Environment and Technology
An Economic Policy Perspective

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Agenda
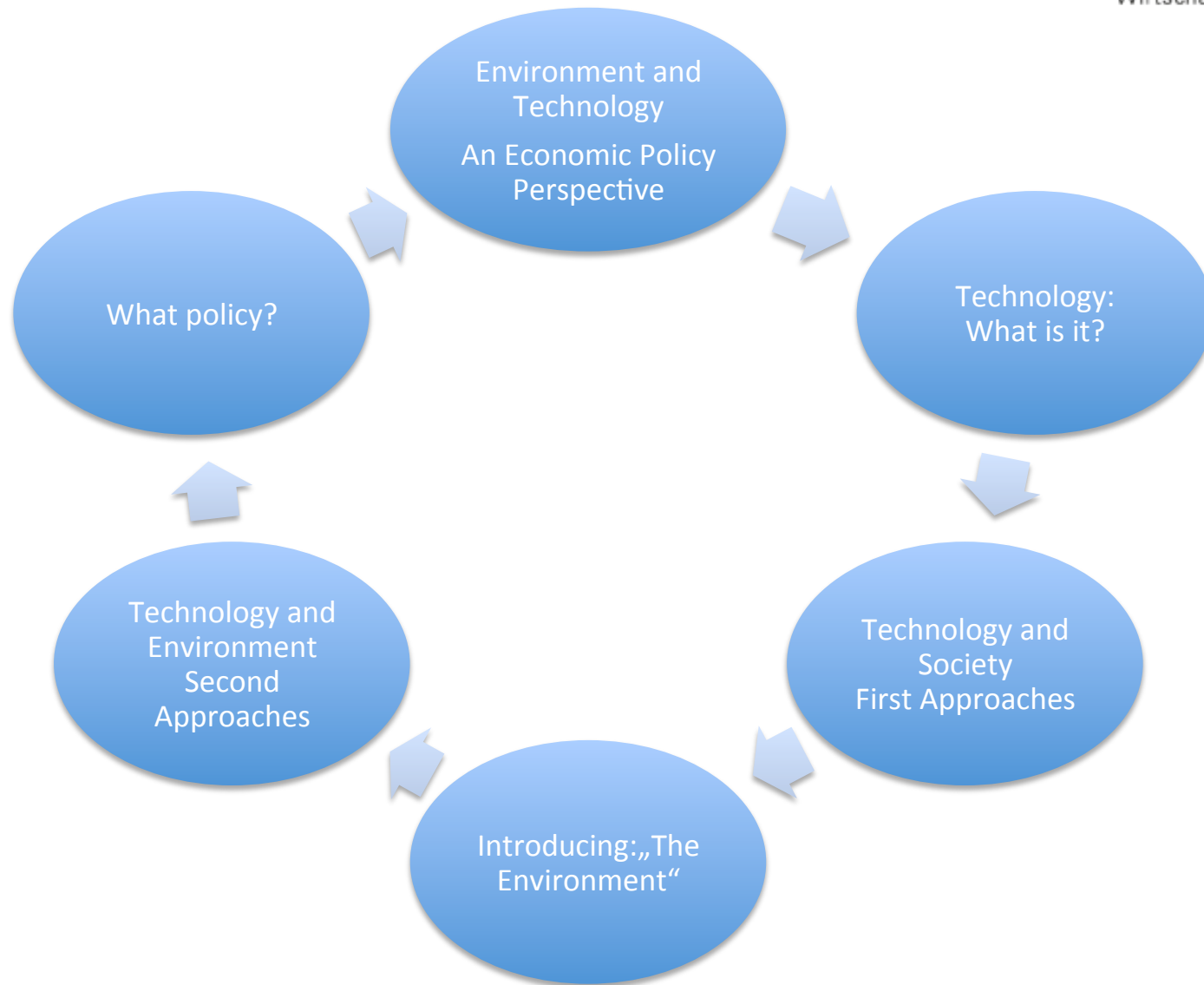
Environment and Technology

An Economic Policy Perspective

Technology: What is it?

Technology and Society First Approaches

Introducing: „The Environment"

Technology and Environment Second Approaches

What policy?

What "is" Technology?

τέχνη (téchnē)
art, skill, craft

λογία (logía)
study of...

Technology as the study of arts, skills and crafts

What "is" Technology?

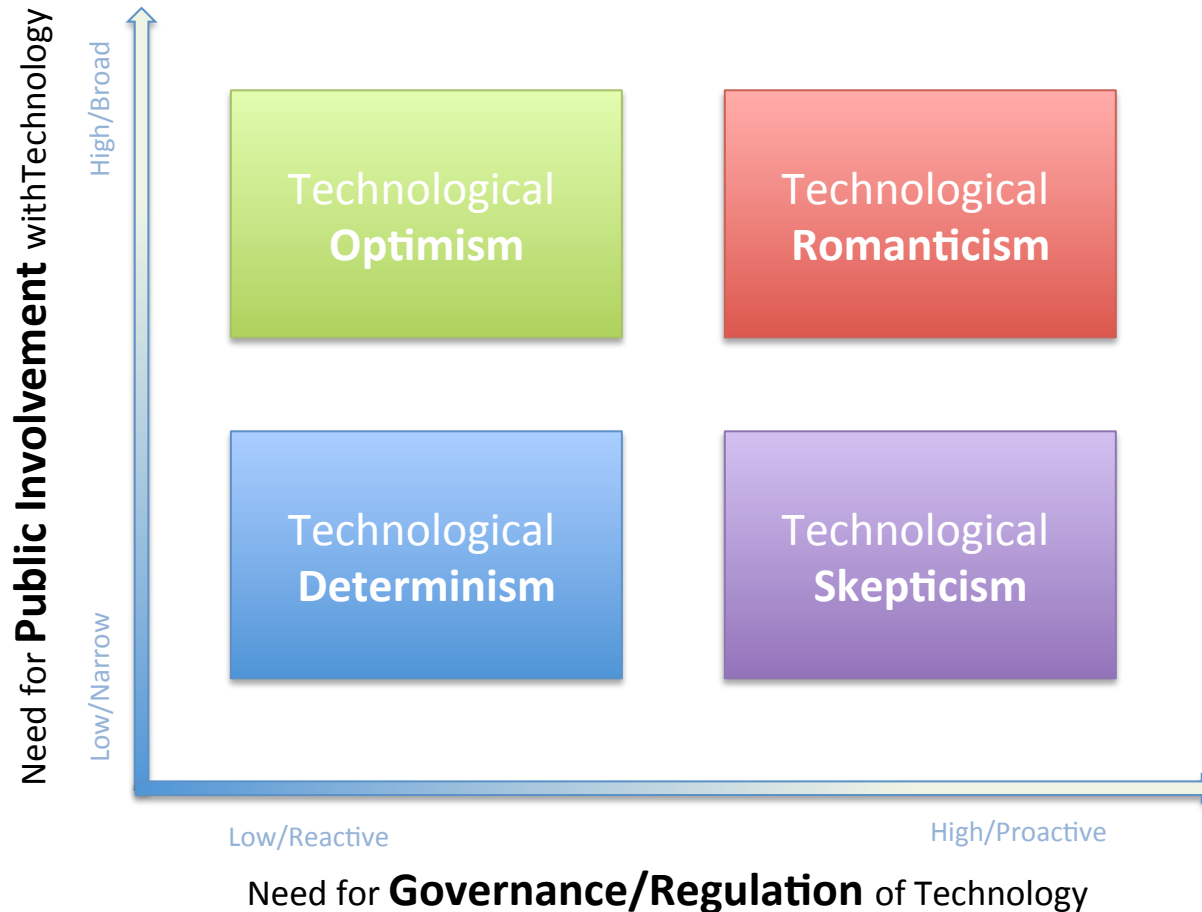| Tangible	Intangible	Application
Tools, Machines, Blueprints, Operating Manuals, Prototypes	Techniques, Crafts, Methods, Consultancy	Goal-oriented mental and physical efforts, using tangibles and intangibles to produce more tangibles and intangibles
Physical artifacts	**Knowledge**	**Process**

Technology can be viewed as a process that forms and changes culture
cf. Borgmann, Albert (2006). Technology as a Cultural Force: For Alena and Griffin. The Canadian Journal of Sociology 31 (3): 351–360

Technology and Society
Views on Technology

Need for **Public Involvement** withTechnology

High/Broad

Low/Narrow

Technological **Optimism**

Technological **Romanticism**

Technological **Determinism**

Technological **Skepticism**

Low/Reactive

High/Proactive

Need for **Governance/Regulation** of Technology

inspired by Christian Kerschner & Melf-Hinrich Ehlers

Technology and Society
Social Construction of Technology

Human action shapes technology

Technology is **embedded** in a social context

Example:

http://www.guardian.co.uk/technology/2012/may/06/sms-text-messages-20th-birthday

Technology and Society
<u>S</u>ocial <u>C</u>onstruction <u>of</u> <u>T</u>echnology

Interpretative Flexibility	• Meanings of technology are observer-dependent • Alternative meanings of technology generate different problems to be solved
Design Flexibility	• Realization of technology can differ significantly • One problem, many technological solutions —> many different views of the problem —> even more different solutions
Relevant Social Groups	• Users (different socio-economc groups, different adaptation speed) • Producers (economic competition, first vs. late movers) • Societal stakeholders (politics, media, "the public")

Technology and Society
Social Construction of Technology

Stabilization of Technology

Rhetorical Closure	Redefinition of the Problem
If relevant social groups "agree" that the problem at hand is **solved** by a certain technology, rhetoric will reemphasize the problem as being solved	If relevant social groups "agree" that the problem at hand is **not the problem** but something else is, no interpretative or design flexibility remains

Certainty, Unambiguity

Technology and Society
ANT or: love your Bruno Latour

How material-semiotic networks <u>form</u> an <u>act</u> as a unity
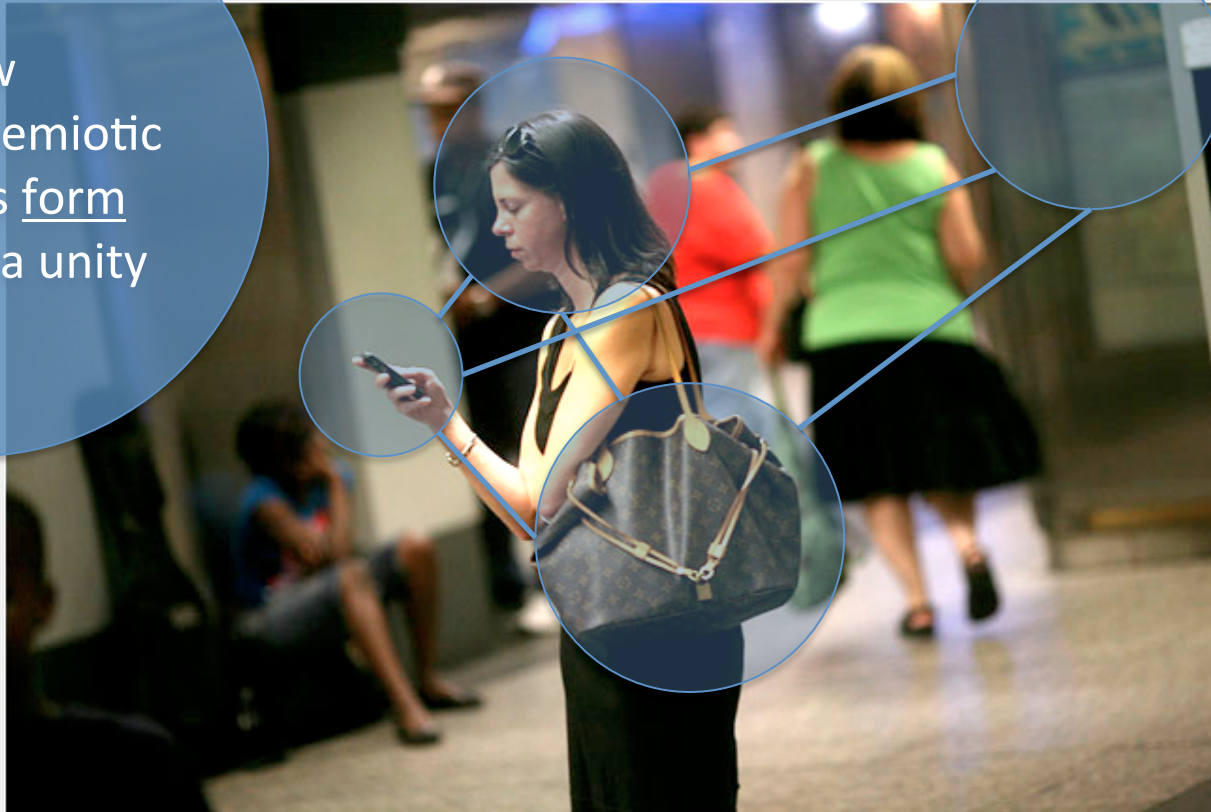
Technology and Society
Thorstein Veblen

- American economist and sociologist (1857-1929)

- *The Theory of the Leisure Class* (1899)

- **Technological determinism**:
    - Technology develops along its own evolutionary trajectory
    - Independent from politics or culture
    - Society is shaped by technology in order to support its further development

Technology marches in seven-league boots from one ruthless, revolutionary conquest to another, tearing down old factories and industries, flinging up new processes with terrifying rapidity.   (Charles A. Beard)

Technology and Society
System Theory (aka Luhmann)

- German sociologist (1927-1998)

- *Soziale Systeme* (1984) / *Social Systems* (1996)
- *Gesellschaft der Gesellschaft* (1997)

*My proposal is that we make the concept of **communication** the basis and thereby switch sociological theory from the concept of action to the concept of **system**. This enables us to present the social system as an operatively closed system consisting only of its own operations, reproduced by communications from communications. With the concept of action external references can hardly be avoided. An action requires, since it must be attributed, reference to socially constituted complexes: a subject, an individual, for all practical purposes even a living body, that is, a place in space. Only with the help of the concept of communication can we think of **a social system as an autopoietic system**, which consists only of elements, namely communications, which produce and reproduce it through the network of precisely these elements, that is, through communication.*

Technology and Society
System Theory (aka Luhmann)

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- There are empirical phenomena with certain features justifying to observe them as systems

- No system can exist independently from its environment, because it comes into being when its operations draw a boundary that differentiates the system from what it is not

- Focus on social systems as systems of communication

- Communication media as drivers of societal evolution
    - Language as medium
    - Generalized communication media
    - Societal distribution media
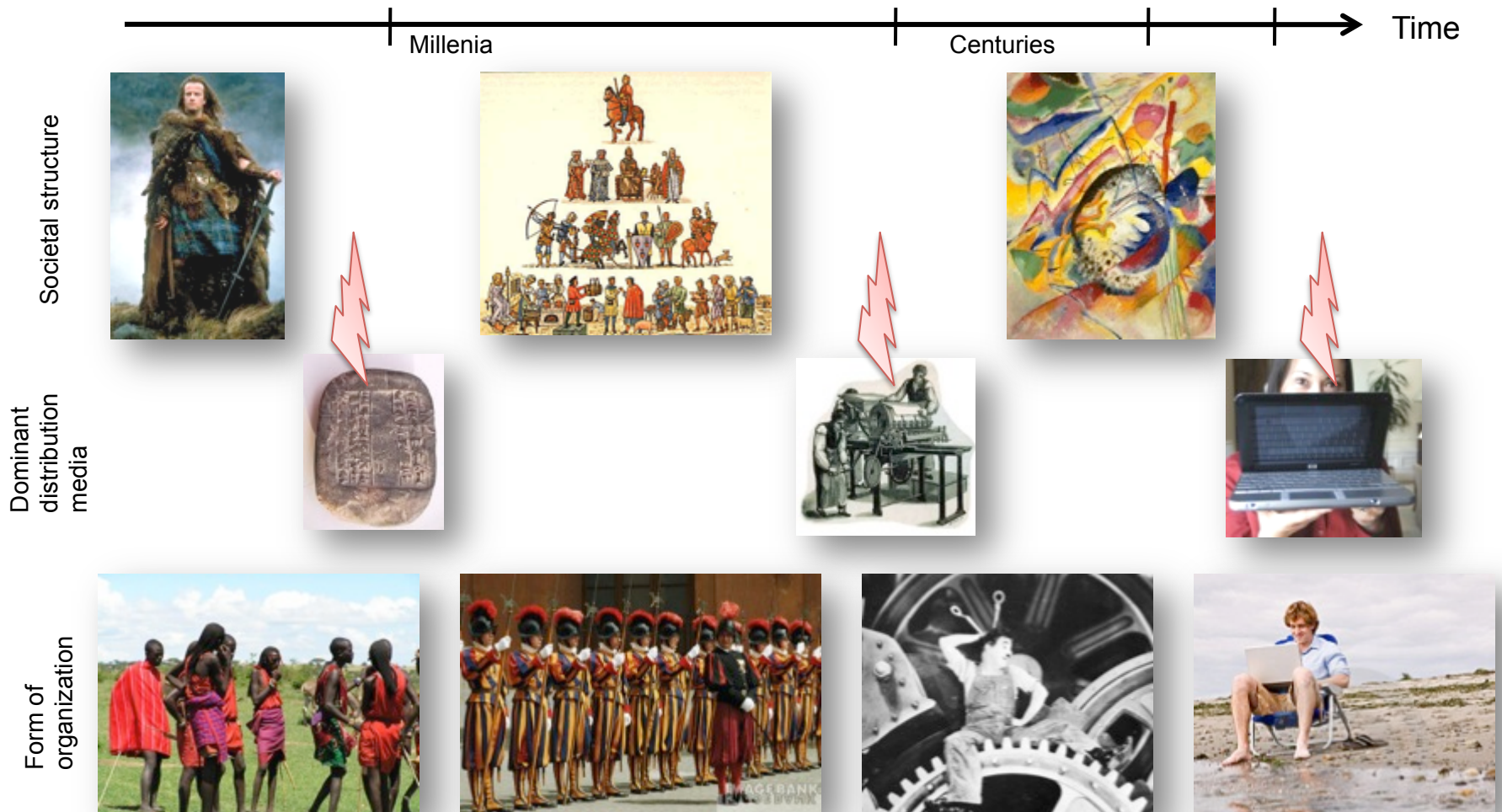
Technology and Society
System Theory (aka Luhmann)

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Technology as system: towards an autopoietic theory of technology

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Abstract: This contribution develops a new notion of technology based on core ideas of Niklas Luhmann's sociological system theory. Technology will be conceptualised as a self-making, self-referencing system, distinct from society and the human individual. Its basal operation is information in the medium of operativeness, processing along the binary code of work/fail. Through close coupling with social systems as well as with human developers and users of technology, technological evolution is ensured as a co-evolutive network of technology and society. Thereby technology irritates society in a way that social reality is created by technology and all progress in technology as well as in society is now decided through technological means. This has great effects when dealing with the ecological crisis and the need for sustainable development. This will be illustrated with the example of the automobile in past, present and possible futures.

Technology and Environment
Introducing "The Environment"

The "paradox" of the environment

Pristineness and nobility: Nature as culture

Is this beautiful?

Technology and Environment
Old Limits and New Insights

Technology and Environment
Jevons' Paradox and Rebound
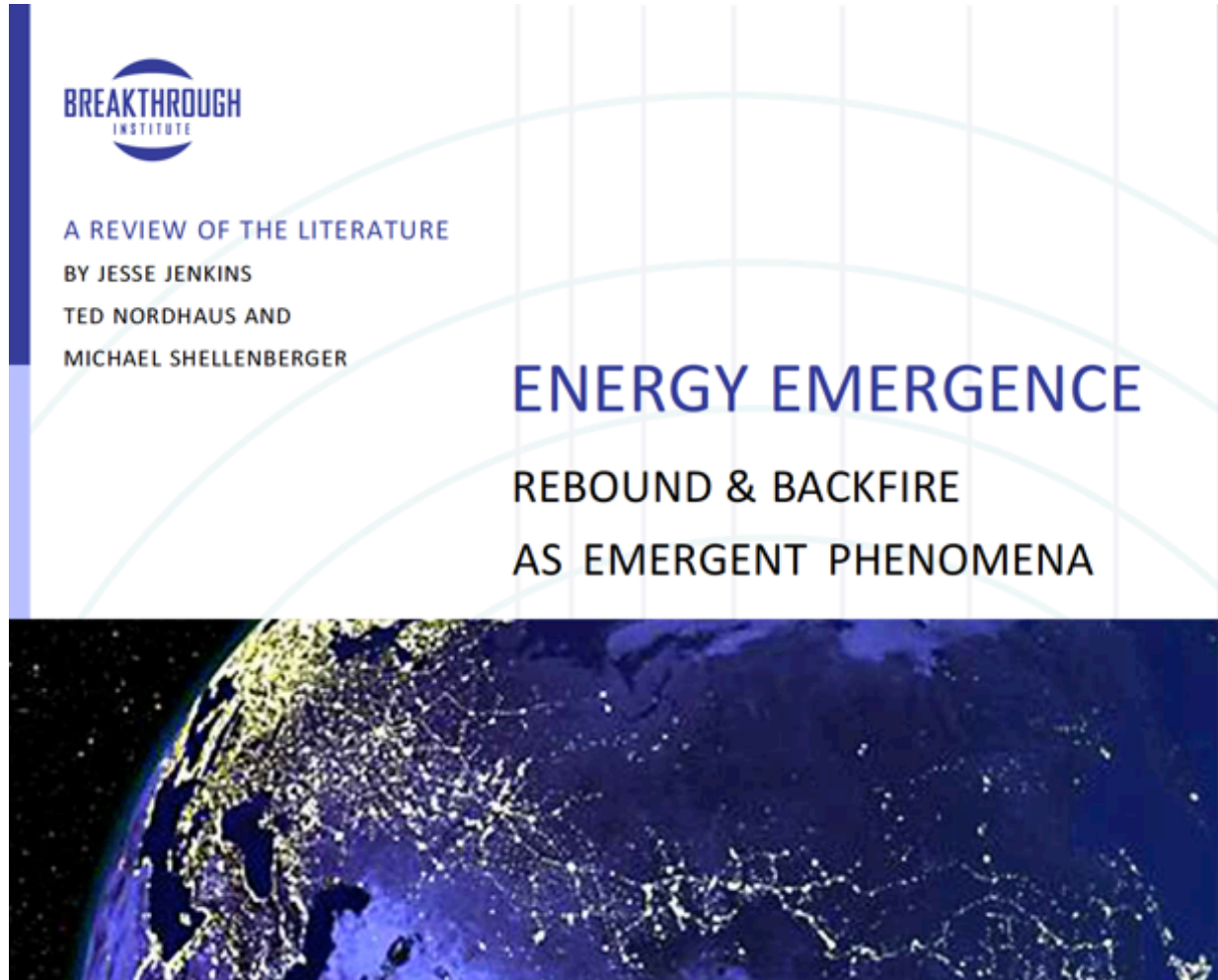
Technology and Environment
Ivan Illich and "Convivality"

Austrian philosopher, Roman Catholic priest (1926-2002)

Counterproductivity is the means by which a fundamentally beneficial process or arrangement is turned into a negative one

Specific Diseconomy is a measure of the degree of institutional counterproductivity that is occurring

Radical Monopoly is "*the dominance of one type of product rather than the dominance of one brand. I speak about radical monopoly when one industrial production process exercises an exclusive control over the satisfaction of a pressing need, and excludes nonindustrial activities from competition.*"

Technology and Environment
Ivan Illich and "Convivality"
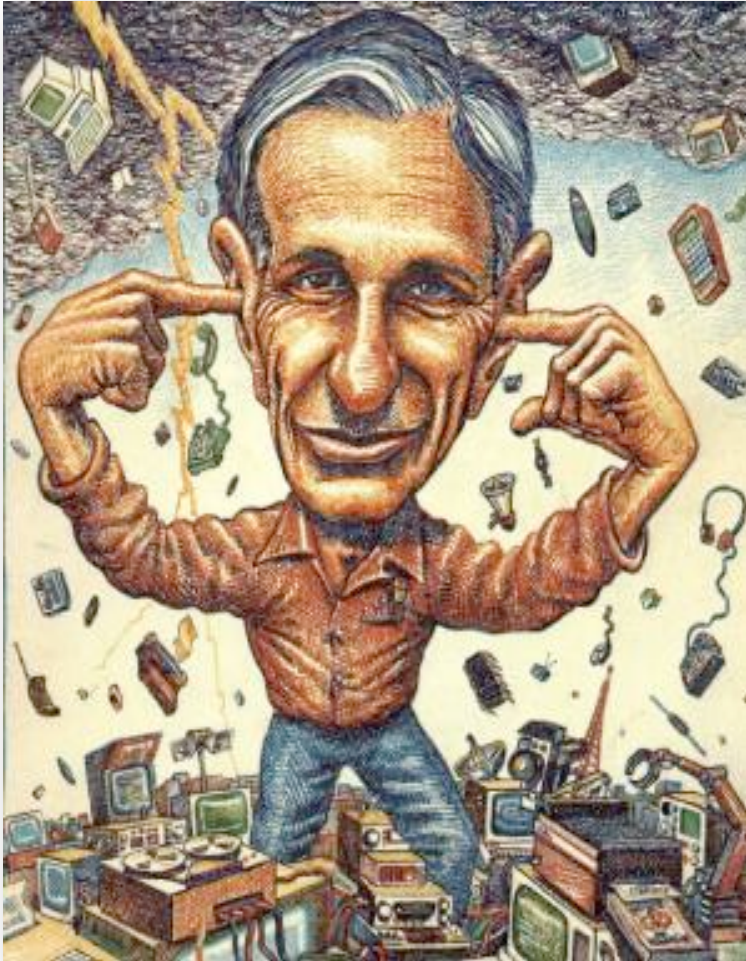
*After many doubts, and against the advice of friends whom I respect, I have chosen "convivial" as a technical term to designate **a modern society of responsibly limited tools**... I choose the term "conviviality" to designate **the opposite of industrial productivity**. I intend it to mean **autonomous and creative intercourse among persons, and the intercourse of persons with their environment**; and this in contrast with the conditioned response of persons to the demands made upon them by others, and by a man-made environment. I consider conviviality to be **individual freedom realized in personal interdependence** and, as such, an intrinsic ethical value. I believe that, in any society, as conviviality is reduced below a certain level, no amount of industrial productivity can effectively satisfy the needs it creates among society's members.*

Technology and Environment
Mumford, Machines & Civilization

American historian, sociologist, philosopher of technology, and literary critic (1895-1990)

Symbols had priority over technology
It is the moral, economic, and political choices we make, not the machines we use, that have produced a capitalist industrialized machine-oriented economy

Technology as arts, skills and crafts

However: Reality of the megamachine
Convergence of science, technics and political power as a unified community of interpretation rendering useless and eccentric life-enhancing values

Technology and Environment
Mumford, Machines & Civilization

Megatechnics
fails to produce lasting, quality products by using devices such as consumer credit, installment buying, non-functioning and defective designs, built-in fragility, and frequent superficial "fashion" changes.

Biotechnics
directs itself towards "*qualitative richness, amplitude, spaciousness, and freedom from quantitative pressures and crowding. Self-regulation, self-correction, and self-propulsion are as much an integral property of organisms as nutrition, reproduction, growth, and repair.*"

Other notions are **Monotechnics** and **Polytechnics**

Technology and Environment
Jacques Ellul & St. Steve Jobs

Technology and Environment
Jacques Ellul & St. Steve Jobs

French philosopher, law professor, sociologist, lay theologian, and Christian anarchist (1912-1994)

Human action is determined by the system
— first by nature, now by "sacred" technology

Technology is "the totality of methods rationally arrived at and having absolute efficiency (for a given stage of development) in every field of human activity."

"Modern technology has become … the defining force of a new social order in which **efficiency** is no longer an option but a necessity imposed on all human activity… Not even the moral conversion of the technicians could make a difference. At best, they would cease to be good technicians. In the end, technique has only one principle, **efficient ordering.**"

Technology and Environment
Odum's Optimism

American ecologist (1924-2002)

The only technological optimist... in this list!

"The human is the biosphere's programmatic and pragmatic information processor for maximum performance."

Ecological engineering
- is based on the self-designing capacity of ecosystems,
- can be a field test of ecological theory,
- relies on integrated system approaches,
- conserves non-renewable energy, and
- supports biological conservation.

Technology serves to make energy surpluses accessible to humans via ecological engineering

Technology, Society & Environment
Views on Technology
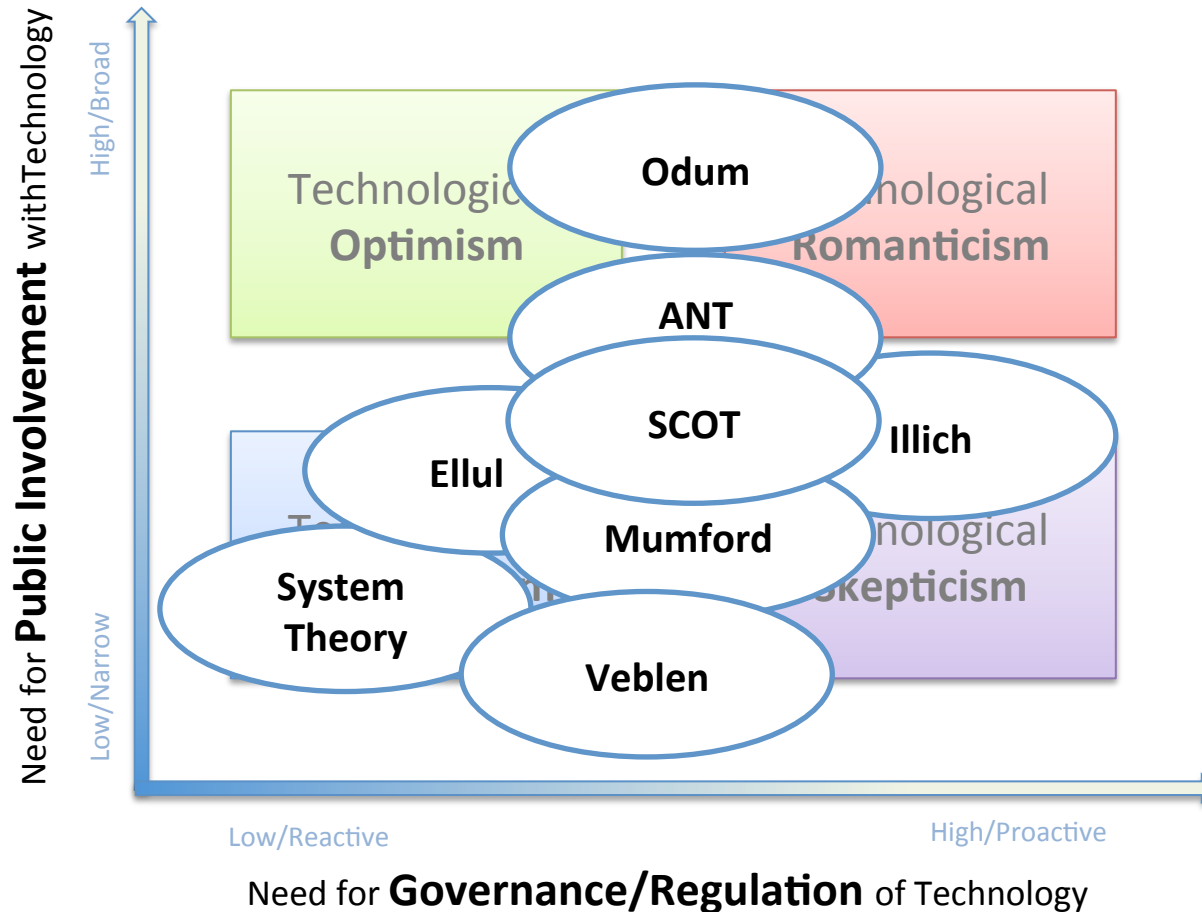
Policy for Technology
What Policy?

Direct Environmental Policy	Indirect Environmental Policy	Non-Environmental Policy
• "Old School Environmental Policy" • Liability laws • Consumer laws • Subsidies • Research policies	• Green/Eco Taxes (e.g. fuel tax for consumers, carbon tax for producers) • Emission permits & trading system • Feed-in tariffs for renewable energy	• Tax laws in general • Government investment in related fields e.g. transportation and housing • Labor laws • Social transfers

"Non-policies"?
(e.g. cultural change from civil society)

Discussion questions

1
Evaluate the effectiveness of direct and indirect environmental policies in the light of social constructivism and technological determinism.
- What policies might work and for what reason?
- What policies might fail and what could be done about it?

2
Reflect on the thoughts of either Illich, Mumford, Ellul and/or Odum (one or more of them).
- What room for governing technical change does politics have?
- How would environmental policy have to be formulated in order to deliver better technology and better environmental quality?

3
Freethinking! Reflect on the entire presentation.
- What role can "grassroots" play, be it activists or entrepreneurs, in order to create a more sustainable society?
- Can politics somehow encourage, enable and/or support this?