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Chapter 18 - General Purpose Technologies

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Abstract

A general purpose technology or GPT is a term coined to describe a new method of producing and inventing that is important enough to have a protracted aggregate impact. Electricity and information technology (IT) probably are the two most important GPTs so far. We analyze how the U.S. economy reacted to them. We date the Electrification era from 1894 until 1930, and the IT era from 1971 until the present. While we document some differences between the two technologies, we follow David [In: *Technology and Productivity: The Challenge for Economic Policy* (1991) 315–347] and emphasize their similarities. Our main findings are:

1. Productivity growth in the two GPT eras tended to be lower than it was in other periods, with productivity slowdowns taking place at the start of the two eras and the IT era slowdown stronger than that seen during Electrification.
2. Both GPTs were widely adopted, but electricity's adoption was faster and more uniform over sectors.

3. Both improved as they were adopted, but measured by its relative price decline, IT has shown a much faster improvement than Electricity did.
4. Both have spawned innovation, but here, too, IT dominates Electricity in terms of the number of patents and trademarks issued.
5. Both were accompanied by a rise in “creative destruction” and turbulence as measured by the entry and exit of firms, by mergers and takeovers, and by changing valuations on the stock exchange.

In sum, Electrification spread faster than IT has been spreading, and it did so more evenly and broadly over sectors. Also, IT comprises a smaller fraction of the physical capital stock than electrified machinery did at its corresponding stage. On the other hand, IT seems to be technologically more dynamic; the ongoing spread of IT and its continuing precipitous price decline are reasons for optimism about productivity growth in the 21st century.



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Keywords

electricity; information technology; IT revolution; productivity slowdowns; technology improvement; creative destruction

JEL classification

O3; N2

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