



Book Reviewed: *Dealers of Lightning: Xerox PARC and the Dawn of the Computer Age*

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Review:

“Xerox could have owned the entire computer industry,” reflected Apple CEO Steve Jobs in 1996. While the giant of the copier industry was responsible for fundamental technological advancements in personal computing in the 1970s and 1980s, Jobs noted, it failed to bring those innovations to market. Compared to Xerox, Mr. Jobs’ company (Apple), and other vanguards of the burgeoning industry, proved much more successful at identifying potential and leveraging new technology.

Journalist Michael Hiltzik’s *Dealers of Lightning* takes readers inside the organization responsible for Xerox’s remarkable story in this period: the Xerox Palo Alto Research Center (PARC). He explores factors associated with its success, and considers the dynamics of decision-making within Xerox that, in hindsight, led to so many missed opportunities. Hiltzik associates PARC’s success with robust financial support from the headquarters at Xerox, a historical moment of dynamic change in computer technology, an economy conducive to recruiting the best talent in engineering and computer science, and leadership at PARC that knew how to get the most out of its human capital. In this environment, Xerox PARC was responsible for what would prove to be some of the most influential developments for personal computing: the graphical user interface with mouse, icons, and overlapping windows, the laser printer, the Ethernet, and the personal computer.

How, business theorists have asked, could Xerox develop such technology, and botch the opportunity to leverage it for commercial gain? Indeed, PARC’s transformative innovations were exploited time and again by companies other than Xerox. Even the laser printer, a technology that would prove to be a huge commercial success for Xerox, experienced frustrating delays coming to market.

In part, Hiltzik’s telling seeks to complicate this dim vision of Xerox’s decision-making. He first notes that the rapid rate of change in the industry in this period makes it exceptionally difficult to fault Xerox for not better anticipating opportunities. Second, he pushes back against the assumption that the sheer size and sophistication of Xerox’s marketing capability should have facilitated exploitation of new technology. Xerox’s size, he argues, may have served as an

impediment to commercializing PARC's innovations, and conversely, Apple's success at marketing the PC may have occurred "not in spite of its small size, but *because* of it" (p. 392). Hiltzik notes that for Xerox, a copier company, fully leveraging revolutionary technology in an entirely different industry would have required a fundamental shift in its corporate investments and customer base. Seldom has a corporation proved able to so fundamentally remake itself. Finally, Hiltzik questions the assumption that the value of a research organization should be judged by the number of its innovations that are monetized alone. Rather, in an effective research program, not all ideas should be expected to prove immediately useful -- and that is okay. Indeed, the willingness of an organization to take such risks might be the only way to transform, and even apparently useless developments might have benefits beyond what could have been originally imagined.

The case of Xerox PARC offers valuable insights for the defense acquisition community. At its core, the Xerox story is about how organizations innovate: how they promote creativity and take advantage of the fruits of invention. These are fundamental questions for a community increasingly focused on improving acquisition outcomes by fostering innovation. Indeed, the breadth of PARC's contributions suggests the potential of a research organization empowered with the right resources, expertise, and leadership. Yet at the same time, the challenges Xerox faced in taking full advantage of these innovations should also chasten Defense decision-makers. The unique mission and organization of the Defense Department will likely make innovation here fundamentally different from companies like Apple that proved so effective at recognizing and realizing the potential of technology developed at PARC.