



## General Purpose Technologies

General Purpose Technologies (GPT) are a special category of technologies that are widely used, capable of ongoing technical improvement and of enabling innovation in application sectors (Bresnahan 2010). Historical examples are steam engines, the factory system, electricity, the chemical engineering discipline, semiconductors, digital technology, and the Internet. When these technologies become widespread, there are complementarities between technical improvement for the GPT and innovations in related application sectors that can lead to sustained economic growth (David 1990).

GPTs highlight the role of network effects, where the value of an input increases with additional users on the network. The U.S. railroad system complemented the invention of the steam engine and networks of roads complemented that invention of the automobile (Gordon 2016). Complementary innovations rise more easily in a standardized network, leading to an important role for standard setting.

A lesson from the history of GPTs is that the diffusion of a new application can take a long time (e.g., from the invention of the steam engine to its influence on economic growth). Factors that influence the speed of diffusion include the skill of the workforce and the capital with which they work. Bresnahan (2010) observes that the combination of the GPTs and their applications is what produces growth.