Biographies

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Richard L. (Rick) Crandall

Richard Crandall encountered his first computer in 1961 as a University of Michigan undergraduate student. He soon fell in love with the machine, an IBM 7094, and sought out computer-related courses across the curriculum. He also found a part-time job in the university's computer center, where he met pioneering operating systems researcher Bernie Galler. In 1964, Crandall's computer center work brought him into contact with a sales representative of California-based Scientific Data Systems. SDS was promoting its computers for remote use via terminals, then a novel and unproven alternative to batch operation. Founded in 1961, SDS was then growing rapidly, and throughout the 1960s was bringing in more revenue from minicomputer sales than pioneer and eventual market leader DEC. Its core markets were in scientific and control applications, but it was eager to expand beyond big customers such as NASA.[1]

After a demonstration of this technology, Crandall began to work closely with the computer team at the University of California at Berkeley, the flagship SDS site. Berkeley was pioneering the use of time-sharing to provide interactive, remote access to a central shared computer facility. Although it could only support about six simultaneous users, it worked well enough to fill many of those who used it with the sense that this was the future direction of the computing field. The key to its success was complex operating system software, written by a team led by professor M.W. Pirtle and included gifted young programmers Butler Lampson and Peter Deutsch (whose teenage exploits as part of a legendary team of Massachusetts Institute of Technology computer enthusiasts was chronicled by Steven Levy in *Hackers*).[2]

Crandall's early career and intellectual interests thus had a lot more in common with people like Lampson and Deutsch than with the earlier generation of service bureau operators such as Bernie Goldstein and Frank Lautenberg, who lacked graduate degrees in engineering or top-flight systems programming skills. Yet, unlike those he worked with, Crandall did not find minor celebrity as a researcher at Xerox PARC, tenured professor, or open-source programmer. Instead, he rushed into business. Crandall was quick to see the potential of time-sharing technology to greatly broaden the economic base of computer users, especially since his own small business moonlighting as a programmer for local businesses depended on "misusing" Michigan's computer for commercial ends.

Creation of Comshare

Together with Bob Guise, a civil engineer graduate of the University of Michigan, Crandall founded Comshare in 1966 to commercialize the technology developed at Berkeley. Crandall took responsibility for its technical direction, leaving overall charge of the business in the hands of Guise. Getting Comshare off the ground meant solving a lot of novel and pressing problems, rapidly and with a small budget and staff. Some of these problems were technical, some commercial.

Only a handful of time-sharing computers were operational in the entire world, and though universities sometimes sold spare computer time to outsiders, nobody had yet proven that time-sharing was a viable business model. Despite considerable publicity given to the time-sharing concept, none of the major computer vendors were even manufacturing computers capable of effective time-sharing operation. Standard, efficient operating systems able to support scores of simultaneous users were still many years from completion, as shown by the delays and failures experienced by MIT, General Electric, and Bell Labs when they attempted to make Multics into the leading commercial operating system for time-sharing systems.

Neither was it clear that telecommunications regulations would permit the creation of large-scale, public data

Editor's Note

The two biographies presented in this issue are part of an ongoing examination of the development of the computer software and services industry, using as a lens the trade association ADAPSO (Association of Data Processing Service Organizations) and the careers of some of its most prominent members. It follows from an article published earlier this year on the origins of ADAPSO in the early 1960s as a trade group for service bureau companies, accompanied with biographies of Bernie Goldstein and Frank Lautenberg (see *Annals*, vol. 26, no. 1, pp. 78-93). This series will conclude in a future issue with a second article exploring the development of ADAPSO during the 1970s, as it expanded its membership within the fledgling software product and time-sharing service industries.

networks by entrepreneurial firms. Getting a time-sharing system open for business meant a combination of cutting-edge computer science, performance-improving hacks and kludges, long hours, good luck, and incorrigible optimism.

Comshare was based in Ann Arbor, Michigan, but Crandall moved to Palo Alto, California, to take part in the development of an improved version of the Berkeley operating system. The work was carried out in collaboration with another small firm, Tymshare, and with the support of SDS. The developers used spare time on Berkeley's computer, which meant making full use of the early morning hours from 2 a.m. to 6 a.m. when it was closed to its regular users. By the fall of 1966 the cooperative stage of the development was complete and the capability of the system had been increased to about a dozen simultaneous users. Tymshare and Comshare shared the resulting code, and each firm received six months free use of a 940 computer from SDS while it tried to build a business around it. Comshare named its version of the operating system Commander.

Both Comshare and Tymshare went on to become important players in the time-sharing industry. Crandall recalls that initially "Tymshare really wanted to sell computer time. Comshare wanted to sell applications that were being run by multiple people on the computer at the same time."[3] For this reason, Comshare's efforts were focused on the development of application software, including custom programs to do things such as stock price predictions and corporate financial modeling. These were then run on Comshare's own computers, but used directly by clients who paid for connection time, computer time, and storage.

Most of the firm's 15 early employees were programmers, assisted by a smaller sales team charged with bringing in new jobs for them to program. While this does not sound so different from the business of a traditional service bureau, Crandall believes that Comshare's use of custom online, interactive editing and debugging tools made it possible to develop applications far more rapidly than competitors using traditional development methods. Like other time-sharing firms, Comshare also sold computer time to customers keen to develop and run their own programs, but here, too, its unique selling point was the provision of then-novel interactive tools for rapid program development.

Comshare's initial, and modest, funding was provided by its founders and a handful of small investors. Fortunately for Crandall and his colleagues, their move into time-sharing was well timed. Within months of Comshare's founding, investors fell deeply, if briefly, in love with time-sharing and software firms. In 1967, the firm received an investment of more than a million dollars from the Weyerhauser family. In November 1968, Comshare went public, for, according to Crandall, "what looked like a huge price to us … higher than we even tried for."[3] With more than three million dollars in the bank, the firm began a rapid national expansion, opening offices around the country to sell its services. This proved an almost fatal mistake, as little more than a year later it had exhausted this pile of cash and gone into debt without generating anything like enough business to finance itself. As CEO, Guise was forced out by Comshare's financial backers.

In August 1970, Crandall took over as CEO just as the "go go years" of the late 1960s gave way to the computer industry's first ever recession. He was just 27 years old. The immediate situation appeared bleak, as losses far outstripped revenues. However, Crandall quickly learned that "you have a lot of leverage when you are broke, because nobody thinks they are going to get anything back."[3] He devoted his personal energies to improving Comshare's sales operations and the quality of its service, hiring a new executive named Richard Eidswick to improve its dire financial management. By March 1971, the company had turned the corner into profitability through a combination of better operating discipline, some cost reductions, and instituting a more process-oriented sales effort under new sales management.

For the rest of the 1970s, Comshare grew rapidly and profitably. Although it made some acquisitions, mostly of failed competitors, it relied primarily on organic growth. Crandall's love of technology and growing his business meant that he "never thought about cashing out," even though in retrospect he realizes that "there were several times when selling the company would have made the most sense" in terms of his personal wealth.[3] This is an interesting contrast to fellow ADAPSO leader Bernie Goldstein's eventual discovery that it was the buying and selling of firms that he found most rewarding.[4] This, too, might reflect Crandall's beginnings as a computer center enthusiast keen to create working systems.

Comshare soon grew to use more than 20 of the SDS 940 computers, eventually building an international network and consolidating its data centers into one large operation in Ann Arbor (serving the US) and another large center in London (serving Europe). Eventually 45 percent of Comshare's sales came from outside the US.

Further tweaks and improvements to its operating system allowed each machine to host 24 simultaneous users. During the 1970s, time-sharing firms were still grappling with cutting-edge technology, and so were forced to be largely self-sufficient in terms of system software and even hardware maintenance. Once systems were working, they tended to stay in use for a long time. Some of the 940s were still in use well into the 1980s. Xerox brought up SDS in 1969 as its entry into the computer business, and Xerox's new Sigma series of machines became the backbone of Comshare's operations. These workhorses ran a new and better operating system, Commander II, developed from scratch by Comshare. The Sigma computers remained in use long after Xerox's withdrawal from the computer market, although Comshare did eventually shift most of its operations to IBM equipment as the major manufacturers began to produce commercial-grade hardware and (eventually) operating systems for time-sharing.

Photo courtesy of Charles Babbage Inst., Univ. of Minnesota, Minneapolis

Rick Crandall speaking at an ADAPSO meeting.

Involvement in ADAPSO

Crandall served as a board member of ADAPSO from 1970 onward. He was an active and founding member of the Computer Timesharing Services Association, led by Thomas J. O'Rourke, head of Comshare's former collaborator, Tymshare. In 1969, this group merged with ADAPSO to become its first section. As well as a chance to address the political and regulatory issues threatening the survival of his young industry, Crandall found opportunities for "networking, really getting to know a broader base of people."[3]

Crandall proved himself to be among the smartest of the software industry pioneers, and of all ADAPSO's leading figures he had the deepest intellectual engagement in the strategic direction of the industry. The analytical and argumentative abilities that might, had his career gone differently, have been channeled into seminars and theorems, were instead applied to figuring out the dynamics and future direction of computer businesses. From 1977 onward his role as strategist was formalized with the establishment of the Long-Range Planning board-level committee, which he chaired through several reorganizations until 1990. From 1984 onward, the committee was given special board-level status as the Long-Range Planning Board Committee.

Crandall's committee produced a series of long-term planning reports, each of which documented opportunities and challenges for the association based on predictions for the future structure of the computer industry. The reports dealt with many of the key issues of concern to ADAPSO, including competition from IBM and unfair competition from groups such as accounting firms, banks, and telecommunications companies. They also ranked and set goals, such as the fourth-ranked goal in 1985: "Trade secret and copyright protection will be adequately afforded to software; loss due to software piracy will be reduced to under 10 percent of industry revenue."[5]

The Long-Range Plan and the deliberations leading up to its review each year were, according to Crandall, the strongest influences keeping the constituency of ADAPSO focused on software and services for more than a decade, despite constant financial pressures to broaden the membership to include higher dues-paying prospects such as the regional Bell firms and the hardware companies. Crandall argued strongly all through the 1980s that to broaden the membership would hopelessly diffuse the focus of the organization and prevent it from taking strong positions on any matters of substance.[6]

ADAPSO's limited resources, and increasingly disparate membership, coupled with the magnitude of the challenges facing it, would make these attempts at planning a thankless task. A 1988 evaluation of ADAPSO by the American Society of Association Executives noted that its goals could not be mapped directly to practical, measurable processes so that "in its current form, the long range plan would be impossible to implement, and even when supplemented with the plan revisions, and a marketing plan, there are inadequate strategies and specific responsibilities to support implementation."[7]

Crandall's other key contribution was to the association's Image Committee, which he chaired from 1979 to 1981. The area of public relations and image shaping was perceived as vitally important by the association's leaders during the late 1970s and 1980s. From 1982, "image" was one of four areas into which committees were grouped, and received its own functional vice president, with a seat on the association's board, to coordinate relevant committees and programs. Image meant not just the image of ADAPSO itself but also of the industries of which its members were part. This was not a new concern. Back in 1963 a committee "working on our Public Image (Misconceptions)" had been set up, only to have its plan to publish a corrective booklet withdrawn three years later when "those charged with its creation reported the project to be impracticable."[8]

By the late 1970s, however, ADAPSO was ready to address the topic more seriously. In 1978 Crandall was elected ADAPSO president and with John Imlay of Management Sciences America, who would serve after him, decided to "do a two-year, back-to-back assault on the major business publications in an attempt to convince them that our industry was worth independent and continuous coverage."[9] Prior to that, computer software and services firms had been discussed in the specialist data processing press, but not in publications aimed at senior and nonspecialist managers. The program involved regular visits by Crandall and Imlay to publications such as *Business Week*, *Fortune*, and the *New York Times*. Their objectives included getting financial analysts to view software and services as a business separate from computer hardware, and publicizing the scope and success of the industry. Crandall also worked with specialist computer industry analysts, such as IDC and Input, to establish common definitions and descriptions for the industry.

The most important early result was a September 1980 *Business Week* cover story on the software industry, which Crandall believes "really opened up the IPO opportunity for software companies" and led to a flood of follow-on articles in different places.[3] Software firms distributed many thousands of copies of the article to potential customers.

The next year, ADAPSO published the first of what became a series of special advertising sections in major publications to promote the industry. The image program also targeted financial analysts and Wall Street firms to convince them to pay attention to software firms and to end a long drought in initial public offerings for software and service firms. Imlay led this effort, which involved conferences for financial analysts and the production of the *ADAPSO Update* newsletter, subtitled "a newsletter for the financial and business community."[10] Alfred R. Berkeley, a junior analyst at Alex, Brown—who would eventually rise to become head of the NASDAQ exchange—soon became an important ally in these efforts. By the early 1980s the software industry had become a Wall Street favorite.

Crandall was particularly active as a spokesman for issues concerning the time-sharing industry. In 1979, for example, he testified before the US House Subcommittee on Financial Institutions Supervision, Regulation, and Insurance after Citibank announced plans to start offering discounted time-sharing services to its customers. In 1981, he testified before the US House Subcommittee on Government Information and Individual Rights to demand that the US impose reciprocal trade barriers on countries refusing to open their computer services markets to American firms. Discussing the difficulties that time-sharing firms were experiencing abroad, he mentioned limits on ownership of local subsidiaries, refusal to supply telecommunication lines, deliberately onerous regulations, and restrictions on network operations.[11] His objective was to make Congress take these subtler, nontariff barriers as seriously as the traditional duties and quotas placed on manufactured goods.

Comshare and software

By the start of the 1980s, the traditional time-sharing business was under grave threat. With the standardization of operating systems and the growing power of minicomputers, many of Comshare's customers had found it tempting to install their own systems rather than rent time from an external computer center. Crandall remembers that "They loved our software but wanted to run it in-house, not as a service."[3] With the introduction of DEC's enormously successful VAX and the new proliferation of desktop computers for interactive calculations and analysis, the trend seemed set to continue. Tymshare, its old rival, had been acquired by McDonnell Douglas, primarily for the packet-switched network it had built.

For Crandall, the answer was to shift Comshare away from the dwindling market for time-sharing and into the rapidly expanding market for packaged software. Obvious as this move might seem in retrospect, the two businesses were quite different, and Comshare was the only time-sharing firm to remain independent while successfully reinventing itself in this

way. Crandall's role as ADAPSO's main strategic thinker helped his firm enormously here, immersing him in the issues faced by the industry as a whole. More than this, he admits that only through the personal ties forged through the association, particularly with Imlay, could he have hoped to learn the fundamentals and the business model of the software products business quickly enough to make the transition.[3] Speaking in 1987, Crandall said that he

> couldn't see how to make a profit because I didn't know about add-ons, maintenance fees, multiple copy opportunities and unbundled professional services charges … I learned these fundamentals at ADAPSO. At meetings, in the bar, at dinners—anywhere I could corner a CEO of an established software company I did. … Without ADAPSO, Comshare would have started the process too late, or not at all.[9]

The decision to switch to software was endorsed by a Comshare management meeting, which Crandall recalls being held held during a canoe trip in Ohio in early 1979. In practical terms, the initial challenge was to create versions of its software that could work on standard IBM operating systems and hardware. Its first product, System W, was launched in 1982 and offered to time-sharing customers and for purchase. It was part of a new category of software called *decision support systems*, or DSS. These were supposed to combine advanced modeling and analytical capabilities with large volumes of data, realizing an idea widely promoted but rarely achieved since the first flurry of enthusiasm for management information systems back in the early 1960s. For some time, Comshare had been offering a system called Financial Control Systems as an online service, providing interactive financial modeling and reporting. System W packaged these capabilities for the IBM platform and added a specialized database, sold as Datman to generalize the kinds of multidimensional consolidation and tabulation of data needed to support marketing and decision-making tasks. For Comshare, the amorphous and disputed term decision support system came to mean "financial modeling integrated with data management … with analytical tools on top."[9]

Crandall seized on a new IBM initiative, announced in 1982, for the firm to partner with independent software companies to promote and jointly sell selected products. Many ADAPSO members were skeptical of IBM's motivations or its commitment to the idea, but Comshare had nothing to lose in the packaged software field.[12] In January 1984, it signed the first of these agreements with IBM. This won considerable publicity, and Comshare instantly established a reputation as a software firm.

Comshare was also a pioneer in integrating personal computers, which offered cheap and interactive computing power, with powerful mainframe systems for maintaining large stores of data. This approach, then known as distributed processing, was much discussed in the mid-1980s but almost never realized in practice. The PC version of System W was upwards compatible with and communicated with the mainframe version, and provided the same analysis capabilities. Despite the fashionable idea that top executives would use computers personally, rather than leaving them to staff analysts, Crandall recognized that "the way the DOS PC interface was designed, executives weren't going to touch it with a ten-foot pole."[3]

A visit to Xerox PARC had impressed Crandall with the power of the graphical user interface, and in 1984 Comshare launched Commander EIS (Executive Information System) in an attempt to overcome this problem. Commander EIS coupled a graphical menu system for reporting and analysis, running on a PC with a touch screen display, with a mainframe-based server to store and crunch the data. Comshare sold this product "directly to senior executives at major corporations" who, impressed by a demonstration, "just mowed over IT and said, 'I don't care what you say, I want it.'"[9] Commander EIS sold to many of America's largest corporations, and eventually supported DOS, OS/2, and Macintosh clients. Using these clients as a foothold in executive offices, Comshare added additional capabilities such as access to live data from Dow Jones.

In 1994, Crandall stepped down from his role as CEO of Comshare. He remembers this as the culmination of a growing feeling of tiredness with the stresses and constant upheavals and transitions of running a technology company. He still loved the industry, but wanted to experience it from a different perspective.

In an odd tribute to the power of historical reflection, Crandall says that this feeling crystallized two years earlier when Walter Bauer, then co-chair of the Charles Babbage Foundation, called him with a reminder that he was the longest serving CEO in the software industry. Rather than considering that as the compliment intended, he found that it motivated a rethinking of his career and role in the industry. He recalls politely declining offers of "psychological and psychiatric assistance" from the board to help him deal with this "mid-life crisis."

Background of Rick Crandall

Born 20 July 1943, New York City. **Education**: University of Michigan: BS (electrical engineering), 1965; BS (mathematics), 1965; MSc (industrial engineering), 1966. **Professional experience**: Comshare: founder, president, CEO, 1966–1994; Aspen Partners: founding partner, 2000–present; Enterprise Software Roundtable: founder, chairman, 2000–present; Arbor Venture Partners I & II: founding partner and strategic advisor; Giga Information Group: chairman, 2002–2003. **Board memberships**: Beacon Information Technology (Japan), 1996–present; Diebold, 1997–present; Pelstar, 2001–present; Tacit Knowledge Systems, 1998–present; BISNet, Inc., Current; ADAPSO Foundation, 1984–1990. **Honors and awards**: Outstanding Entrepreneur Award of the University of Michigan Business School and Harvard Business School Alumni, 1992. Named "One of the Five Leading Pioneers of the Software and Service Industry" by *ICP Business Software Review*, 1986.

He remained as nonexecutive chairman until 1997, and retained his seat on the board until Comshare was sold to GEAC in 2003, putting an end to its independent existence. Comshare had retained its focus on interactive financial analysis and decision support tools, an area boosted by the popularity of data warehousing projects. The deep recession in IT spending from 2000 onward had hurt Comshare, which had reported a substantial loss the previous year. It fetched $52 million in cash, a small multiple of its $42 million in annual revenues.

After Comshare

By the time Crandall left Comshare he had long since cut his ties to ADAPSO. His own ideas about the strategic direction and future of the association had increasingly diverged from its actual course. During the mid-1980s he had strongly favored a proposed merger of ADAPSO with the Information Industry Association, a group of firms such as Dow Jones and the Institute for Scientific Information involved in distributing data electronically. Crandall believed that the computer services and electronic content industries had many more similarities than with hardware and telecommunications, and the Information Industry Association could be accommodated within ADAPSO alongside software and services companies "representing various forms of 'content'."[3] Instead, the ADAPSO board decided to expand in other directions, reflected in the eventual renaming of the association as the Information Technology Association of America (ITAA).

Other participants recall the Information Industry Association merger as having been undermined by disagreement on the board composition of the merged society, a perennial issue for ADAPSO with its federal structure.[13] Crandall remembers being worried that "you're not going to be able to come up with any objective that you'll get everybody to agree on and that means that we'll turn into a nothing organization." By the end of the 1980s he found himself decisively outvoted, and after writing "some vitriolic memos to the board" he resigned in 1990 as chair of the Strategic Planning committee. Shortly afterwards he left the association.

In 1994, Crandall started his own informal group, the Enterprise Software Roundtable. This biannual gathering of 36 leaders of the largest enterprise software firms began when Crandall was asked for advice on revitalizing ITAA, and assembled the group to consult with leaders of the large companies in his trade about what they might require of a trade association. According to Crandall, the executives then decided that they needed a more intimate forum of their own, the management of which he found "a great way to stay connected with the industry" after giving up his own position as CEO of Comshare.[3] While ITAA now focuses on policy research and advocacy, Crandall's roundtable provides an environment for networking and open discussions on customer issues and growth enablers among the leaders of software firms similar to the environment that ADAPSO's sections had back in the 1970s.

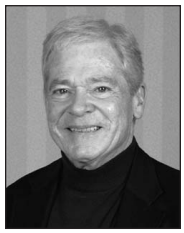
Crandall remains active in other venues, and currently serves as the software industry advisor to the US Chamber of Commerce—the software advisor to Bryant Park Capital, a boutique investment bank focused on mid-market companies. In July 1998, he cofounded Arbor Partners, LLC, a classic venture capital firm focused on enterprise software product startups and early-stage companies. In 1995, Crandall assisted Gideon Gartner in forming and developing Giga Information Group, which grew to be one of the larger IT advisory firms. Crandall became chairman of Giga in 2002 until early 2003, when it was sold to Forrester Research.

According to Crandall, his model is "to invest personally and to receive equity for consultative work in strategy, CEO mentoring, marketing, partnering and financial strategies."[6] Crandall's interest in the history of technology led him to write a series of books on the origins of the cash register industry (an important precursor of the computer industry) called *The Incorruptible Cashier*.[14]

References and notes

1. K. Flamm, *Creating the Computer: Government, Industry, and High Technology*, Brookings Institution, 1988.
2. S. Levy, *Hackers: The Heroes of the Digital Revolution*, Anchor Press/Doubleday, 1984. One aspect of the Berkeley system was described in L.P. Deutsch and B.W. Lampson, "An Online Editor," *Comm. ACM*, vol. 10, no. 12, Dec. 1967, pp. 793-799.
3. R.L. Crandall, oral history interview by Paul Ceruzzi, 3 May 2002, Charles Babbage Inst. (CBI).
4. T. Haigh, "Biography: Bernard (Bernie) Goldstein," *IEEE Annals of the History of Computing*, vol. 26, no. 1, Jan.–Mar. 2004, pp. 85-90.
5. See "ADAPSO Long-Range Plan, 1985–89," dated 26 Apr. 1985 with annotation "Final Approved Document" in ADAPSO Records (CBI 172), CBI. Hereafter this collection will be referred to as CBI 172.
6. R. Crandall, personal communication to the author, 17 Nov. 2003.
7. Am. Soc. of Assoc. Executives, "ASAE Evaluation Report for ADAPSO, The Computer Software and Services Association," 1988, ADAPSO Records (CBI 172), CBI.
8. Assoc. of Data Processing Service Organizations, board meeting minutes, 28 Oct. 1963, CBI 172, discusses its establishment. Assoc. of Data Processing Service Organizations, incoming board meeting minutes, 26 May 1966, CBI 172, discusses its abandonment.
9. R.L. Crandall, "ADAPSO: Past, Present, Future" (presented at ADAPSO: 25 Years of Leadership), 1986, ADAPSO Records (CBI 172), CBI. Imlay and John Maguire of Software A.G. were longtime chairs of committees in the Image area, continuing to serve into the late 1980s.
10. This description is taken from the masthead of *ADAPSO Update*, copies of which are preserved in the CBI 172 ADAPSO collection.
11. This testimony was given on 2 Apr. 1981. Crandall made similar points in R.L. Crandall, "Trade Barriers to Foreign Expansion by U.S. Computer Service Firms," presented at the Computer Law Association's Program on International Free Trade—The Computer Industry, 9 Oct. 1979, ADAPSO Records (CBI 172), CBI.
12. L. Johnson, "Industry Image," *ADAPSO Reunion Transcript, May 2–4, 2002*, iBusiness Press, 2003, pp. 237-254.
13. Ibid., pp. 77-97.
14. R.L. Crandall and S. Robins, *The Incorruptible Cashier: The Formation of an Industry, 1876–1890*, vol. 1, Vestal Press, 1988, and R.L. Crandall and S. Robins, *The Incorruptible Cashier: The Brass Era, 1888–1915*, vol. 2., Vestal Press, 1996.

Larry A. Welke



Although Larry Welke never ran a service bureau, shipped a software package, or established a time-sharing firm, he is remembered by his ADAPSO colleagues as the key figure behind its successful expansion into the software field. His own business, International Computer Programs, was the first producer of trade publications devoted to software, making him an important promoter of the early independent software industry.

Career in data processing

Welke's early background was typical of many software industry pioneers. His first exposure to data processing came around 1955, when he began to work on a punched card system for job control as a young General Electric management trainee. As a punched card user he developed a close relationship with the IBM account representative. In the 1950s it was not uncommon for IBM salesmen to act as unofficial job banks for the punched card staff they came into contact with, but in this case Welke was hired away to IBM. At IBM he worked on systems analysis work for customer applications. He was trained to program the then new IBM 650 computer, which during the late 1950s became a common adjunct to conventional punched card machines. He remained at IBM for six years, shifting into a sales job in search of better pay. Welke's departure was prompted by his divorce, something which he believes would have crippled his career in the famously paternalistic IBM of the era.[1]

Fortunately, the computer industry of the early 1960s was booming. As an intelligent young man with (by the standards of the field) considerable experience, Welke did not find it hard to get another job. It took him a few years, however, to settle into something he was good at and enjoyed. A short spell at JC Penney trying to manage a large programming team to automate its new catalog business demonstrated to all concerned that his ability to both sell and perform a programming job did not translate into any knowledge of how to manage it. This was followed by an 18-month consulting assignment in Argentina, setting up a computerized record-keeping system for its state electrical company. Returning to data processing management, he created and grew a data processing operation for the Merchant's National Bank of Indianapolis. This time things went bet-

ter, and by 1968 he had risen to be a vice president as his department grew in size and stature.

International Computer Programs

In 1966, however, Welke had begun an entrepreneurial business of his own. In the mid-1960s, the market for application software products was something that many people talked about, but few knew how to do anything about. Welke recalls

> that the majority of firms that started say in 1967 and 1968 died before they saw 1970. Because it looked like a good concept but when you had to write it down on paper and try to make it work, it didn't work at all.[1]

His exposure to the concept came through participation in the American banking industry. As Welke recounted in an anecdote published in *Annals* discussing the origin and early days of International Computer Programs (ICP), an informal "swap room" at one of its meetings demonstrated a willingness to exchange applications programs within the banking industry.[2] Although the American Bankers Association decided to produce a catalog of available software (much as the scientific user group SHARE had done more than a decade earlier), Welke was not sure that this could succeed on a volunteer basis, and resolved to do better.

Welke's initial idea was to be a middleman in the software industry. Rather than publishing and selling software, he wanted his firm to sell a newsletter to data processing managers. The *ICP Software Directory* would list all the organizations with computer packages to sell. Initially its focus was limited to banks, but it soon broadened to include other industries, and even scientific and engineering products. The first issue was produced in 1967. (Computing pioneer Robert V. Head had devised a slightly different solution to the same perceived problem in the banking industry, by setting up a separate firm, Software Resources, to package and market, rather than just list, internally produced bank packages with a broader potential market.[3]) After a slow beginning, things picked up the next year, prompting Welke to quit his bank job and try making a living from publishing. However, few firms were actually buying application software in the 1960s. Subscriptions came primarily from firms researching the market in hopes of entering it. While ICP eked out a profit by running a seminar series in 1969, the recession of 1970 killed this business, too.

Welke sees the resistance to packaged software on the part of data processing managers as a combination of self-interested defense of the status quo with some quite sensible caution, given some real disasters afflicting early packaged software suppliers. He recalls that

> I used to go around and give presentations to the various professional organizations like Data Processing Management Association or Association of Computing Machinery and invariably at the end of the presentation somebody would raise his hand and say, why should I buy a software product because if I do, what the heck do I do with all my people? And I would say, fire them.[1]

Partly for this reason, it was much easier to market systems software such as library or sort routines than application software. System software would make in-house programmers more productive and bring "pretty clever technology" to them. Application software, on the other hand, was an automation of existing business systems that had always been designed and controlled within the firm. This threatened in-house programmers and analysts more fundamentally. In addition, systems software could be sold directly to data processing managers for consumption within the computer department. Application software, in contrast, had to be sold to the business staff involved with the tasks to be automated (payroll, savings account balancing, and the like) as well as to the computer staff who would be installing it.

What saved the firm was its shift to a fundamentally new model. The *ICP Software Directory* was sold to data processing managers and carried listings of software packages without charge to their suppliers. Welke created a new catalog, *The Skinny*, which worked more like the yellow pages: tens of thousands of copies were given away free to data processing managers (initially using the *Datamation* subscription list), while the cost of production was underwritten by charging for each listing. This model, in contrast, was a great success. Most software firms had done little or no advertising prior to this, and so *The Skinny* tapped into a latent demand for affordable, targeted advertising to their customers. Ads tended to be technical and fact heavy, listing technical specifications and features of the package. Data processing managers were still reluctant to purchase software, but this was no longer Welke's immediate problem, as long as the software suppliers still had enough money left to advertise.

The small population of software firms was also much easier to sell to than the much larger and more diffuse pool of potential software

buyers. This, he recollects, "simplified the business greatly, and gave us an opportunity to focus on a much smaller community of people."[1] It also gave Welke a long-term identification with, and interest in the continued health of, the software product suppliers:

> There were just a couple hundred people to begin with that were in the software product business. A couple of ICP people were assigned to do nothing other than read every magazine and newspaper that came out that had anything to do with technology and spot the company names that were new or different, that we had never heard of before and add them to our database. … We always knew who they were, where they were, and I could make a point of getting in front of them to tell our story of what we were doing and why they should get involved and all that sort of thing.[1]

Along with this went an increasingly close involvement with software producers. In the 1960s, the newly introduced term *software* was used to describe a variety of things, often according to the particular interests of the person doing the defining.[4] Welke favored an expansive definition of software, and hence a broad and inclusive vision of the software industry itself. In a 1980 *Datamation* article, he wrote that

> Software includes, but is not limited to, control programs, executive supervisors, teleprocessors and communications monitors, application programs, programming aids, languages, etc. I do not differentiate on the basis of delivery vehicle used: software could be delivered as a product, with or without large- or small-scale hardware, as a service through a time-sharing network, as one of the value-added components in a facilities management arrangement, etc.[5]

Founding the ADAPSO Software Section

Welke was a member of ADAPSO, having first made contact back in 1966 when he asked the association to allow inclusion of material from its own "Clearing House" software listings in his directory.[6] He recalls that the first ADAPSO meeting he attended, in 1967, included just 23 people and was more "a bunch of guys who got together" than a formal conference, despite the presence of Ross Perot as keynote speaker.[7] At this point, ADAPSO remained primarily an organization of service bureau operators. It welcomed the idea of improving its coverage of software, but found this hard to accomplish. Jerry Dreyer, its ambitious new executive director, publicly bemoaned this in a 1970 *Datamation* article, saying that

> The slowness in the development of our Software Section is particularly vexing to us. We have solicited this important segment of the computer services industry on numerous occasions, and the results, as of this writing, have been somewhat disappointing. I personally attribute the inadequate response to a surprising lack of cohesion and sophistication among too many of the software entrepreneurs, who seem to understand the mysteries of Wall Street better than the obvious merits of cooperation.[8]

In 1971, Welke organized a conference to launch a new and more formal ADAPSO Software Section, held in Denver on 21–22 October. The event yielded 26 founding members, and appointed Welke as the new section's first president.[9] Anticipating its success, ADAPSO president Bernie Goldstein told the ADAPSO board that the association "would now truly represent all the major aspects of the computer services industry and speak with a united voice." He commended Welke for his "extraordinary efforts" toward its establishment.[10] As Welke remembers this meeting,

> These people were all presidents or CEO's of their particular companies. They had never met their competitors. … They'd read about them in the press, they'd seen the advertisements. … That was a major breakthrough because they found out that their competitor didn't have two heads, wasn't ugly, that all the bad things that you always think about a competitor weren't true.[1]

Welke had also been in close touch with the Association of Independent Software Companies (AISC), the first trade group for software companies, some of which were supplying packaged software, but most of which were primarily contract programming firms. This was a small group, with less than 20 members at its peak. The group primarily served firms providing custom software and services under government contract. Its activities, few of which progressed terribly far, consisted of lobbying and proposed legal action and "education efforts" regarding allegedly anticompetitive developments. These included government reliance on various nonprofit software sources when a commercial software industry was now established (particularly the proposed conversion of the nonprofit System Development Corporation to a for-profit corporation), federal government efforts to impose contracts

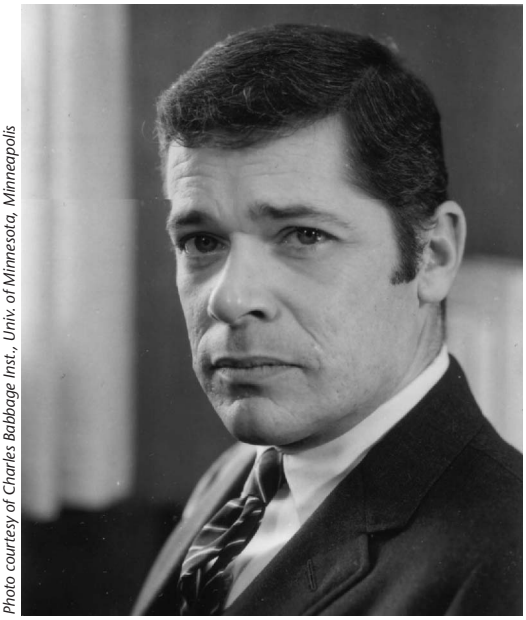


Photo courtesy of Charles Babbage Inst., Univ. of Minnesota, Minneapolis

Larry Welke circa 1970s.

severely limiting the levels and durations of software lease payments, and the bundling with hardware sales by computer manufacturers.[11]

The ADPASO board had been aware of AISC for some time. In 1970 its executive director, Jerry Dreyer, reported that he had met with the AISC board to discuss a merger "although there are some friendly voices in the group, it will continue to be a long battle to bring them into ADAPSO." He blamed this on the maligned influence of a former leader.[12] As the main point of contact between members of the two groups, it was natural for Welke to see the potential for affiliation between them. A larger, more effective group would be good for the software industry, and therefore good for ICP.

Welke led ADAPSO's diplomatic efforts with considerable success, working with ASIC on its main tangible activity, the lobbying of government officials responsible for procurement regulations. In February 1972, AISC president Wayne Shelton reported to its members that having attended a meeting of the ADPASO Software Section he "was generally impressed with the meeting itself and the organization" and noted that "many things have changed since our decision two years ago not to be the nucleus of the Software Section of ADAPSO."[13] A presentation by Welke to the AISC Executive Committee in April led to approval of the merger concept at a subsequent meeting in May and rapid ratification of the plan through a postal vote of the AISC membership.

With its October 1972 Annual Meeting, ADAPSO was formally rechartered as a federation of sections. Its Software Section was combined with the formerly independent AISC to produce a new section with around 35 members, known initially as ADAPSO/AISC.[14] Goldstein welcomed the merger as adding "decibels to the ADAPSO industry voice," and identified Welke and the former AISC president, Shelton, as instrumental in the merger. ADAPSO gained only eight immediate new members from this process (among them Automatic Data Research, the Planning Research Corporation, and Informatics Tisco), but the new organization was well positioned to become the main voice for independent suppliers of software packages and services.[15]

Other ADAPSO service

This close relationship worked well for ICP and for ADAPSO/AISC, or as it was soon renamed, the Software Industry Association (SIA). Welke himself called the association "integral with ICP's success."[16] This relationship took many forms. As part of a broader recruiting drive in 1973, Welke was formally tasked by the board to solicit software firms on a commission basis.[17]

His bigger contribution, however, came with the establishment of annual ICP Million-Dollar Awards ceremonies, held initially in conjunction with the main ADAPSO meetings. As Welke tells the story, he was inspired to create the awards after a financial analyst dismissed the software industry with the comment than no product had ever reached a million dollars in total sales. After realizing that many companies had, in fact, achieved this he decided to publicize the fact by awarding ceremonial plaques to each of the successful products. In 1974, there were three products (Cincom's Total, ADR's Autoflow II, and Informatics' Mark/IV) in the ten million dollar club, eleven in the two million dollar club, and sixteen in the million dollar club.[18] These ceremonies generated a great deal of pride and good feeling within the young industry, and were widely reported within the broader computer press to give a trickle of credibility to successful software firms. They also "generated advertising, revenue, and clients for ICP."[1]

During the 1970s and 1980s Welke served ADAPSO in a number of formal positions, including a two-decade tenure as a board member of its software section, and two separate terms as section chair. Within ADAPSO he spent a five-year spell as Contracts Committee chair, and also served terms as Political Action Committee chair and Program chair. In 1989, he served as ADAPSO vice chair, and in 1990 as chair (as the president was by then known).

Welke's natural flamboyance and sociability

served him well within ADAPSO. Colleagues remember his fondness for pranks, and for lavish showmanship. For many years, for example, Welke would bring the ICP hot air balloon with him to events, offering rides to his colleagues. His knack for self promotion meshed with the industry's need for visibility. Welke himself attributes his business success to his love of talking. Having been "born with a crooked arm," during his childhood he wanted to avoid getting into too many losing fights without running away. He learned that "if I made them laugh, they would be friends, you know, or they would look more kindly on me despite the fact that I was pretty much of an ugly, little crippled kid."[1]

His unique position, as a member of the inner circle of ADAPSO's Software Section who was not himself in the software business, made Welke a key focal point for the group. Indeed, he was given a special exemption to serve as a full member of ADAPSO despite running a business otherwise eligible only for associate membership. His interest was primarily in the fortunes of the industry as a whole, rather than in any one software firm. He also knew that firms would be much more successful in building their businesses if customers could have some confidence in the soundness of the whole software product concept. The issues involved were not mere trivial ones of presentation and marketing, but were crucial to the creation of the software package as a viable product, and so of the packaged software industry as a viable business.

As Welke recalled recently:

> In the 1960s, the most basic legal and commercial issues lacked clear definition. 'If I write a program for you and you pay me for it, who owns the program? Do you or do I? Or can I write the program and let you use it but I retain the ownership of the thing.' Well nobody had raised the question before. How do you price something like that? Better than that, how do you price it the second time you sell it, and the third time and on and on. How do you maintain it? Do you charge for that? Is that customizing? Is that per hour? That whole set of business disciplines was something that no one had done before and consequently it was really pioneer work on the part of anybody that was doing it.[1]

Maturity and decline of ICP

In the mid-1970s, the advertising-supported *Skinny* was becoming unmanageably large, and so Welke broke it apart to form a number of more targeted publications, each with the same basic model. ICP finished up with five publications, four of which covered software products of all kinds aimed at a specific industry. For example, one covered banking, and another insurance. (The fifth covered the cross-industry function of accounting and administration.) As the software market diversified, these publications listed minicomputer software alongside mainframe offerings. Each offered a lower advertising rate and a smaller, more targeted population. Collectively, however, they provided more revenue and better coverage.

Another new publication, *Bottomline Magazine*, proved ahead of its time. The idea was to provide a computer technology magazine for senior management, focusing on the business benefits of computer technology rather than on the technical and product details that filled magazines intended for data processing staff. This was a bold move, in many ways anticipating the CIO movement of the late 1980s and early 1990s with its push for top executives to recognize the business importance of information technology. Unfortunately, Welke "lost a ton of money on it"[1] and the project was rapidly abandoned. On seeing that it concerned computers,

> the CEO who received the magazine never even opened it, just automatically routed it down to the DP manager anyhow. So we were sending it to what we thought was the right audience but they didn't look at themselves as the audience.[1]

While data processing managers were happy to return the cards to request a new issue and confirm their credentials as recipients, this was not the audience Welke had promised to advertisers. (Even today, nobody has succeeded in this task. A similar fate recently befell the snappily written *Darwin Magazine*, launched by the publishers of *CIO Magazine* to explain corporate technology issues to top managers.)

ICP continued to diversify and shuffle its portfolio of publications. By 1981 it published six "Interface" publications, the *ICP Directory* (now covering services as well as products) and the *ICP Insider's Letter* (a successor to an earlier ICP software newsletter). In the mid-1980s, it added a version of the directory for microcomputer software. At this point, Welke was talking up ICP as a model company for Toffler's "third wave" environment, where "We have a lot of people who are very creative … who are given an area where they can get problems they can solve.… You find that in that environment they work harder than ever."[19] This was, as Welke himself admitted, a management philosophy taken from the high-margin software industry in which a handful of creative individuals were seen as the key corporate assets.[19]

Background of Larry Welke

Born 7 July 1931. **Education**: Marquette University, BA (economics), 1954. **Positions held**: General Electric: management trainee, 1954–1956; IBM: Data Processing Division, systems analyst, DP sales, 1956–1962; JC Penney: manager, systems and programming, 1962–1963; Middle West Utilities: computer consultant (in Argentina), 1963–1964; Merchants National Bank: vice president, Customer Data Services, 1964–1968; International Computer Products, president, 1966–1996; info-partners international, president, 1997–2003; iBusiness Press, president, 2002–present.

Unfortunately for ICP, the very growth and mainstream acceptance of the software product industry encouraged by ADAPSO soon changed the dynamics of the computer publishing industry, putting a premium on more mundane kinds of managerial expertise. During the 1980s, larger and more tightly managed competitors such as Ziff-Davis and VNU moved into the markets for controlled circulation magazines and trade directories. As an increasingly large proportion of the overall computer industry, software firms received extensive coverage and advertised widely in the leading trade publications such as *Computerworld* and *Datamation*. The larger software firms, such as Oracle and Computer Associates, could now afford to advertise in general business publications. Meanwhile, ICP had put itself more squarely in the path of these competitors, by shifting the focus of the magazines toward editorial content rather than simple advertising and listing products. Welke blames this on his having "caved into the guy who was running the editorial content part of the business at the time." Editorial content began at around 15 percent of the magazines, and by his estimation finished up at around 45 or 50 percent. While this enhanced the appeal of the publications, it raised costs enormously since the magazines were now bigger and, more importantly, journalists and editors had to be paid.

By the late 1980s, ICP's trade publication business was dwindling away. Publication of the directories, more diversified than ever, continued into the 1990s in book form. CD-ROM versions were also produced. ICP was formally dismantled in 1996, since which time Welke has been a self-employed small businessman. His new firm was known as info-partners international, inc. It traded on his abilities as a speaker and sales consultant. Until 2000, it continued to offer the ICP database in online form. Welke's particular interest in recent years has been in the use of the Internet as a sales tool, something he wrote about in a book, *The End of Selling As We Know It*.[20] He recently returned to the publishing field with another small business, the iBusiness Press imprint.

With info-partners, Welke has specialized in working with regional IT associations, including tailored versions of his Million Dollar Awards program. As computer firms multiplied nationally, these regional associations had become an important forum for grassroots activity within the industry, especially as small firms began to feel marginalized within ADAPSO and other national organizations. Welke had been instrumental in the formation of CRITA, the Council of Regional Technology Associations, as an umbrella group for these organizations.[7] In 1990, he had helped to found the Indiana Software Association. This took off after several false starts. As Welke recalls, "In Indianapolis, I brought six guys together in 1985. It didn't work. We brought them together again in '86. It still didn't work. We did that until 1990 and, in the sixth year, we finally began expanding."[7] In many ways, these groups were a natural continuation of his early work with ADAPSO, at a time when the national software industry had been small enough to work with on an intimate and personal basis.

Acknowledgments

I would like to thank The Software History Center for a grant supporting this work, my wife Maria Haigh for contributions to the research, and the staff of the Charles Babbage Institute for making available the so-far unprocessed portions of their ADAPSO holdings.

References and notes

1. The information on Welke's career is from L. Welke, oral history interview by Thomas Haigh, 3 May 2002, OH 369, Charles Babbage Inst. (CBI). Information on Welke not otherwise cited is derived from this source.
2. L. Welke, "Founding the ICP Directories," *IEEE Annals of the History of Computing*, vol. 24, no. 1, Jan.–Mar. 2002, pp. 85-89.
3. R.V. Head, "The Travails of Software Resources," *IEEE Annals of the History of Computing*, vol. 24, no. 1, Jan.–Mar. 2002, pp. 82-85. Banking was an important early source of interest in software packages. Banks were federally regulated and so did pretty much the same things in the same way across the US. In addition, regulation also kept them artificially small, creating a large potential market and making in-house development proportionally more expensive.
4. T. Haigh, "Software in the 1960s as Concept, Service, and Product," *IEEE Annals of the History of Computing*, vol. 24, no. 1, Jan.–Mar. 2002, pp. 5-13.
5. L. Welke, "The Origins of Software," *Datamation*,

vol. 26, no. 12, Dec. 1980, pp. 127-130.
6. Assoc. of Data Processing Service Organizations, board meeting minutes, 12–13 Oct. 1966, ADAPSO Records (CBI 172), CBI. Hereafter, citations to this collection will be shortened to CBI 172.
7. L. Johnson, "ADAPSO Conferences Workshop," *ADAPSO Reunion Transcript, May 2–4, 2002*, iBusiness Press, 2003, pp. 77-97.
8. J.L. Dreyer, "The ADAPSO Story," *Datamation*, vol. 16, no. 3, Mar. 1970, pp. 55-58.
9. L. Welke, letter to members of the software industry, 1 Nov. 1971, Martin A. Goetz Papers (CBI 159), CBI.
10. Assoc. of Data Processing Service Organizations, minutes of meeting of the retiring board of directors, 20 Oct. 1971, CBI 172, CBI.
11. The characterization of AISC given here is based on various minutes, official documents, and correspondence found in Martin A. Goetz Papers (CBI 159), CBI. The foundation of AISC was reported in "Software Companies Organize," *Computerworld*, 1968 (clipping available in CBI 159). Its 11 founding members included Walter Bauer of Informatics and representatives of Applied Data Research, Auerbach Associates, Computer Applications International, Planning Research Corporation, and Computer Usage Corporation.
12. Assoc. of Data Processing Service Organizations, meeting of the board of directors minutes, 17 June 1970, CBI 172. The first presidents of AISC were William Wolf and Richard C. Jones.
13. W. Shelton, status report to AISC members, 22 Feb. 1972, Martin A. Goetz Papers (CBI 159), CBI.
14. The merger was reported in "ADAPSO/ASIC," *ADAPSO News* (CBI 172), vol. 2, no. 4, July–Aug. 1972, pp. 5. The figure of 35 members comes from "Software News," *ADAPSO News* (CBI 172), vol. 4, no. 2, Mar.–Apr. 1974, pp. 9-10.
15. Eight new members are reported as a result of the merger in Assoc. of Data Processing Service Organizations, minutes of meeting of ADAPSO board of directors, 21 June 1972, CBI 172, CBI.
16. L. Welke, "Founding the ICP Directories," *IEEE Annals of the History of Computing*, vol. 24, no. 1, 2002, p. 87.
17. Assoc. of Data Processing Service Organizations, minutes of meeting of ADAPSO board of directors, 1 Feb. 1973, CBI 172, CBI.
18. "Software News," *ADAPSO News* (CBI 172), vol. 4, no. 2, Mar.–Apr. 1974, pp. 9-10.
19. "Larry A. Welke," *ICP Interface*, special edition, 1981, pp. 34-42.
20. L.A. Welke, *The End of Selling As We Know It: An Executive's Guide to Customer Creation*, Authorhouse, 2001.

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