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<ul style="list-style-type: none">• Volti: Ch. 1 The Nature of Technology	ماهیت فناوری
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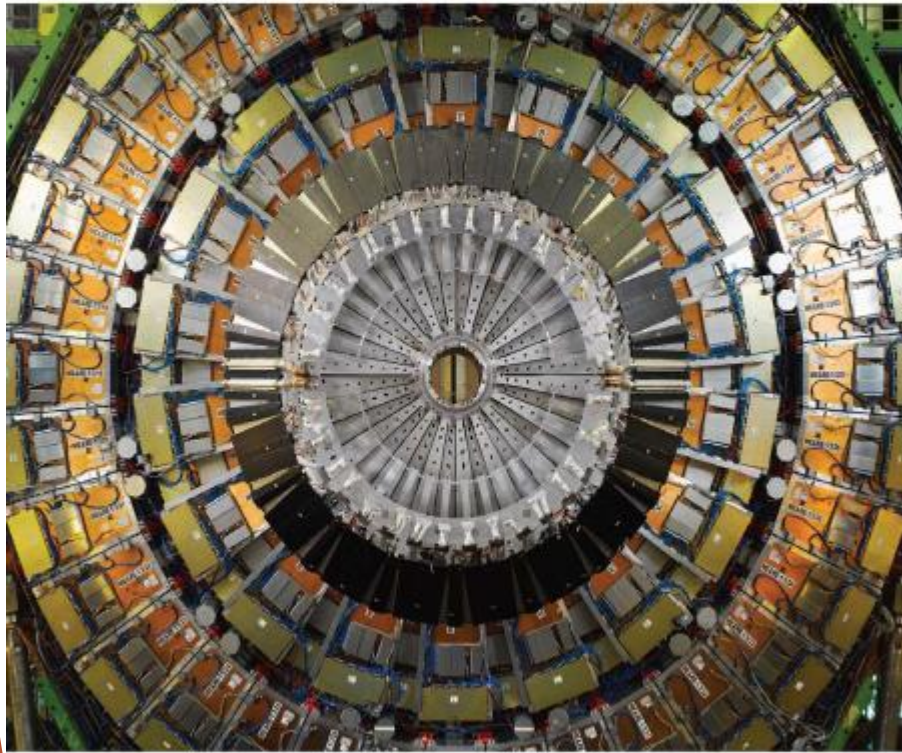
۱. پایا، علی و همکاران. (۱۳۹۰). ارزیابی آینده پژوهانه تأثیرات علوم و فناوری های همگرا بر حوزه های اخلاق، اجتماع و سیاست در ایران

تا ۱۴۰۴. رهیافت، ۴۹، ۱۹-۲۸.

2. Brey, P. (2012). Anticipatory ethics for emerging technologies. *NanoEthics*, 6(1), 1-13.
3. Brey, P. (2005). Artifacts as Social Agents. In H. Harbers, *Inside the Politics of Technology. Agency and Normativity in the Co-Production of Technology and Society* (pp. 61-84). Amsterdam University Press.
4. Johnson, D. G, Wetmore, J. M. (eds.) (2008). *Technology and Society, Building Our Sociotechnical Future (Inside Technology)*. MIT Press. England.
5. Johnson D.G. (2007) Democracy, Technology, and Information Societies. In: Goujon P., Lavelle S., Duquenoy P., Kimppa K., Laurent V. (eds) *The Information Society: Innovation, Legitimacy, Ethics and Democracy In honor of Professor Jacques Berleur s.j.*. IFIP International Federation for Information Processing, vol 233. Springer, Boston, MA.
6. Prensky, M. (2001). Digital Natives, Digital Immigrants Part 1, *On the Horizon*, 9(5), 1-6.
7. Taebi, B. (2017). Bridging the gap between social acceptance and ethical acceptability. *Risk analysis*, 37(10), 1817-1827.
8. Vermaas, P. (Ed.). (2011). *A Philosophy of Technology - From Technical Artefacts to Sociotechnical Systems*. Morgan & Claypool.
9. Volti, R. (2013). *Society and Technological Change*. Worth Publishers Inc.

SOCIETY and TECHNOLOGICAL CHANGE

SEVENTH EDITION



Rudi Volti



Society and Technological Change

Eighth
Edition

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- *Society and Technological Change* (New York: St. Martin's Press, 1988; 2nd edition, 1992; 3rd edition, 1995, 4th edition, Worth Publishers, 2001, 5th edition, 2005. 6th edition, 2009, 7th edition, 2013).
- *The Engineer in History*, co-authored with John B. Rae (New York: Peter Lang, 1994, 2nd edition, 2001).
- *The Encyclopedia & Science, Technology and Society* (3 vols.), editor and principal author (New York: Facts on File Publications, 1999)
- *Cars and Culture: The Biography of a Technology* (Westport, CT: Greenwood, 2004; Baltimore and London: Johns Hopkins University Press, 2006)
- *Technology Transfer and East Asian Economic Transformation* (n.p.: The Society for the History of Technology and the American Historical Association, 2002)
- *An Introduction to the Sociology of Work and Occupations* (Thousand Oaks, CA: Pine Forge Press, 2008, 2nd edition 2012)
- *Technology and Commercial Air Travel* (Washington, DC: The American Historical Association, 2015).



chapter **one**

The Nature of Technology

منتخب فصل اول:

- ▶ چرا تکنولوژی ... ؟
- ▶ انسان ابزارساز: اصولاً تکنولوژی، "غیرطبیعی" نیست.
- ▶ قانون چکش: چنین نیست که تکنولوژی، همواره در پاسخ به نیاز انسان باشد.
- ▶ اشتیاق تکنولوژیک، چالش حل مسئله،
- ▶ ارتقای اعتبار ملی،
- ▶ افسون ذاتی
- ▶ تکنولوژی چیست؟ (تعریف شماتیک تکنولوژی)
- ▶ پیشرفت تکنولوژیک محصول جامعه عقلانی:
- ▶ جامعه ای دینامیک
- ▶ اساساً خوش بین
- ▶ دارای اعتماد به نفس لازم برای تغییر
- ▶ در پی منافع مشخص

منتخب فصل اول (ادامه):

- ▶ جامعه از نظر تکنولوژی پیشرونده:
- ▶ دارای روش های خاص حل مسئله
- ▶ متکی بر بررسی های سیستماتیک
- ▶ مبتنی بر تجربیات
- ▶ در پی انتخاب منطقی مناسب ترین راه حل
- ▶ تفکیک جامعه از نظر تکنولوژیک پیشرفته از جامعه برتر فرهنگی - اخلاقی
- ▶ انواع رویکردها به رابطه فناوری و اجتماع (موضوع بحث جلسات بعد)
- ▶ پارادوکس تکنولوژیک جامعه مدرن و راه حل آن

Homo Faber

Technologies are developed and applied so that we can do things not otherwise possible, or so that we can do them cheaper, faster, and more easily. The capacity of human beings to employ technologies sets us apart from other creatures. To be sure, beavers build dams, otters crack open shellfish with rocks, and chimpanzees use sticks to extract termites from their nests. But no other animal comes close to humans in the ability to create tools and techniques—the first two elements in our definition of technology—and no other creature is so dependent on them. The development of technology is in large measure responsible for the survival and expansion of a species that lacks many of the innate abilities of other animals. Left

Technology Naturalness

in all, humankind is a physically puny bunch. But compensating for this physical weakness is an intelligence that is the ultimate source of technology. Humans

Reliance on technology is as old as humanity itself. Whatever evils have accompanied the use of particular technologies, it is pointless to indict technology as being somehow “unnatural.” Our past as well as our future as a species is inex-

Technology and Needs: (the law of hammer)

chapter. For now, we should note that although it is a human creation, technology does not always respond to existing needs; a new technology may in fact create its own needs. The development of technology on occasion exemplifies a phenomenon that has been dubbed “the law of the hammer”: give a six-year-old a hammer, and to the child everything starts looking like a nail.

Technology Development Goals: Enthusiasm

It is also important to note that the goals achieved through the use of a technology do not have to be “practical” ones. Some technologies have been developed so that we can grow more food or construct more comfortable buildings, but others have been developed simply for the challenge and enjoyment of solving technological problems,¹⁰ a proclivity that Robert Post has described as “technological enthusiasm.”¹¹ The prodigious efforts that went into the Daedalus

National Prestige

grounds, although their supporters have made valiant efforts to do so. Their primary purpose seems to be the elevation of national prestige by demonstrating a nation's collective ability to solve daunting technological problems. At the same time,

Inherent Fascination

many other technologies have a dual nature; they serve a practical purpose, but they are not valued only for this reason. An outstanding example is the automobile. It would be hard to justify the enormous resources employed for the building and operation of cars if transportation were the only goal. For many people (the author included), cars are objects of inherent fascination. Technological features like variable valve timing and active suspension systems have little to do with utilitarian transportation. The appeal is at least as much in the sophisticated technologies themselves as in the purposes that they serve.

So ... What is *Technology* (Definition of Technology)

Much of what has just been said can be incorporated into a schematic definition of technology: a system created by humans that uses knowledge and organization to produce objects and techniques for the attainment of specific goals.

Technological Development: Product of Rationality

The development of technology has stimulated a belief that progress is a natural part of human life. At the same time, the progressive development of technology has itself been the product of a distinctive set of cultural values and mental processes that are characterized by a rational approach to the world and how it is to be controlled. Technological development is more than the random accumulation of tools, techniques, and organizational forms. Underlying the process is a set of attitudes and orientations that are collectively described as “rational.”

Technologically Progressive Society

What makes a technologically progressive society different from others is that its methods of problem solving are oriented toward an objective scrutiny of the problem at hand, coupled with a systematic, empirically based examination of possible solutions and a logical selection of the most appropriate ones. Beyond this approach to the solution of problems lies another cultural attribute: the belief that solutions are *possible* and that constant changes are necessary in order to realize them. A society imbued with a rational ethos is dynamic and essentially optimistic, and it exhibits the confidence necessary to alter existing ways of doing things in order to gain particular benefits.

Non-rational Problem Solving

These remarks are not meant to convey the ethnocentric belief that modern Western culture is superior to all others. The intention here is not to ridicule the beliefs and practices of people and societies that use nonrational approaches to problem solving. There is no reason to believe that rationality has been and always will be the special attribute of a particular group of people. Moreover, modern societies often manifest behaviors and patterns of thought that are anything but rational, as when large numbers of people continue to find value in astrology, numerology, and the predictions of supposed psychics.

Rational Approach – Non-rational Goals

It is also important to recognize that rational ways of thinking do not confer moral superiority. To the contrary, the rigorous development and use of rational procedures can be accompanied by major moral and ethical transgressions. The rational method of problem solving, with its overarching concern for devising appropriate means for attaining particular ends, makes no distinction concerning the ends being pursued. There is nothing in the rational approach to the world that prevents the use of logically and empirically derived means in the service of goals that are neither rational nor ethically justifiable. We can take note of the words

- **Technological Determinism**
(will be discussed later...)

Paradox of the Technological Society Powerful Technological Society – Powerless Individuals

it. This creates the fundamental paradox of modern society: technology has generated massive powers available to human society, while as individuals we exert very little of that power. We have access to a wide range of powerful technologies, yet our inability to understand them often leaves us with feelings of impotence and frustration, as anyone who has experienced a computer crash will attest.²⁷

Technology Shaping in Democratic Society

Distrust flourishes when people have no ability to participate in decisions that shape their lives, and the inability to affect the course of technological change can produce a mixture of naïve hope and paranoid reaction. A realistic sense of control, including a sense of having some control over technology, is essential for an individual's mental health. No less important, widespread participation in the shaping of technology is essential for democracy. Technology's benefits cannot be separated from its costs, and thus it becomes necessary to determine if the former justify the latter. If a society is truly democratic, such decisions will be made with as much citizen participation as possible. Moreover, the benefits and costs of technology are not shared equally, and once again the apportioning of costs and benefits should be done in as participatory a manner as possible. We will return to