Personal Digital Services

The true and principal use of computers has never been understood by the computer industry. The computer is properly a tool, toy, and environment for individuals. In this it resembles the automobile. But the computer industry has overlooked its ultimate market for 30 years, from 1945 until 1975. It is as if the motor industry had produced trucks and buses for 20 years before it built its first car.

By the year 1980 there will be programmable computers in some 10 million American homes, and in another 10 years, substantially all. (I readily admit that some editors have considered these figures outlandish.) The present 10,000 or so computers now in American homes represent only an infinitesimal fraction of what is to come.

This of course means a revolutionary market and social change comparable to what happened with the telephone, radio, and television. By comparison, CB radio and digital watches, pocket calculators, and video games dwindle to the significance of the hula-hoop.

What are the uses of the home computer? What use isn't there? But delineating the principal markets is something else again.

The distinction between "personal" uses of the computer, and whatever other kinds there may be, is not a sharp one at all. Artistic and frivolous uses, leisure, and self-improvement come first to mind. But scientific and business applications come right behind: there are amateur scientists, and professional ones, who would like to work at home; many people have businesses in their homes, or would like to if the paperwork could be eliminated. Thus in principle there is no exact distinction between personal and nonprofit uses, and all the types of software that have evolved for other purposes will eventually turn up in homes.

Many things will fuzz the line between hobbyist or amateur use, on the one hand, and business and professional use on the other. A large proportion of personal, non-business use will be closely related to business use. For instance, a collector of stamps or antiques will need virtually the same software as a museum, or a dealer in such objects: keeping track of objects' descriptions, origins, price, time of acquisition, and so on. Services which are now unusual and innovative in industry will, as their prices drop and they become simple to use, become desirable for many home users. These include digital music synthesis and recording and, soon, computer-based motion-picture editing; later, perhaps digitized photographic archives and laboratory services.

But such applications will not be the center of use. I see the personal use of computers in four basic categories. First, of course, there are numerical uses, for personal figuring and bookkeeping, automatic accounting, tax preparation, financial projection, and the planning of financial resources. Second, there are information retrieval and track-keeping, the filing of whatever information the user wants to keep. This includes inventories and catalogs on the one hand, but in another direction can become a sort of "family Bible" of personal historical information. A third category is text and word processing, including correspondence, general writing, recipes, diaries, and "guest books." This may extend even to advanced systems of the Thinkertoy class, allowing the intercomparison of complex alternates that are being considered. (The advanced text systems of course merge with the retrieval function.) Finally, there are games. By this I mean games in the larger sense. Today's computer games, such as the many available in Basic, tend to be zero-sum competition or simple brain-teasers and explorations of certain complex events (like Lunar Lander and Kingdom). Though these can be worthwhile, tomorrow's games will do much more.

The home computer revolution will not happen all at once. We may distinguish several eras of the evolving personal market.

It is in the first era that we now find ourselves: a market of electronics hobbyists who want to assemble their own computers, and inexperienced persons fanatical enough to try because they want computers so much.

However, a second era, one entirely different from the first, will begin shortly. Complete and reliable machines will soon come on the market, complemented by prepared, easy-to-use software for a spectrum of users. (Several such machines are reputed to have arrived; the software has not.) Such complete turnkey packages will change the market emphasis from the present nuts-and-bolts "reality" of the computer to its software virtuality.

The new users will have little familiarity with hardware, or even with machine language, and they will program in high-level languages or not even program at all, being happy to use the new programs that come packaged. (As in many other cultures, the newcomers will be greeted with disdain and resentment by the old-timers who arrived six months before.)

Finally, the mass market era will arrive when computers and programs can be purchased as easily as cassette recorders and pre-recorded cassettes. Demand will abruptly rise into the millions.

Of course, the explosion of little computers will not mean the demise of the market for external or centralized services. Quite the contrary. There will be several reasons for offering personal services external to the owned machine, or in complement to it.

- Cost: particular hardware may cost too much.
- Other shortcomings: the hardware may be broken or otherwise unavailable.
- Networking: for many applications one user wants to be in touch with others.
- Social aspects: the user may want to be in the same room, say, with other game participants.
- Equipment multiplexing: it may not make sense to have what you only need part of the time, such as a large disk,
or tape, or printer. (The multiplex advantage has long been the excuse for timesharing, i.e., it supposedly did not "make sense" to have your own computer. This argument is still valid for other equipment and for some uses of timesharing.)

It is quite likely, indeed, that the personal computer market will expand both in purchased equipment and in ancillary services; the personal services to be offered will in many cases parallel, and in many cases extend, the software to be offered for small machines. (However, individuals will probably show a much greater reluctance to spend a computer dollar on evanescent services when it could go for permanent equipment.)

Corresponding to the three market eras, we will see a succession of user services offered. All are simultaneously viable and will eventually coexist.

In the first stage, we can expect to see simple services in place of equipment which individuals can't otherwise afford, e.g., printout and storage. We may expect users, for instance, to bring data cassettes to their local computer store, to have their correspondence printed, much as people bring film to be developed at the drugstore.

Those users who cannot afford mass storage devices should be able to dial up their local computer store and load a program into their own computers over the phone. Or, after finishing some sort of work — a data set, a piece of writing, or a graphical work of art — send it over the phone for storage to their local service.

Lastly, low-cost timesharing, offering restricted facilities and simple languages, should have a ready market for hobbyists — when the price comes down to reasonable levels, like two or three dollars an hour. Walk-in timesharing parlors will appear, with terminals amid tasteful decor. Particular timesharing services will be built around this market: for instance, programs sectioned to be downloaded rapidly from the central system, chain to one another, and accept data from the user.

The computer store, and later the timesharing parlor, will at first have something of the atmosphere of the old country store, with comrades chatting around the pot-bellied stove, though this will change as the population of users expands and becomes less exclusive.

In the second era, user services will begin to appear that have nothing to do with the usual ideas of the computer.

Scheduling systems of the PERT and Planalog type will become easy to use. Advanced Thinkertoy systems will become available.

Advanced games of real complexity having a certain social profundity, some with graphics, will become available. Two examples of such games are Diplomacy, by Allen B. Calhamer, and Dungeons and Dragons, by Gary Gygax and Associates. The former consists of complex non-zero-sum bargaining in an intense social context, largely simulating World War I. The latter is a system for imagined adventuring in an imaginary castle, with the referee as semi-opponent: a group of players, representing a band of explorers, wander through the castle according to the rules of the referee. Each player may do anything he wishes; when a crisis occurs, such as an encounter with a dragon, the player chooses his weapon and tells him the result. (While "D&D" has been implemented in a number of computerized forms, so far these have reduced it to a mechanistic game of exploration and conquest, without the intense social setting that gives the game its fire.)

In the third era, user services will proliferate and there will be a jungle of imitations. There will be considerable differentiation for users of different interests. There will be quiet timesharing parlors and noisy ones, cool sophisticated parlors and those with a more lively atmosphere. The close social interaction of the computer store and timesharing parlor will become more distant, as patrons and proprietors come to have less in common.

More sophisticated applications will spring up. Low-priced library systems will appear, allowing users to read, annotate, and anthropologize whatever they want from an ever-growing body of instantly available documents. Teleconferencing schemes will become widespread. Extremely sophisticated games will appear, but these should more properly be called "games, adventures, and simulations" — libraries of programs ranging from talking personoids, such as Eliza, to comic strips in which the reader may take an active part. We will see large-scale social and international simulations through which users may experiment with the world's destiny.

The exact consequences of all this are impossible to delineate right now. But some of us, at least, are motivated by the belief that these developments will contribute significantly to human understanding.

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