Technological Change: A Burden or a Chance

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Abstract

The photography industry underwent a disruptive change in technology during the 1990s when the traditional film was replaced by digital photography (see e.g. The Economist January 14th 2012). In particular Kodak was largely affected : by 1976 Kodak accounted for 90% of film and 85% of camera sales in America. Hence it was a near-monopoly in America. Kodaks revenues were nearly 16 billion in 1996 but the prediction is that it will decrease to 6.2 billion in 2011.

Kodak tried to get (squeeze) as much money out of the film business as possible and it prepared for the switch to digital film. The result was that Kodak did eventually build a profitable business out of digital cameras but it lasted only a few years before camera phones overtook it.

According to Mr Komori, the former CEO of Fujifilm of 2000-2003, Kodak aimed to be a digital company, but that is a small business and not enough to support a big company. For Kodak it was like seeing a tsunami coming and theres nothing you can do about it, according to Mr. Christensen in The Economist (January 14th 2012).

In this paper we study the problem of a firm that produces with a current technology for which it faces a declining sales volume. It has two options: it can either exit this industry or invest in a new technology with which it can produce an innovative product. We distinguish between two scenarios in the sense that the resulting new market can be booming or ends up to be smaller than the old market used to be.

We derive the optimal strategy of a firm for each scenario and specify the probabilities with which a firm would decide to innovate or to exit. Furthermore, we assume that the firm can additionally choose to suspend production for some time in case demand is too low, instead of immediately taking the irreversible decision to exit the market. We derive conditions under which such an suspension area exists and show how long a firm is expected to remain in this suspension area before resuming production,

investing in new technology or exiting the market.