Under the Mike-R-Scope: What Happened at Xerox PARC?

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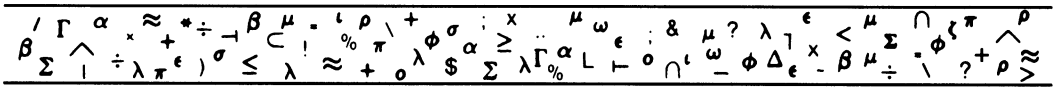

Fumbling the Future: How Xerox Invented, then Ignored, the First Personal Computer by Douglas K. Smith and Robert C. Alexander appeared almost a decade ago and has been republished with a 1999 copyright. In addition, 1999 saw the publication of a new book on the same subject, Michael Hiltzik's *Dealers of Lightning: Xerox PARC and the Dawn of the Computer Age*. In this column, I review and compare these books, and also describe the role of the management scientists at Palo Alto Research Center (PARC), a topic neither book mentions.

In both books, the authors Smith and Alexander and Hiltzik describe how Xerox set up a new research laboratory in Palo Alto, away from its copier business in Rochester, to do research on the architecture of information. Both books contain descriptions of the personalities involved and some of the key research issues that led to the breakthroughs that define the modern personal computer. These include the bit-mapped, what-you-see-is-what-you-get display, the desktop, icons, the use of the mouse and menus, and, more generally, a whole antimainframe computing philosophy based upon the then revolutionary idea that computing would become cheap relative to human time and attention. Both point out the key role that the work done by the PARC computer scientists plays in the present state of personal computing.

When I went to work at Xerox PARC in 1973, Xerox was on *Fortune*'s list of the five best managed companies. At that time, Xerox was the archetype of a successful growth company, but its success was due to two key decisions made a decade or two earlier by the late Joseph

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Wilson: to develop the xerographic office copier and to sell copies rather than copiers. In fact, at the strategic level, Xerox was being managed badly, especially with respect to technology policy. Kearns, who is a former Xerox president, and Nadler [1992, p. 103] admit that "the work [at PARC] was not connected to a firm business strategy, which was the fault of senior management."

P的工作没有与明确的商业战略联系在一起
这是高层管理人员的失误

Smith and Alexander are interested in business strategy. They tell the basic story of Xerox's strategy failure in the face of fantastically successful research outcomes. Hiltzik is a journalist who covers Silicon

施乐公司在面对极其成功的研究成果时战略失败的基本故事

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施乐是成功成长型公司的典型

Valley. He tells the same story in somewhat more detail. Hiltzik's book appears to be based upon more extensive interviews and is roughly twice as long. It includes, however, an incongruous epilogue entitled "Did Xerox blow it?" in which Hiltzik attempts to argue that Xerox didn't do too badly. Part of this argument is that Xerox made money on high speed laser computer printing, a technology that came out of PARC. Part of it is that lots of other companies have failed in the computer business. I had been told by the person who alerted me to the Hiltzik book that it defended Xerox. By the time I got to the epilogue, I was wondering what that warning was about. The book, like Smith and Alexander's, is full of the details and particulars of management failure. I'll discuss laser printing below, but the argument that others have failed in the computer business is irrelevant; they didn't have the breakthroughs Xerox had.

I had known that Xerox had unwisely let Steve Jobs of Apple see the PARC technology. What I had not known until the Hiltzik book spelled it out was that Xerox had received a substantial block of Apple Computer's initial public stock offering in return for Job's tour of PARC and then failed to hold on to it. They just didn't understand their technology and its value. (Xerox management also had problems with technology in its main business. Xerox was late developing recirculating document handlers for copiers and late developing simple, inexpensive small copiers.)

管理层不理解其价值

其实他们在主要的打印机业务上也有问题

Both books have details of events in Xerox and descriptions of personalities of which I have first hand knowledge (and lots of which I don't). In general, both books are right on the mark with respect to these events and personalities. The one slightly sour note I detected was in Hiltzik's description of the brief Xerox career of Myron Tribus. Tribus, a former dean of engineering at Dartmouth and a former high official in the Commerce Department under Nixon's secretary of commerce, Maurice Stans, was brought in as an executive vice president for research and engineering at Xerox. He lasted only two years before the accountant who ran Xerox's engineering organization (badly) outmaneuvered him politically. Both books tell this story, but Hiltzik's ends with a quote from Tribus in which he says a friend told him he had to leave for his own health because he was working 12 hours a day surrounded by people who wanted to do him in. I visited Tribus in his Rochester office near the end of his

一个朋友告诉他, 为了自己的健康, 他必须离开, 因为他每天工作12小时, 周围都是想害他的人

tenure at Xerox, and I got the distinct impression that although by that time he had not yet resigned, he was completely cut off from responsibility and had little to do.

虽然他当时还没有辞职
但他已经完全被剥夺了责任
几乎无事可做

Neither book contains any mention of the Analysis Research Group (ARG) at PARC and its role. The group was headed for many years by Richard Smallwood, who resigned a tenured position in Stanford's engineering economic systems department to lead it. It showed on PARC's organization chart as a staff group reporting to George Pake, the head of PARC, but while staff support may have been its initial intent, it quickly evolved into a small group doing research, development, and innovative applications of management science methods of potential use to Xerox. ARG was unique at PARC in several ways. It was concerned with developing tools and innovative applications in addition to doing basic research. It was also unique at PARC in that it dealt with process research (the process of running Xerox) rather than product research. For much of a decade, ARG's permanent staff, in addition to Smallwood, consisted of Stephen A. Smith, Shmuel Oren, Peter Morris, and me.

分析小组的角色

ARG在PARC中具有多方面的独特性, 它不仅致力于开发工具和创新应用还进行基础研究它的另一个独特之处在于, 它处理的是流程研究(即施乐运行的过程)而不是产品研究

ARG was successful intellectually and practically. Its intellectual success is demonstrated by the publications of its members. Its practical successes included a decision analysis study that kept Xerox from constructing an unneeded factory [Smallwood and Morris 1980]. Members of ARG also developed management science tools that were used in managing Xerox operations. These included a simplified project evaluation tool [Rothkopf, Redwood, and Rice 1974], an inventory management system for spare parts [Smith 1977], a tool for sizing Xerox service territories [Smith 1979], a tool for selecting the contents of Xerox service representatives' repair kits [Smith, Chambers, and Shlifer 1980], and a tool for analyzing workloads at copy centers [Rothkopf and Johnston 1982].

智力和实践上取得成功
还开发了用于管理施乐运营的管理科学工具

More critical was ARG's work on market models. Forecasting the acceptance and use of new products was a major concern at Xerox. From theoretical and

市场模型, 说服了管理层

They just didn't understand their technology and its value.

applied work on other forecasting projects, ARG developed an approach to such forecasting based upon value-choice models. In particular, Oren [1974] derived logit choice models independently of McFadden [1974]. The work led to a major applied project done jointly with Xerox's market-research and product-development communities on the market for Xerox's proposed high-speed laser computer printer. That project is well documented in the Edelman Prize finalist paper by Oren, Rothkopf, and Smallwood [1980] and in later papers by Oren and Rothkopf [1984] and Rothkopf [1993]. The forecasting technology ARG developed played a key role in convincing doubting top managers that Xerox could compete successfully with IBM in the computer center in laser computer printing. Without that demonstration, Xerox would not have had its highly profitable laser-printing business and would have had much less to show for its investment in PARC.

The management forces in Xerox that

led to the horrendous gap between PARC research and Xerox's business also led to a lack of appreciation for ARG's nonstandard applied role. When resources became tight, Xerox management squeezed ARG. It is ironic that shortly after the last of the ARG permanent staff left PARC, PARC management changed and started trying to end the isolation of PARC research from Xerox business plans.

Whatever the effect on Xerox of the loss of ARG, the members of ARG have fared well. After leaving PARC, Smallwood and Morris became the top two leaders of Applied Decision Analysis, Inc. One of their successful lines of business has been market models like the one used to evaluate Xerox laser printers. The other three long-term ARG members have become full professors and have served as department chairs—Smith at Santa Clara University; Oren at the University of California, Berkeley, after a brief period at Stanford University; and I at Rutgers after six years at Lawrence Berkeley Laboratory.

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