

The Real Lessons From Kodak's Decline

Eastman Kodak is often mischaracterized as a company whose managers didn't recognize soon enough that digital technology would decimate its traditional business. However, what really happened at Kodak is much more complicated — and instructive.

By Willy Shih

Eastman Kodak Co. is often cited as an iconic example of a company that failed to grasp the significance of a technological transition that threatened its business. After decades of being an undisputed world leader in film photography, Kodak built the first digital camera back in 1975. But then, the story goes, the company couldn't see the fundamental shift (in its particular case, from analog to digital technology) that was happening right under its nose.

The big problem with this version of events is that it's wrong. Moreover, it obscures some important lessons that other companies can learn from. To begin with, senior leaders at Kodak were acutely aware of the approaching storm. I know because I arrived at Kodak from Silicon Valley in mid-1997, just as digital photography was taking off. Management was constantly tracking the rate at which digital media was replacing film. But several factors made it exceedingly difficult for Kodak to shift gears and emerge with a consumer franchise that would be sustainable over the long term. Not only was a major technological change upending our competitive landscape, but challenges were also affecting the ecosystem we operated in and our organizational model. Ultimately, refocusing the business with so many forces in motion proved to be impossible.

A Difficult Technology Transition

Kodak's first challenge had to do with technology. Over the course of more than a century, Kodak and a small number of its competitors had developed and refined manufacturing processes that enabled consumers to capture and preserve images for a lifetime. Color film was an extremely complex product to manufacture. The 60-inch "wide rolls" of plastic base material had to be coated with as many as 24 layers of sophisticated chemicals: photosensitizers, dyes, couplers, and other materials deposited at precise thicknesses while traveling at 300 feet per minute. Wide rolls had to be changed over and spliced continuously in real time; the coated film had to be cut to size and packaged — all in the dark. With film, the entry barriers were high. Only two competitors — Fujifilm and Agfa-Gevaert — had enough expertise and production scale to challenge Kodak seriously.

The transition from analog to digital imaging brought several challenges. First, digital imaging was based on a general-purpose semiconductor technology platform that had nothing to do with film manufacturing — it had its own scale and learning curves. The broad applicability of the technology platform meant that it could be scaled up in numerous high-volume markets (such as microprocessors, logic circuits, and communications chips) apart from digital imaging. Suppliers selling components offered the technology to anyone who would pay, and there were few entry barriers. What's more, digital technology is modular. A good engineer could buy all the building blocks and put together a camera. These building blocks abstracted almost all the technology required, so you no longer needed a lot of experience and specialized skills.

Semiconductor technology was well outside of Kodak's core know-how and organizational capabilities. Even though the company invested lots of money in the basic research and manufacturing of solid-state semiconductor image sensors and developed some notable inventions (including the color filter array that is used on virtually every color image sensor), it had little hope of being a competitive volume supplier of image sensor components, and it was difficult for Kodak to offer something distinctive. Contrast this with Sony Corp., which entered the sensor business to support its electronic video recording business. As an electronics company, its organizational capabilities were far more aligned with what was needed to succeed. What's more, it jumped in early.

But Sony and other Japanese consumer electronic companies also had to adjust to the changes brought on by digital technology. Sony's Trinitron color television, once a category leader, was overrun by "plug-and-play" modular digital components — in this case, liquid crystal displays, flat panel displays, and TV chips that made designing a television set easier. As Yukio Shohtoku, retired executive vice president of Panasonic Corp. explained to me, modularization "makes consumer products, our consumer products, a commodity."

Once consumer electronic products transitioned to digital, Shohtoku noted, leading brands such as Panasonic and Sony lost their competitive edge in those markets. This explains how hundreds of companies, many of them startups, could move into imaging and how a company such as GoPro Inc., based in San Mateo, California, could appear out of nowhere and take the consumer video recorder market by storm. It's a situation that many makers of technology products are now facing or may soon face.

Scaling Down Is Hard

While the technology presented one set of problems, figuring out how to manage declining film sales while trying to extract maximum profits presented another. Growing companies learn how to invest in manufacturing efficiency and in achieving scale economies. As volumes increase, unit costs go down and capital efficiency improves. But scaling down is hard to do. It helps if your capital base is fully depreciated, but what if you have to reduce the size of your production runs? At a certain point, you just don't have enough volume anymore to absorb your fixed costs.

In Kodak's case, film had a finite shelf life, so as sales declined, the company had to figure out how to shrink the size of production batches without driving unit costs up too far or forcing the selling price up, which would have led to a death spiral. I remember when the yearly sales of a particular type of Kodak film went below a single wide roll production batch. Shrinking the run length would drive up the proportion of time and materials expended in setup, and shifting to smaller production lines would incur additional capital expense, something that would have been impossible to justify. Having a product line made up of many film types worked well when sales were going up but worked against the company as volumes shrank. Discontinuing products pushed film photographers (especially professionals) to digital, and it further drove down cost absorption. For a while, Kodak was fortunate that motion picture print film manufacturing was able to absorb a huge proportion of factory overhead. But when theaters finally moved to digital projection, the company couldn't slash costs fast enough to keep up with declining volumes.

Declining scale was also a big problem for Kodak in its retail distribution network. Once the volume of film sales at retail stores started to drop, holding onto shelf space became harder. This is not a unique problem — it happens in other markets that are being affected by low-cost imports, market fragmentation, or the cyclical decline of products as newer, more sophisticated products are introduced. But in Kodak's case, the category was disappearing. For many years, Kodak management was careful not to talk about the problem publicly to prevent it from becoming a self-fulfilling prophecy (something critics misconstrued as management not grasping the gravity of the situation). One could argue that exiting the business and forcing consumers to

transition to new solutions was the right way to go. But that would have required Kodak to give up billions of dollars in profits and abandon products like motion picture print distribution too soon, without having other products to capture the demand.

Ecosystem Troubles

The third part of Kodak's problem had to do with its ecosystem. Much has been written about the importance of building an ecosystem when a new product or service has to leverage complementary assets. Kodak built a unique and powerful ecosystem to support film-based photography. While the majority of its profits came from manufacturing and selling film, retail partners made large profits from photo finishing. For retailers, it was a wonderful business because it brought customers into their stores multiple times: first to purchase film, then to drop off exposed film for developing and printing, and finally to pick up the prints. Each visit brought ancillary purchases, and photofinishing was one of the top two or three profit generators for many retailers and chain stores. But the end of analog imaging was bringing this golden era to an end.

In hindsight, there were two ecosystem design problems. First, as analog photography declined, there was no reason for retailers to be loyal to Kodak products; many were just as happy to use chemicals and paper from Fuji. Second, Kodak management didn't fully recognize that the rise of digital imaging would have dire consequences for the future of photo printing.

Organizational Inertia?

Kodak management has been criticized for compromising its digital efforts because it wanted to protect film. But the criticism is overblown. Responding to recommendations from management experts, from the mid-1990s to 2003 the company set up a separate division (which I ran) charged with tackling the digital opportunity. Not constrained by any legacy assets or practices, the new division was able to build a leading market share position in digital cameras — a position that was essentially decimated soon thereafter when smartphones with built-in cameras overtook the market.

A complicated and emotional issue was how to deal with the thousands of people in the legacy businesses that were destined to shrink. Most of the individuals in question knew they didn't have the right skills for the new businesses; their jobs were to maximize profits from the declining businesses for as long as possible. A few people could make the transition, but the truth is that commoditized digital businesses tend to have lower profit margins and can't afford to carry a lot of costs — particularly legacy costs.

The organizational challenge was even more pronounced at a senior level. For many managers of legacy businesses, the survival instinct kicked in. Some who had worked at Kodak for decades felt they were entitled to be reassigned to the new businesses, or wished to control sales channels for digital products. But that just fueled internal strife. Kodak ended up merging the consumer digital, professional, and legacy consumer film divisions in 2003. Kodak then tried to make inroads in the inkjet printing business, spending heavily to compete with fortified incumbents such as HP, Canon, and Epson. But the effort failed, and Kodak exited the printer business after it filed for Chapter 11 bankruptcy reorganization in 2012.

What Might Kodak Have Done?

With the benefit of hindsight, it's interesting to ask how Kodak might have been able to achieve a different outcome. One argument is that the company could have tried to compete on *capabilities* rather than on the *markets* it was in. This would have meant directing its skills in complex organic chemistry and high-speed coating toward other products involving complex materials — a path followed successfully by Fuji. However,

this would have meant walking away from a great consumer franchise. That's not the logic that managers learn at business schools, and it would have been a hard pill for Kodak leaders to swallow.

For Kodak, it might also have meant holding on to Eastman Chemical Co., a unit it spun off in 1994. After emerging from Chapter 11 bankruptcy protection in 2013, Kodak chose to stand its ground in the imaging business. Today, it is a much smaller company that sells products such as commercial printing solutions, while Eastman Chemical, based in Kingsport, Tennessee, has become a major player in industrial chemicals, fibers, and plastics. (Ironically, Eastman Chemical might end up being George Eastman's most lasting legacy.)

Yet another potential path for Kodak might have been proactively exiting its legacy businesses in a timely way, as IBM Corp. did. From the early 1990s through the 2000s, IBM managed to do this very efficiently, exiting markets that included printer manufacturing, flat panel displays, personal computers, and disk drives. For the company that's doing the exiting, exiting legacy businesses is an opportunity to restructure and shed a lot of costs. Kodak eventually did this with its consumer film business, which is now owned by Kodak's U.K. pension plan. But for an organization exiting its traditional business, the real challenge is keeping an innovation pipeline full of new products and services that can replace the old ones. As Kodak has shown, that can be a formidable challenge.

Lessons for Managers

Every situation is different, but the experiences of Kodak suggest some sobering questions for managers in industries undergoing substantial technology-driven change. Among them are:

Is our core technology converging to the point of being replaced by a general-purpose technology platform? If so, the company could lose manufacturing scale and early-mover advantages — such as being far down the legacy manufacturing learning curve.

Is the technology that underpins our business likely to shift to a digital/modular platform that will lower barriers to entry? If so, commoditization pressure will be inevitable, and the company must prepare to live on much lower margins.

Do we have a capital-intensive legacy business? If so, can we develop a strategy for scaling down production volumes that is both capital efficient and keeps production costs from rising excessively? This is key to maximizing cash flow while trying to execute a transition. It will involve using older equipment or repurposing production assets to make alternate products.

How does the balance of power in our ecosystem change as technology shifts impact different parts of the value chain differently? Will the interests of partners cause our company to do things that are contrary to its long-term interests? This requires thinking about how ecosystem partners will manage the transition and adjusting strategy accordingly.

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