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Note on Digitization and its Effects

The purpose of this note is to provide some insight about the change from analog to digital, the increasing penetration of digital technologies in our lives, the increasing performance of that technology, and the effects of this digitization.

The analog world

People live in an analog world. Everything that we perceive is “a continuous transmission of information to our senses. This continuous stream is what defines analog data.”

Through the 1940s, we had little choice but to work in analog since digital had not yet been invented. Specialized readers and tools came to be intimately associated with each medium:¹

- **Books** have been the storage medium of choice for the printed word for much of the world since Gutenberg invented movable type in the mid-15th century and, especially, since the invention of powered printing presses in the early 18th century.² (While books were available before then, they were too expensive or too labor-intensive for the general population to use.) Though difficult to produce for much of history, they require no specialized readers for most of the population.
- **Photographic film** has been used to capture and store images since Eastman Kodak invented it in 1885.³ A camera was needed to capture the image, and a specialized process and associated materials were needed to develop and print the image.
- **Radios** have been used since the late 1800s to receive radio waves and convert them into audio waves (voice or music).⁴ Specialized equipment was needed to send the radio waves, and a specialized receiver (a radio) was needed to receive the radio waves and make them audible.
- **Movie theaters** have shown motion pictures (captured on expensive reels of photographic film) using a motion picture projector since the 1890s.⁵ A specialized, and expensive, motion picture camera was used to capture these motion pictures.⁶ In the 1920s, talking pictures (captured using suitably equipped cameras and played by suitably equipped projectors) began to gain popularity.⁷
- **Telephones** have been used to transmit voice over a wire since their invention in the 1870s.⁸ Relatively inexpensive equipment was needed to send and receive the signals at either end of the phone call, but a huge, separate infrastructure was needed to transport and manage the telephone traffic between homes and businesses.



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