

Technological Determinism Revisited

By Brian Martin

Merritt Roe Smith and Leo Marx (eds), *Does Technology Drive History? The Dilemma of Technological Determinism*.

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FOR many academics in technology studies, teaching seems to be a constant struggle to challenge students' unthinking adherence to technological determinism. On the other hand, within the field itself, technological determinism has long since been rejected. Or has it? This volume presents a range of answers to this question within US-based history of technology.

The contributors give similar definitions of technological determinism. For example: 'The belief in technology as a key governing force in society ...' (Merritt Roe Smith, p. 2); '... the belief that social progress is driven by technological innovation, which in turn follows an 'inevitable' course' (Michael L. Smith, p. 38); 'The idea that technological development determines social change ...' (Bruce Bimber, p. 80); '... the belief that technical forces determine social and cultural changes' (Thomas P. Hughes, p. 102); '... a three-word logical proposition: "Technology determines history"' (Rosalind Williams, p. 218).

Several of the contributors scrutinise the meaning of technological determinism. Rosalind Williams deconstructs 'technology', 'determines' and 'history'. Bruce Bimber helpfully distinguishes three interpretations of technological determinism. First is the normative interpretation, which is concerned with how norms of technological practice, such as efficiency and productivity, have become independent from political and ethical values. Second is the nomological interpretation, in which technology is seen as the cause of social practice. Third is the unintended-consequences interpretation, concerned with the problem that the effects of technology can't be foreseen. Bimber argues that only the nomological interpretation is both technological and deterministic. Furthermore, only with a narrow

definition of technology, namely as artefacts, can there be true technological determinism, since broad definitions of technology, including production processes for example, bring society back into the picture. It is hard to find any historian of technology who subscribes to (nomological) technological determinism.

There would almost seem nothing to debate, but fortunately Robert L. Heilbroner is available to present a determinist perspective. Reprinted here is his 1967 article 'Do machines make history?' from *Technology and Culture*, in which he argues that under capitalism, and only capitalism, technology has a unidirectional development due to the autonomous operation of the market. Even in that article Heilbroner supplied many qualifications to his argument. In this book he contributes a further chapter in which he reconsiders his position, backtracking towards a 'soft determinism' which involves the mutual interaction of technology and society. Mutual interaction seems to be the standard position.

At one level, the book is a debate about the value of technological determinism as a way of understanding history. Heilbroner with his soft determinism and concern with broad historical trends stands on one side, while most of the other contributors are much more concerned to show the contingencies, particularities, oppositions, disjunctures and variabilities in technological change. Philip Scranton presents a postmodern approach, arguing for 'more modest efforts to unravel conjunctural complexities replete with productive complementarities and dispiriting antagonisms' (p. 168). In between determinism and constructivism lies Thomas Hughes' idea of technological momentum.

While most of the contributors provide examples that counter a simplistic view of technology-driven social development, two in particular provide excellent case material. Peter C. Perdue uses examples from Chinese agriculture, medieval Western European agriculture and eighteenth-century Russian agriculture to show that single-factor models do not work, whether they use technology, population or class structure as driving forces. He argues instead for an equilibrium model in which several factors reinforce each other. Richard W. Bulliet looks at three 'pre-industrial' innovations in Islamic countries – block printing, harnessing of horses and wheeled transport – and finds that social barriers prevented their uptake by mainstream culture. As Thomas J. Misa argues, as soon as one looks at the details of technological change, it is difficult to sustain any suggestion of determinism.

This book is an outgrowth of a workshop on the topic held in 1989 at the Massachusetts Institute of Technology. Given that technological determinism is so widely rejected by historians of technology, why did anyone bother? John M. Staudenmaier's concluding chapter provides some answers. In the wider culture, especially in the US, technological determinism remains

well entrenched, as shown in chapters by Merritt Roe Smith and Michael L. Smith. As a result, historians cannot escape the issues of determinism that constantly intrude due to the constant promotion of the ideology of progress through technology (or technology as progress). For example, many whiggish histories of technology continue to be written, often funded by corporations selling the technologies. In addition, debates over technological determinism provide a forum for disputes about ways of approaching history that are debated in the profession generally.

With its variety of perspectives, this book might be a good text for an advanced undergraduate class. However, there are some important limitations, many of which stem from blinders typical among US male academics. All of the 12 contributors are academics at US universities; most of them are historians. As might be expected from scholars working in a culture that constantly trumpets 'free enterprise', the role of the market is given undue prominence and there is little emphasis on the role of the state in directing technological development. The only one of the contributors to mention gender is Rosalind Williams, the one woman among them. The constructivist approaches of Bijker, Pinch, Callon, Latour, Law and others are addressed only by Hughes (mainly as a foil for his own approach), with an incidental footnote by Williams. Critical approaches such as labour process theory are nowhere mentioned. Social movements are almost invisible. Seven of the 13 chapters include substantive case studies, and of these five draw from US history. The restrictions on vision frequently associated with US scholarship pervade the entire book.

Staudenmaier notes that the history of technology is generally ignored by other historians as well as the general public. This book, which certainly has strengths, seems unlikely to change this situation.

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