

Technological or Media Determinism

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Introduction

Scholars who study the history of communications technologies or media include historians of technology and of literacy, sociologists, economists, political scientists, anthropologists and technologists such as computer scientists. A central controversy concerns how far technology does or does not condition social change. Each commentator emphasizes different factors in technological change. No neat explanation is adequate and rigorous proof is difficult if not impossible.

In this kind of arena it is wise to beware of generalizing too widely. In particular, it helps to be aware of the nature and pitfalls of a very persuasive stance known as technological determinism (or occasionally 'media determinism'). This is still the most popular and influential theory of the relationship between technology and society, but it has been increasingly subject to critical review by scholars in recent times. Students need to be aware that the term 'deterministic' tends to be a negative one for many social scientists, and modern sociologists in particular often use the word as a term of abuse.

Various kinds of 'determinism' feature in social science theories. For instance, *biological* (or *genetic*) *determinism* seeks to explain social or psychological phenomena in terms of biological or genetic characteristics. This stance underlies notions such as that women are 'essentially' earthy, natural and spontaneous (an argument known as 'essentialism').

The controversy in developmental psychology over 'nature versus nurture' is one between *genetic* and *environmental* determinism. Thomas Hobbes (1588-1679) was an early

advocate of the importance of nature (heredity) whilst the most famous advocate of the importance of nurture (or experience) was Jean-Jacques Rousseau (1712-78). An interesting integration of this debate with that about technology can be found in the book, *So Human an Animal*, by Rene Dubos.

Then there is *linguistic determinism*, according to which our thinking is determined by language, a theory which links it to certain forms of technological determinism.

Just like these other deterministic theories, *technological determinism* seeks to explain social and historical phenomena in terms of one principal or determining factor. It is a doctrine of historical or causal primacy. The term 'technological determinism' was apparently coined by the American sociologist and economist Thorstein Veblen (1857-1929) (Ellul 1964: xviii; Jones 1990: 210; see Veblen's 'The Engineers and the Price System').

Technology-led theories

The technological determinist view is a *technology-led* theory of social change: technology is seen as 'the prime mover' in history. In economics, this is known as a 'technology-push' theory rather than a 'demand-pull' theory. According to technological determinists, particular technical developments, communications technologies or media, or, most broadly, technology in general are the sole or prime antecedent causes of changes in society, and technology is seen as the fundamental condition underlying the pattern of social organization.

Technological determinists interpret technology in general and communications technologies in particular as the basis of society in the past, present and even the future. They say that technologies such as writing or print or television or the computer 'changed society'. In its most extreme form, the entire form of society is seen as being determined by

technology: new technologies transform society at every level, including institutions, social interaction and individuals. At the least a wide range of social and cultural phenomena are seen as shaped by technology. 'Human factors' and social arrangements are seen as secondary.

Karl Marx is often interpreted as a technological determinist on the basis of such isolated quotations as: 'The windmill gives you society with the feudal lord: the steam-mill, society with the industrial capitalist' ('The Poverty of Philosophy', 1847), and determinism certainly features in orthodox [Marxism](#). But several apologists have insisted that Marx was not a technological determinist.

Various non-Marxist theorists such as Sigfried Giedion, Leslie White, Lynn White Jr, Harold Innis and [Marshall McLuhan](#) have adopted the stance of technological determinism. In a *reductio ad absurdum*, Marshall McLuhan interprets Lynn White's book, *Medieval Technology and Social Change* as suggesting, in McLuhan's words, that 'such inventions as the horse collar quickly led to the development of the modern world' (McLuhan & Watson 1970, p. 121). Technological determinism is also commonly associated with futuristic commentators regarding what they refer to as 'the microelectronic revolution' (e.g. Large 1980). For instance, Christopher Evans declared that the computer would transform 'world society at all levels' (Evans 1979, cited in Robins & Webster 1989, p. 24).

Reductionism

Technological determinism focuses on causality - cause and effect relationships - a focus typically associated with 'scientific' explanation. Any exploration of communications technology has to recognize the difficulty of isolating 'causes' and 'effects', or even in distinguishing causes from effects. As an explanation of change, technological determinism is 'monistic' or *mono-causal* (rather than

'multicausal'): it offers a single cause or 'independent variable'. It represents a simple 'billiard ball model' of change. It thus makes strong claims which many people find attractive, and which, if justified, would make it a very powerful explanatory and predictive theory.

As a mono-causal explanation, technological determinism involves *reductionism*, which aims to reduce a complex whole to the effects of one part (or parts) upon another part (or parts). *Sociological reductionism* is widely criticized, but it is intimately associated with the quantitative paradigm of science. The philosophers Democritus (6th century B.C.) and Rene Descartes (1596-1650) had both taught that the way to knowledge was through separating things into component parts. It is a feature of reductionist explanation that parts are assumed to affect other parts in a linear or one-way manner, and interpretation proceeds from the parts to the whole.

Reductionism contrasts with 'holism', which is broadly concerned with the whole phenomenon and with complex interactions within it rather than with the study of isolated parts. In holistic interpretations there are no single, independent causes. Holistic interpretation proceeds from the whole and relationships are presented as non-directional or non-linear. It is holistic to assert that the whole is more than the sum of its parts, a proposition with which it is difficult to disagree when you think of a working motor compared with the stacked parts. Sometimes holism refers more broadly to a general hostility to analysis, a hostility common in the arts: 'We murder to dissect,' wrote Wordsworth.

As the social critic Lewis Mumford has noted, one reductionist tendency is the identification of technology with tools and machines. This is merely, as he put it, 'to substitute a part for the whole' (in Pursell 1994, p. 26), because technology includes the whole of our material culture, not only tools and machines. It is also worth noting (as Carroll Pursell observes), that this reductionist interpretation involves a masculinization of technology. Just as the penis is sometimes referred to as a tool, so tools

can be seen as symbolically phallic. Such symbolism has generated profound cultural reverberations.

Theory-making always requires simplification, and reductionism has proved useful in the natural sciences, but reductionism is widely criticized as a way of approaching social phenomena. It is impossible to isolate a single cause for any social process and to prove that it is the primary determinant (for instance, it is highly problematic to isolate the potential cognitive influences of literacy from those of schooling). Indeed, the philosopher Michel Foucault rejects the notion that there is *any* principle that determines the nature of society. Walter Ong has defined as technological 'relationism' a tendency for a communications technology which 'grows to more than a marginal status' to interact in 'a bewildering variety of ways' with 'noetic and social structures and practices' (Ong 1986, p. 36).

Technological determinists often seem to be trying to account for almost everything in terms of technology: a perspective which we may call *technocentrism*. To such writers we are first and foremost *Homo faber* - tool-makers and tool-users. The American Benjamin Franklin apparently first coined the phrase that 'man is a tool-using animal'. Thomas Carlyle echoed this in 1841, adding that 'without tools he is nothing; with them he is all.'

The oldest tools - deliberately shattered stones - date back to about 2.4 million years ago. A recent commentator has suggested that the symmetrical flint tool known as the 'Acheulian hand-axe', which first appeared around one and a half million years ago, may even have appeared before language (Pursell 1994, p. 18). Such tools are presented by archaeologists as both shaping and reflecting the social nature of *Homo sapiens* (ibid., p. 19).

The British biologist Sir Peter Medawar has argued that technological evolution has contributed more to our biological success than our biological evolution (ibid., p. 33). In other words, he too suggests that in developing technologies, we shape ourselves.

Any perspective which puts technology first involves what has been called the 'doctrine of technological primacy' (W. E. Moore in Potter & Sarre 1974, p. 484).

Leslie White offers a clear example, declaring that 'We may view a cultural system as a series of three horizontal strata: the technological layer on the bottom, the philosophical on the top, the sociological stratum in between... The technological system is basic and primary. Social systems are functions of technologies; and philosophies express technological forces and reflect social systems. The technological factor is therefore *the* determinant of a cultural system as a whole. It determines the form of social systems, and technology and society together determine the content and orientation of philosophy' (White 1949, p. 366).

This bears some similarity to Marx and Engel's theory of *historical materialism* according to which the institutional 'superstructure' of society (which includes politics, education, the family and culture) rests on an economic (some say techno-economic) 'base' or foundation, and major historical change proceeds from base to superstructure. The issue actually divides modern Marxists. According to some crude Marxist accounts the character of the base *determines* the character of the superstructure (a stance not shared by Marx and Engels): this is the doctrine of *economic determinism* which critics dismiss as *economism*. Other Marxist theories tend to stress more interaction between base and superstructure, the relative autonomy of the superstructure, or diversity within it.

Mechanistic Models

Reductionism, like technological determinism in general, is a *mechanistic* mode of explanation associated with positivism: a philosophical stance based strictly on the scientific method. Machines offer tidy models of phenomena for mechanistic theorists. It is common among

social theorists to refer to 'mechanisms of change'. Machines serve a designated function and operate strictly according to cause and effect. Within the context of their mechanisms, causes are explicit and intentional and consequences are predictable. Machines are characterized by their relentless and rigid regularity. They are assembled from parts and can be analysed or disassembled into them. A machine like a clock, once it is initiated, is autonomous in the sense that it can run independently of human intervention for long periods, but it does not select its own goal. Critics of reductionism are often broadly anti-analytical and anti-mechanistic. For the biologist Rene Dubos, 'the mechanical definition of human life misses the point because what is human in man is precisely that which is not mechanical' (Dubos 1970, p. 132).

Mechanistic models have obvious deficiencies when applied to social phenomena. The use of complex and interacting technologies may have implications which are not always entirely intended or predicted. And the complex fabric of social reality cannot be neatly analysed into component factors. Machines are also under complete control - we can turn them off - which one might expect to appeal to voluntarists of a rationalist bent. However, we may also need to consider to what extent the user may become part of a complex machine when using it.

Reification

Associated with technological determinism is *reification*. To reify is to 'thingify': to treat an abstraction as a material thing. What is 'Technology'? Reifying 'Technology' involves treating it as if it were a single material thing with a homogeneous, undifferentiated character. This notion can be seen as a kind of 'essentialism'. In common and academic usage, the word 'technology' is variously used to refer to tools, instruments, machines, organizations, media, methods, techniques and systems. And as Jonathan Benthall notes, 'virtually any one of a wide range of technical innovations can stand symbolically for the whole

of technology... The symbolic field of technologies is interconnected' (Benthall 1976, p. 22).

The problem is that it is easy to slip into generalizations about 'Technology'. Philosophers such as Edmund Husserl and Martin Heidegger treated technology as a monolithic phenomenon. And Jacques Ellul, a French sociologist, adopted the even broader umbrella of 'technique', by which he referred to 'the totality of methods rationally arrived at and having absolute efficiency... in every field of human activity' (Ellul 1964, p. v). The linking of computers with other technologies is also making it increasingly difficult to make clear distinctions between different media.

Technology is often seen as a whole which is more than the sum of its parts, or various manifestations. However, as Seymour Melman observes 'there is no machine in general' (1972, p. 59). Similarly, the umbrella term 'mass communication' covers a multitude of very different media. And even categories such as 'writing', 'print', 'literacy', 'television' or 'the computer' encompass considerable diversity. Referring loosely to such abstract categories is hazardous. Some technologies may also be less determining than others; the flexibility or 'openness' of tools varies. And of course a technology cannot be cut off as a separate thing from specific contexts of use: technology has many manifestations in different social contexts. A single technology can serve many quite different purposes.

Reification is a difficult charge to avoid, since any use of linguistic categorization (including words such as 'society' or 'culture') could be said to involve reification. Theorizing about technology and society is full of reification, quite apart from these two key terms. Reification is involved when we divide human experience into 'spheres' variously tagged as 'social', 'cultural', 'educational', 'political', 'ideological', 'philosophical', 'religious', 'legal', 'industrial', 'economic', 'scientific' or 'technological'. If such separation proceeds beyond analytical convenience it also involves what is called structural autonomy, a theme which I will examine in a moment.

Lived experience is a seamless web, but academia in particular encourages specialists to indulge in reductionist interpretation. Structuralist sociological theories emphasize that social institutions interact as an inter-related system; none act as independent 'causes' (although theorists differ in the importance which they ascribe to particular factors). It is not adequate to suggest that what shapes technology is science, since science is also socially shaped, and technology also influences science (MacKenzie & Wajcman 1985, p. 8). Rather than being 'outside' society, technology is an inextricable part of it.

The debate over technology and society is typically polarized into an emphasis either on technological factors or on socio-cultural factors. Within this reificatory framework economic factors tend to be lumped either with technological ones or with socio-cultural ones. I should add that whilst reification is a strong criticism for materialist theorists, to other theorists who reject epistemological realism (which posits the purely objective existence of things in the world) reification is hardly meaningful as a criticism, since (as one's stance approaches epistemological idealism) things are what we make with words.