

# Technology and Society



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# Technology and Society

**Engineers know as little about  
technology development  
as fish know about hydrodynamics**

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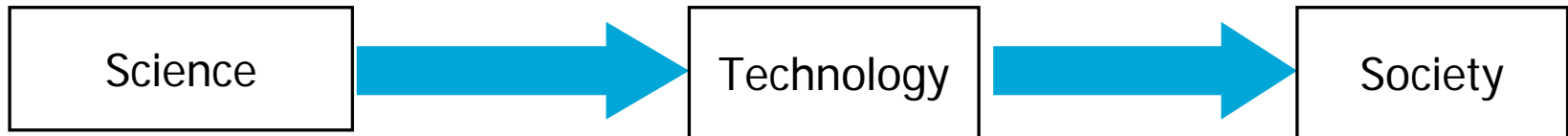
## Determinism vs. Constructivism



*Every new generation has some creative geniuses. They invent some new technologies (by there more than average intelligence or by pure coincidence). The act of invention is independent of society. Succesful inventions diffuse in society and, thereupon, transform society.*

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## Determinism vs. Constructivism



*technology innovation is not accidental but depending on scientific progress. As scientific progress is the result of its own dynamics, and independent of societal change, technological change is independent of society.*

(E.g. Dijksterhuis, 1950 and Koyre, 1943).

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## Autonomous Technology

Scientific knowledge accumulates

Technology is applied science

Resources for technological innovation are growing forever

Technology is ever improving

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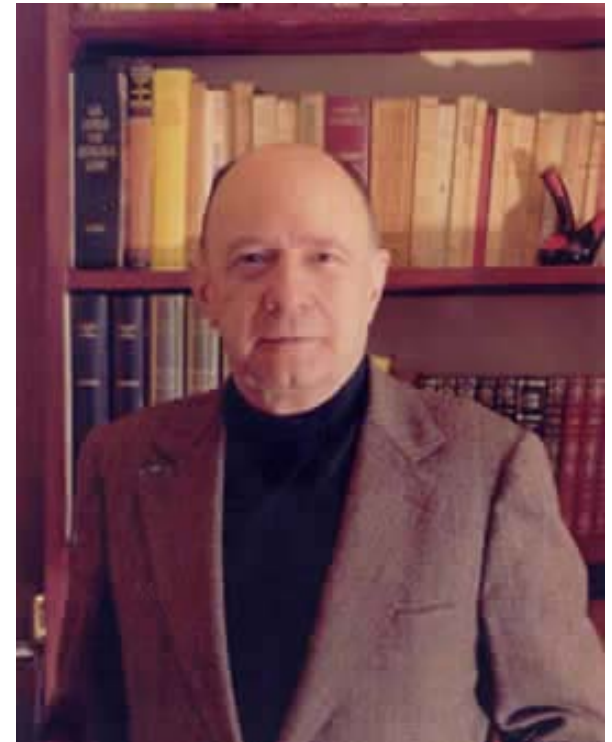
Technological innovation: A positive sum game?

Technological autonomy → Technological determinism

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Autonomous Technology → The negative vision

Jacques Ellul



<http://www.jacques-ellul.org/media/portrait.jpg>

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## Traditional Technology according to Ellul:

Limited in its application (technologies were often based on specific local resources and therefore hardly transferable);

Dependent on limited resources and on much 'skill' (skills like making and repairing tools, but also being able to judge weather conditions, or the tides);

Local in its character, i.e., technological solutions for specific problems were embedded in local culture and traditions.



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Ellul characterizes modern technology by:

**Automatism**, i.e. there is only one 'best' way to solve a problem, and this technology seems to be compelling, everywhere on the planet;

**Self increase**, i.e. a new technology reinforces the growth of other technologies: this leads to exponential growth;

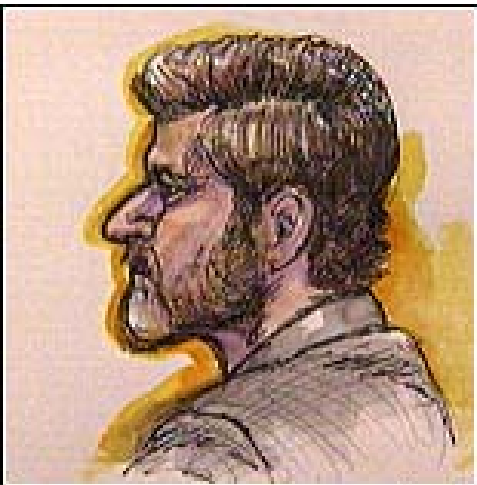
**Indivisibility**: the technological way of life must be accepted completely, including its good and bad sides;

**Cohesion**, i.e. technologies that are used in various different areas have much in common;

**Universalism**, i.e. technology is geographically as well as qualitatively omnipresent.

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e.g Unabomber Attacks



Kaczynski

(CNN)



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## Unabomber Attacks → The Car

The car increases our freedom by increased freedom of movement

By having a car, we can do our shopping in Malls

Small neighborhood shops disappear

We therefore are forced to have a car

So a technology like the car curbs our liberty

## UNABOMBER



Kaczynski arrested,  
<http://images.encarta.msn.com/xrefmedia/shar/emed/targets/images/pho/t304/T304687A.jpg>

# What is wrong with Unabomber?

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## An Alternate Vision: Social Constructivism

Various social groups are involved with technology

Every group has a specific view of a certain technology

Example: PC.

- secretary: type writer
- book keeper: administration tool
- at home: communication tool

Technologies are shaped by demand / influence of relevant social groups

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## SCOT-model: Social Construction of Technology

Artifact

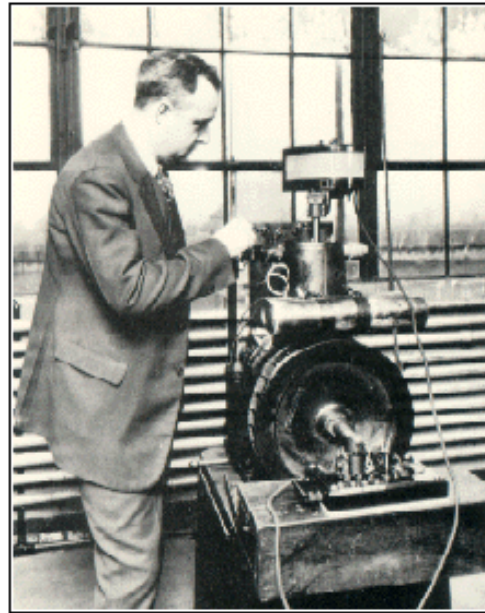
Relevant social groups

Interpretative flexibility

Inclusion of new groups

Technological frame

# How to Prevent Negative Effects of Technology



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## CFC's

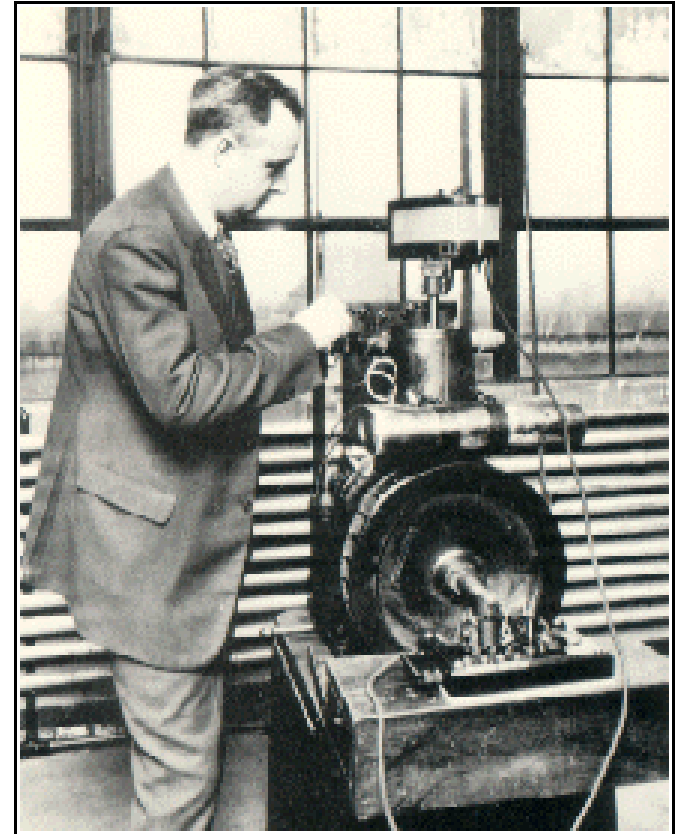
Thomas Midgley jr.

Developed tetra-ethyl lead (TEL) as an additive to gasoline and chlorofluorocarbons (CFCs)

Due to environmental effects:

In 1973 the first measures were taken in the US to phase out leaded gasoline

Since 1999 CFC's are no longer being produced



<http://www.dartmouth.edu/~toxmetal/images/Midgley.gif>



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## DDT

Paul Hermann Muller

Invented DDT in 1939 (insecticide useful to control insect borne diseases)

Won the 1948 Nobel Prize in Medicine

Silent Spring, 1962, Rachel Carson

Dealt with the effects of chemicals such as DDT in the environment.

This led to the banning of DDT in the 70's and 80's in western countries



<http://sandwalk.blogspot.com/2007/03/nobel-laureate-paul-hermann-muller.html>

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## Effects

### **First order**

Expected effects

### **Second order effects:**

Cultural/behavioural changes

Telephone for social communication

New roads attracting more car

### **Third and higher order effects:**

Social exclusion

Criminal use

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## Technology Assessment Defined

Technology Assessment is:

The **systematic** identification, **analysis** and **evaluation** of the **potential secondary consequences** (whether beneficial or detrimental) of technology in terms of its **impacts** on **social, cultural, political, economic** and **environmental** systems and processes.

Technology Assessment is intended to provide a neutral, factual input into the decision-making process.

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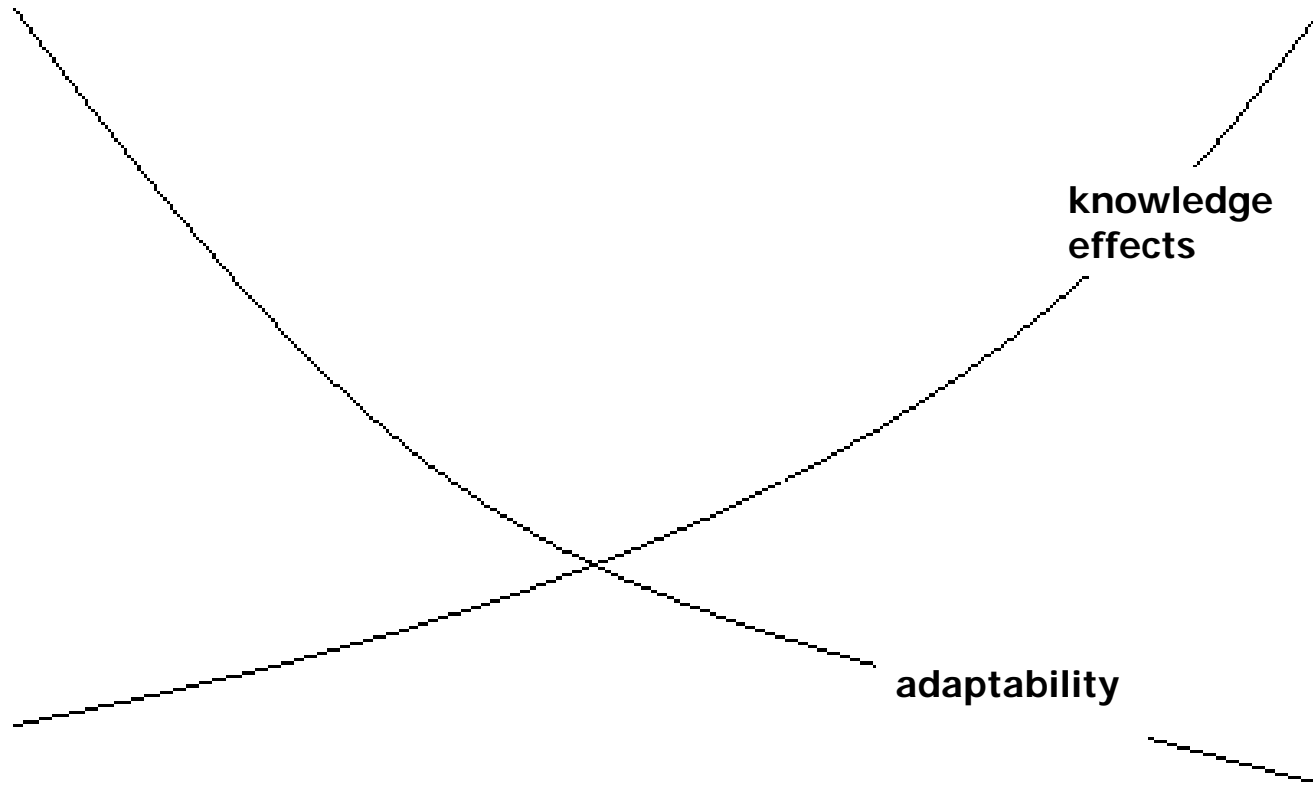
## Control Dilemma

....attempting to **control** a technology is **difficult**, and not rarely impossible, **because during its early stages, when it can be controlled**, not enough can be known about its harmful **social consequences** to warrant controlling its development; **but by the time these consequences are apparent, control has become costly and slow.**

Collingridge, 1980, p19

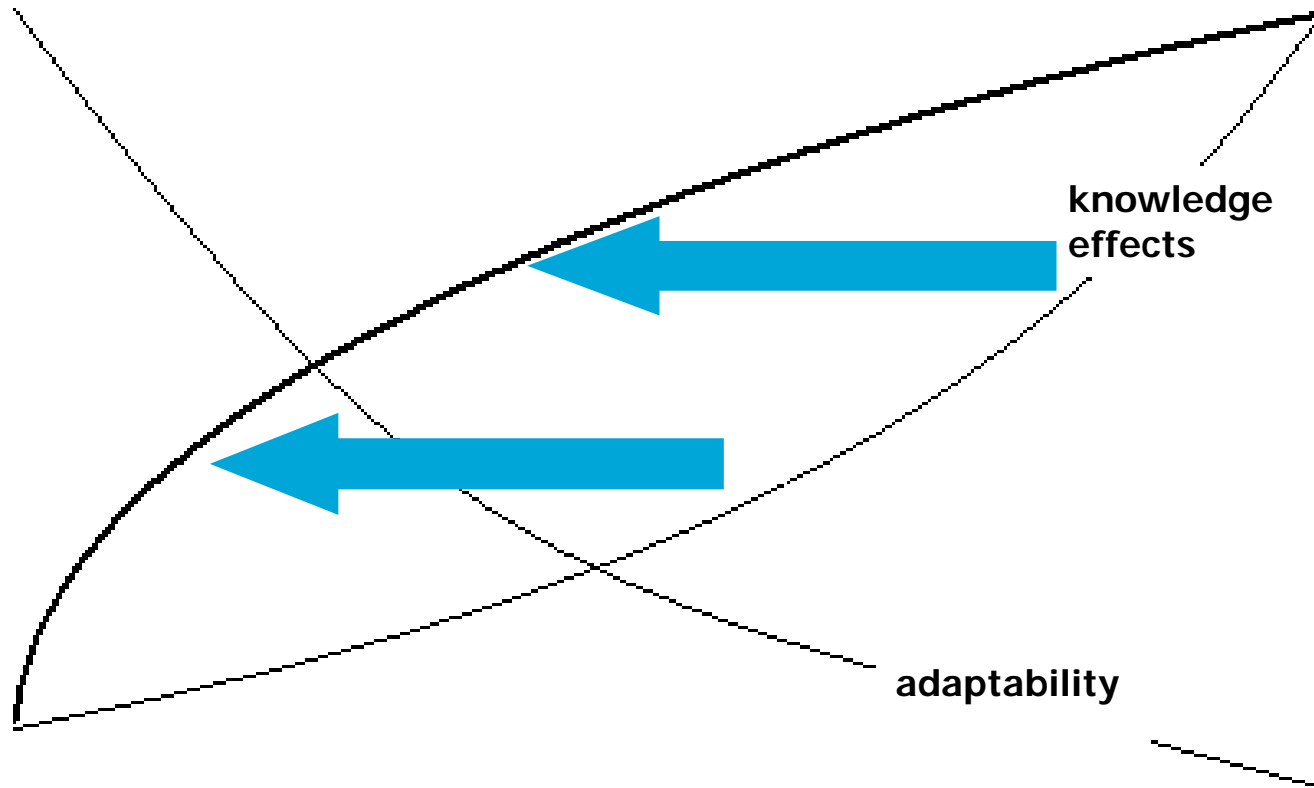
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Control dilemma, (trilemma), Collingridge



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Control dilemma with forecasting of impacts



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## Modern Technology Assessment

Constructive approach

Influence course of technology

Involve main stakeholder groups

Facilitate dialogue by future studies, forecasts etc.