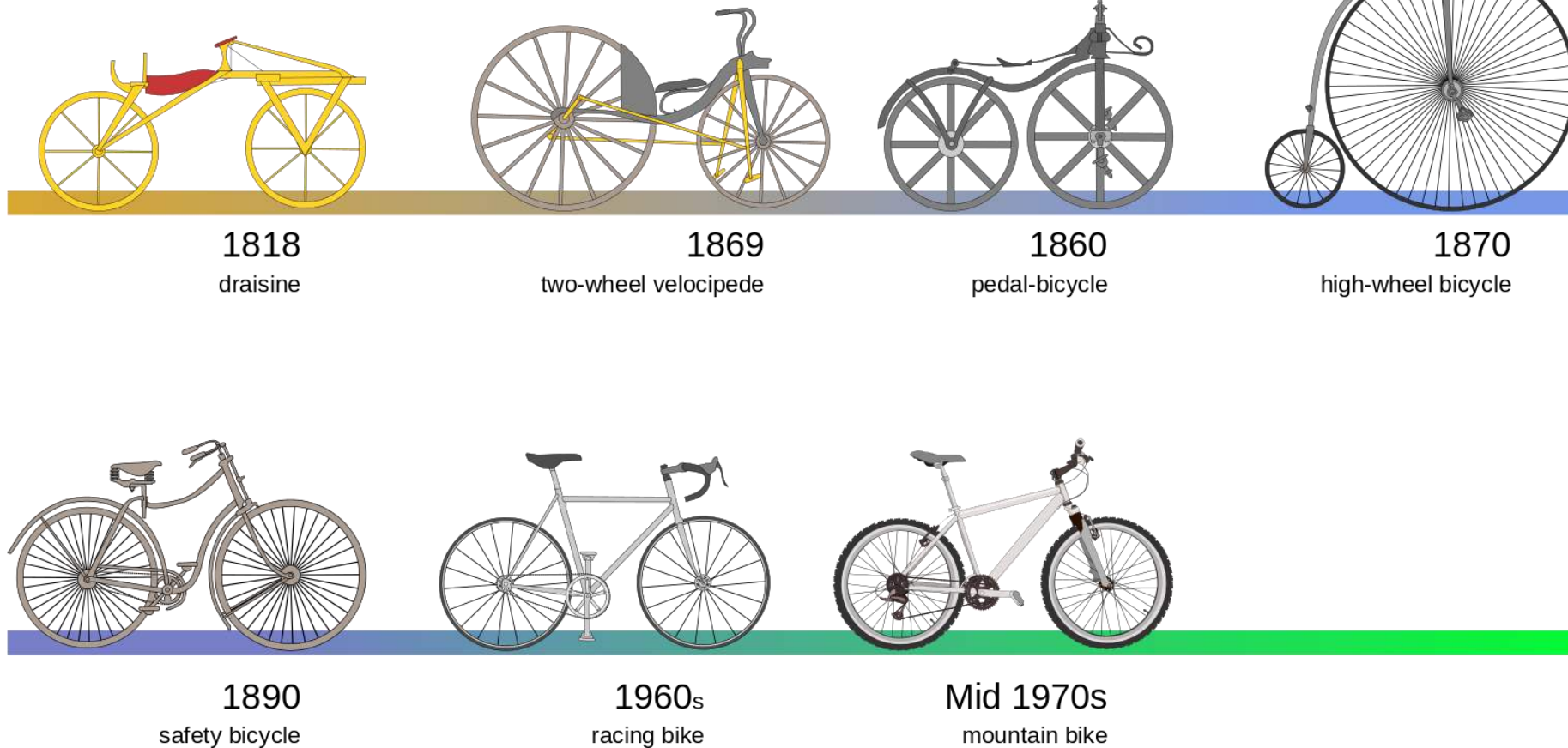- an example of ANT is SCoT...

Social Construction (SCoT)

- *critical-theory-type view*
- technology does not determine human action
- human action shapes technology
- the ways a technology is used cannot be understood without understanding the social context in which that technology is embedded

Social Construction (SCoT)

- Relevant social group
  - Any technology needs social acceptance
- Interpretive flexibility
  - Meaning of a technology emerges from society
- Closure and stabilization
  - A technology's meaning becomes fixed over time
- Wider context
  - values of society are frameworks for interpreting any technology

e.g. The bicycle

1818
draisine

1869
two-wheel velocipede

1860
pedal-bicycle

1870
high-wheel bicycle

1890
safety bicycle

1960s
racing bike

Mid 1970s
mountain bike

Bicycle evolution http://commons.wikimedia.org/wiki/File:Bicycle_evolution-en.svg

Think of another example

- ...(?)

Critique of SCoT

- focuses on how technologies arise, and ignores consequences
- focuses on social groups and interests that contribute to the technology but ignores others not directly connected
- focuses on immediate needs but disregards deeper issues
  - Langon Winner (1993)

References

- Feenberg, A. (2003) What is Philosophy of Technology: Lecture for the Komaba undergraduates
http://www.sfu.ca/~andrewf/komaba.htm