به نام پروردگار متعال

فناوری و اجتماع

Technology and Society

مبحث سوم: اثرات تغییر فناورانه

• Volti: Ch. 2 Winners and Losers: The Differential Effects of Technological Change	اثرات تغییر فناورانه

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chapter two

Winners and Losers: The Differential Effects of Technological Change

اهمّ مطالب:

- تز خنثی بودن (بی طرفی فناوری)
- اثرات تغییرات فناورانه بر ساختارها و روابط اجتماعی موجود
- مقاومت، طغیان و مبارزه در برابر فناوری: لادایت ها، لادیسم و نئولادیسم
- استمداد از فناوری (فن سالاری یا تکنوکراسی) و مدیریت علمی-فناورانه

(Volti, p. 22)

Is it a truism …?!

It is a truism that a particular technology can be used for either good or evil purposes; a construction team employs explosives to build a road, while a terrorist uses them for roadside bombs. :

(Vermaas, p. 16)

Neutrality Thesis

‘*Guns don’t kill people, people kill people.*’

This slogan, once produced by the American *National Rifle Association*, is perhaps the most succinct way of summarizing what is known as the neutrality thesis of technical artefacts.

What this thesis asserts is that from a moral point of view a technical artefact is a neutral instrument that can only be put to good or bad use, that is to say, used for morally good or bad ends, when it falls into the hands of human beings.

(Volti, p. 22)

Technological Change and Social Relationships

. But there is less appreciation for a more subtle point: technological change is often a subversive process that results in the modification or destruction of established social roles, relationships, and values.

. Of course, sometimes the disruption is less apparent when technological innovation results in the creation of entirely new industries that are not in direct competition with existing ones. Many new industries and individual firms owe their existence to the emergence of a new technology. Witness, for example, the rapid growth of personal computer manufacturing, peripheral equipment production, software publishing, and app development that followed the invention of the integrated circuit. Even

اثرات مثبت و منفی تغییرات فناورانه

خطر جبرگرایی

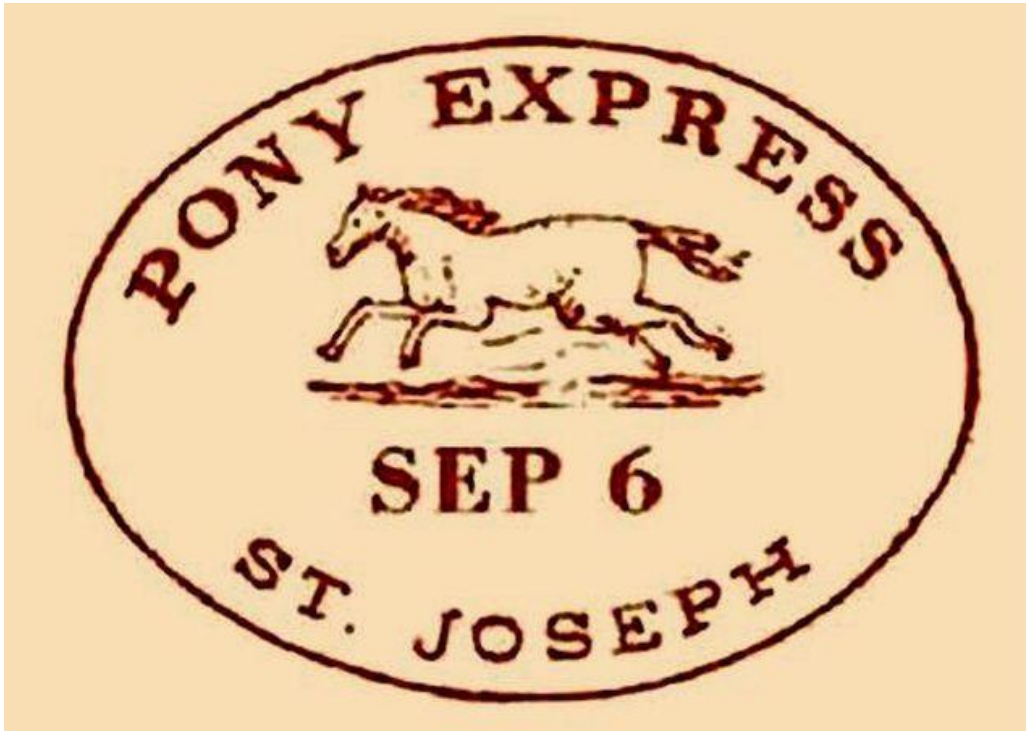
- دهۀ ۱۸۶۰: تلگراف ... پونی اکسپرس (منفی)
- دهۀ ۱۸۸۰: ماشینهای نیوماتیک ... ساختار و روابط مدیریتی کارخانه ها (مثبت)
- دهۀ ۱۹۴۰: لوکوموتیو دیزل به جای بخار ... شهرکهای حومه راه آهن (منفی)
- دهۀ ۲۰۰۰: گسترش سفارش آنلاین و ایبوک ها ... فروشگاههای زنجیره ای کتاب (منفی)

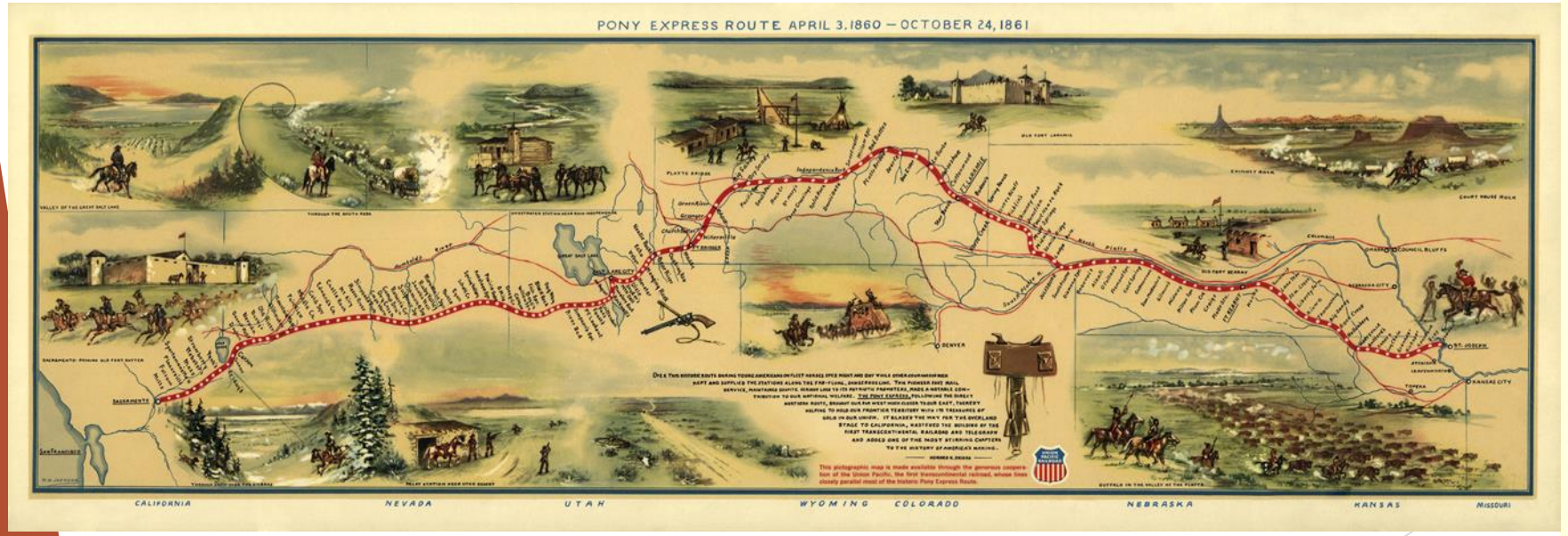
(Volti, p. 22)

Telegraph and Pony Express (1860s)

There are many technological changes that are small in scope, the effects of which are felt by only a few. A few technological changes are massive, and they lead to vast social restructuring. In either case, technology does not yield its benefits without exacting a cost.

The disruptive effects of technological change can readily be seen in the economic realm, where new technologies can lead to the destruction of obsolete firms, as when the fabled Pony Express rapidly lost its customers after telegraph wires had been strung across the West.





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(Volti, p. 25)

Pneumatic Machines and McCormick Order (1880s)

Technological changes do not always result in the destruction or modification of an existing social order; sometimes they may help to preserve it, as happened when pneumatic molding machines were adopted by the McCormick reaper manufacturing plant in the 1880s.[7] These machines were not installed, as conventional analysis would lead us to think, in order to reduce costs or to produce a better product; in fact, they were deficient on both counts. They were installed for the sole purpose of eliminating the skilled workers who formed the backbone of the National Union of Iron Molders, an organization that was challenging the entrenched authority of McCormick's management. The molding machines allowed the replacement of skilled workers by unskilled ones, and three years later, having served their purpose, they were discarded by McCormick's management.

(Volti, p. 24)

Diesel Locomotive and Caliente (1940s)

The life of the town was supported by a single industry: the servicing of steam locomotives. Caliente was an important division point on a transcontinental railroad, and many of the town's people worked as machinists, boilermakers, and repairmen. Their incomes in turn supported Caliente's commercial and civic establishments. Then, in the late 1940s, the diesel-electric locomotive rapidly replaced the steam locomotive. Diesels had many advantages; they were more fuel-efficient, hauled longer trains, and did less damage to the rails and roadbed. They also required less frequent servicing. When servicing was required, it took place in large centralized shops.

(Volti, pp. 24-25)

… Caliente, Nevada

The town lost its economic base, and within a few years it had become a shell of its former self. People moved out, homes were abandoned, and shops were boarded up. The local newspaper sadly noted, "Employees who have given the best years of their lives to this railroad are cut off without anything to which they can turn, many of them with homes in which they have taken much pride; while others, similarly with nice homes, are told to move elsewhere."[6]

The tragedy of this small town has been repeated in many other communities affected by technological change. Many places of employment have closed down as new products and processes have replaced old ones, leaving communities and their inhabitants in desperate straits. The technological advances that produced these dislocations may have benefited society as a whole, but at great cost to the people who were immediately affected.

(Volti, p. 23

eReaders and BORDERS Bookstores (2000s)

The closure of the Borders bookstore chain was due in part to the growing popularity online ordering and e-readers. (David L Ryan/The Boston Globe via Getty Images; RICHARD B. LEVINE/

(Volti, pp. 26-27)

Ned Ludlum … The Luddites

There have been many other occasions when individuals and groups have recognized that certain technological changes were not working to their advantage. In some cases, their reactions have taken a violent turn. The most famous of these are the outbreaks of machine-smashing that occurred in early nineteenth-century England.[10] These attacks were the work of different groups who were collectively known as Luddites, a name that was derived from one Ned Ludlum, an apprentice stocking maker who, as legend had it, answered his master's reprimand by smashing his stocking frames with a hammer.

(Volti, p. 27)

The Luddites (1811) Movement

r. There was really nothing new about these attacks; the breaking of machines by disgruntled workers had a long history in England, the earliest recorded episode taking place in 1663. But the Luddite disturbances that began in 1811 did represent a substantial increase in the scale of these attacks; by the following year, the government had to deploy 12,000 troops to restore order to the parts of England affected by the movement.

(Volti, p. 27

Luddism Motivations

Since these attacks coincided with an era of rapid technological change, it is easy to draw the conclusion that they were motivated by the fear of many workers that their jobs would be lost to new machinery. The actual story is a bit more complicated. Luddite attacks occurred in a number of separate branches of the textile industry, and each was characterized by a distinctive set of motivations and responses. The Luddite movement began in the hosiery trades, where there long had been opposition to the use of wider stocking frames that allowed the employment of poorly paid unskilled labor for the manufacture of an inferior product. The situation might have been resolved in a peaceful manner had it not been for the dire conditions encountered by many of England's working people at the time. The Napoleonic

(Volti, pp. 27-28

Luddism, Economy and Labor Unions

severe attacks of the Luddite epoch. Although the machinery had been used for many years in many textile establishments, the severe economic conditions of the time brought matters to a head. More than the other instances of Luddite revolt, the attacks on cropping equipment were motivated by a deep fear of unemployment induced by technological change.

Machine-smashing by riotous crowds was a likely form of labor protest when workers were scattered and lacking in permanent organizational linkages. In contrast, the large factory served as a fertile ground for the development of labor unions and other organizational vehicles for pressing the interests of workers. Industrial sabotage did not come to an end, but it was generally superseded by unionization and more effective forms of worker protest.

(Volti, p. 28)

Were the Original Luddites Anti-Technologists?

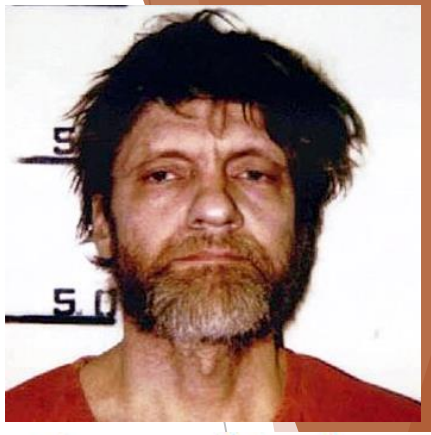
These early episodes of machine-smashing have led to the application of the "Luddite" label to anyone opposed to modern technology. But it is perhaps unfair to impute to the original Luddites a hostility to technology per se. As we have seen, most instances of Luddism were not motivated by a fear and hatred of new machinery; their grievances were those of people suffering from the low wages and unemployment caused by a generally depressed economy. The machines were seen as convenient targets of their ire rather than the sources of it.

(Volti, p. 28)

Neo-Luddites: Kaczynski Case (Theory)

Another striking expression of Luddite sentiments appeared in 1995 when *The New York Times* and the *Washington Post* published a lengthy critique of modern society and the pivotal role of technology in creating and maintaining it. According to its author, a society based on modern technology brings some material comforts, but "all these technical advances taken together have created a world in which the average man's fate is no longer in his own hands or in the hands of his neighbors and friends, but in those of politicians, corporation executives and remote, anonymous technicians and bureaucrats whom he as an individual has no power to influence."[11]

(Volti, p. 28)



Kaczynski Case (Action): Unabomber

Regaining human freedom therefore required the total destruction of industrial society and the technologies that made it possible. This would not be a peaceful revolution, but one that required the destruction of factories, the burning of technical books, and the eradication of all of the components of an industrial civilization. This creed might have been dismissed as the agitated musings of a late twentieth-century Luddite, but its author was not just a misguided critic of the modern world. Shortly after the publication of the manifesto, it was discovered that its author was Theodore Kaczynski, dubbed by the media as "The Unabomber," an elusive figure who from 1978 to 1995 had been responsible for 16 bombings that killed three people and wounded 23 others.

(Volti, pp. 33-34)

Technological Fix … Technocracy:

Converting Social Problems to Technical Problems

trying to convert social problems into technical problems. There have been numerous flirtations with technocracy—the governance of society by engineers and other people with technical expertise, who attempt to develop policies based on technical and "scientific" principles. There is no denying that the technocratic vision is at first glance an appealing one. In a world too often governed by venal and incompetent politicians, there is something very attractive about a system of governance that supposedly bases itself on logic and the use of expertise

(Volti, p. 30)

Shortcomings of Technological Shortcuts

First, even if a technology "works" by producing the desired result, the actual mechanisms through which the technology produces a change are often poorly understood. This is particularly evident when the technology is used in conjunction with other interventions, such as the coupling of methadone maintenance with individual counseling. Technological shortcuts also produce uneven results; they work when applied to some segments of the targeted population but do nothing for the rest. Above all, technological solutions only eliminate the surface manifestations of the problem and do not get at its roots. A methadone program does not address the social and psychological causes of drug addiction, and improved methods of removing graffiti do nothing to mitigate the anger and alienation that may motivate the defacement of public spaces. These criticisms aside, tech-

(Volti, pp. 31-32)

Why Technology Can't?

The main difficulty underlying the use of technology to solve social problems is that these problems are fundamentally different from technical problems. In the first place, social and technical problems differ in their specificity. If you intend to design an air conditioner, you at least know what your goal is: to keep a space cool. In many ways this problem is similar to the far more grandiose objective of landing a man on the moon; although there may be daunting technical problems to overcome, at least the goal is clear and unambiguous. But what if your goal is to reduce crime? Crime, unlike air temperature, is a very diffuse concept, encompassing everything from forgery to murder. Even when a particular crime is singled out for treatment, its causes are likely to be manifold and not easily addressed by a single technology.

(Volti, p. 32)

Why …?

To make matters even more difficult, social problems are directly concerned with human motivations and behaviors. It is one thing to change the temperature of the air by inventing and installing an air conditioning system; it is quite another to attempt to change human behavior through the same kind of technological intervention. Human beings are wondrously intricate creatures whose actions are governed by extremely complex motivations. Trying to understand, let alone change, human actions is an exceedingly difficult task. And humans are likely to resist when attempts are made to change their behavior.

(Volti, pp. 32-33)

and Why …?

It is also apparent that technological solutions work best when they operate within closed systems—that is, when the issue to be addressed is sealed off from outside influences. Of course, no technology exists in isolation from the surrounding society. A transportation system based on private automobiles, for example, is the result of choices exercised within the economic and political realm, such as a government's decision to build a highway network. But within a given technology there are many specific matters that can be treated as purely technical problems. In these cases, it is possible to approach the problem directly and not worry about the influence of other factors. If your car fails to start one morning, you can be sure that the problem lies only with its components; you need not concern yourself with sunspot activity or a recent presidential election in Peru. When a problem is not so easily isolated, a technological solution is much less likely. Today, millions

(Volti, p. 34)

Scientific Management
(Fredrick Taylor: a metallurgical engineer)

. If obdurate metals could be better controlled and shaped through the application of new technologies guided by scientific principles, why couldn't the same thing be done with workers?

The technocratic spirit of Scientific Management is thus evident: the tasks and prerogatives of management rested not upon the exercise of raw power but on management's technical superiority in guiding the production process. At the

(Volti, p. 36)

Scientific Management Problems

conduct in work settings not characterized by repetitious actions. But of equal or greater importance, both management and labor realized that the implementation of Taylor's system posed fundamental threats to their own interests. Most managers were highly reluctant to delegate their authority to the dictates of "scientific" procedures.[23] Workers, on the other hand, resented the loss of what little autonomy they had, and they widely believed—with considerable justification—that higher levels of productivity would result in the downward adjustment of piece rates, leaving them no better off than before the program had been enacted.

(Volti, pp. 36-37)

Fallacy of Scientific Management

The basic fallacy of Scientific Management, one shared by all other variants of technocracy, is that administration can replace politics. Administration is based on the application of rules that allow the realization of given ends. It is thus a manifestation of the rational spirit of applying the best means for the achievement of a particular goal. It does not, however, determine these ends. The Internal Tax codes and other policies are formulated through choices made in the political arena. Neither technology nor administration can supply the values that form the basis of these choices.

(Volti, p. 37)

Technological Changes … Social Changes

To summarize, technological changes inevitably produce social changes. These changes, in turn, do not affect everyone equally. Although many technologies produce widespread benefits, not everyone benefits to the same degree, and there are instances where particular individuals and groups lose out completely. A choice of technology is often a determination of who wins and who loses; it is therefore proper that affected parties have the opportunity to participate in the process. This issue will be taken up in greater depth in the last three chapters. At this point it can at least be hoped that without deflating the very real achievements of technology, some sense of its inherent limitations has been conveyed. Technology and the procedures underlying its development have been immensely powerful in their own realm; outside this realm, however, they are less likely to be effective. Equally important, the methods that have been so successful in developing and applying new technologies cannot be transferred to the governance of society. Technological development may make some aspects of our lives better, but it can never substitute for a just and effective political and social system.