

CAMPBELL-KELLY, MARTIN, (2003) *From Airline Reservations to Sonic the Hedgehog – A History of the Software Industry*, The MIT Press Cambridge, Massachusetts. 372pp, notes, bibliography, index.

From Airline Reservations to Sonic the Hedgehog is a history of the software industry in the United States, down to 1995. It avoids technical details – there's little about software engineering and programming languages, for example, or developments in computer science – to focus on the economic and business accompaniments of technological change. And Campbell-Kelly is an academic historian, providing full references and a discussion of sources and avoiding hype or dramatisation. But *From Airline Reservations* is never heavy going: the less interesting tables can easily be skipped over, the references are out of the way as endnotes, and short, focused case studies make for compelling reading.

An introduction discusses industry statistics, other sources, and the restriction to the United States. The basic structure is then chronological and sectoral, with a three sector division into software contracting, corporate software products, and mass-market software products.

Two chapters cover software contracting. In the 1950s IBM's Technical Computing Bureau and SHARE user groups were important players and FORTRAN and COBOL were developed. The System Development Corporation, set up to produce software for the national defence network (SAGE) required thousands of programmers and became a kind of "programming university", while the SABRE airline reservations system was the most important civilian project. As well as large systems integrators there were small software contractors, some of which were to grow rapidly.

The 1960s saw consolidation, with an increasing need for marketing and project management skills as well as casualties from a computer "utility" fad (early Application Service Providers) and the computer stocks crash of 1970. New firms continually appeared, however, with high turnover. Coverage of software contracting stops there, with a closing comment that: "Software contracting remains the most popular way of participating in the software industry, programming services enterprises outnumbering software products firms by 2 or 3 to 1".

There are three chapters on the software products industry. The first covers its origins between 1965 and 1970, with extended case studies of two leading products: ADR's Autoflow (flow-charting) and Informatics' Mark IV (file management). The significance of IBM's 1969 unbundling of hardware and software is also treated at length.

Next comes a survey of software products through the 1970s. These were classified by supplier (computer manufacturers and independent vendors, with some turnkey vendors, software brokers, and time-sharing services) and by category. The latter included systems (database systems, IBM's CICS, Unix) industry-specific (banking, manufacturing), and cross-industry (accounting, office automation, CAD) software. Campbell-Kelly suggests that the increasingly fine classification of software was itself significant.

The period from 1980 to 1995 saw "the United States' lead in software products become seemingly invincible". This is illustrated with case studies of IBM (a manufacturer) and three big independent vendors: Computer Associates (a consolidator), Oracle (databases), and SAP (ERP software). One reason for the success of the latter, a German company, was that European companies lagged those in the United States and had not yet invested in company-specific software.

Then come three chapters on the personal computer software industry. The first covers the pioneer period from 1975 to 1983, beginning with the origins of the microcomputer and the "first mover" advantage in operating systems held by Digital Research and then Microsoft. Also covered are programming languages and VisiCalc and other productivity software packages. In production and distribution "there was almost no point of contact between the booming microcomputer software industry and [that] for corporate mainframes and minicomputers".

The second chapter continues the story down to 1995. Much of this involves Microsoft, of course, but the chapter title is "Not Only Microsoft" and Campbell-Kelly argues that it has received disproportionate attention. Topics covered include the IBM PC standard, Autodesk and AutoCAD, the race for a GUI, battles between Lotus 1-2-3 and Excel and between WordPerfect and Microsoft Word, Adobe, and others. Success in the PC software industry came not just from luck, but from exploitation, deliberate or not, of the economics of increasing returns.

A third chapter looks at home and recreational software, in particular at games (and game consoles), CD-ROM encyclopaedias, and personal finance software (Quicken versus Microsoft Money). Here Campbell-Kelly sees "a historical trend for software to become subordinate to the intellectual content or the complementary services offered".

Campbell-Kelly himself is British and there are occasional references to British and European companies, but the focus is on the United States. A final chapter looks at reasons for the success of the US software industry: an early start and market size, clustering effects, and government support for R&D.

On "political" issues, Campbell-Kelly takes a more positive view of Microsoft than some: "Microsoft's monopolies and abuses do not seem any worse than some of the others described in this book". He also ignores free software completely, which is perhaps reasonable given the end-point in 1995, though the GNU Project and its antecedents would have made an interesting topic – and hindsight suggests that the idea of free software was more significant than any specific product.

"From Airline Reservations to Sonic the Hedgehog" should command a wide audience: participants in the industry, both programmers and managers, students of economics and business, and the interested general public.

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