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The Silicon Valley license-plate holder that reads "He Who Has the Most Toys at the End of the Game Wins" centers this debate. For a country that still leads in science through federally funded academic research and has the most creative engineers, the future is bright because, according to George Gilder, startups like T.J. Rodgers's Cypress can form and prosper in various niches. Creative programmers (unlike authors) can even form large companies such as Lotus and Microsoft. These bring lots of toys for the few who founded them. In this respect, Mr. Rodgers is correct in agreeing with Mr. Gilder: small is beautiful.

But there's more to it than that. Software companies leverage much more hardware than they used to. Because hardware continues to look more like consumer electronics (like the recent laptop computers do), by 2001 most hardware will be built offshore by foreign-owned companies and distributed by old-line computer companies. Traditional U.S. computer companies continue to downsize, unable to either build creative

products or compete in the manufacturing-intense consumer electronics arena. In effect, large, non-U.S. companies will continue to accumulate the toys.

By using the book publishing example, Noyce points out the fallacy in Gilder's arguments. By analogy, publishing (in this case, hardware manufacturing) is going offshore and taking its toys with it. Old-line computer companies will distribute until K mart and Wal-Mart do it cheaper. The United States has a few authors with a few toys.

Noyce thinks that rebuilding the infrastructure will limit manufacturing decline—but without more national commitment, this may be futile. Gilder doesn't help by omitting from his book the story about how the three-year Japanese CMOS lead, resulting in patents and processes, came from a MITI-sponsored collaborative R&D program. The book also omits AT&T's and IBM's leading roles in semiconductors.

The Ray Kurzweil story, on the other hand, fits Gilder's pattern: entrepreneurial genius teams up with Stevie Wonder to create a revolutionary music synthesizer. Another view: the Kurzweil synthesizer was a one-shot, expensive, quick-to-market product play, enabled by relatively low-priced memory, with little technology or manufacturing ability. The company is for sale. Kurzweil got a few toys; everyone else lost them. Yamaha, not Baldwin or Hammond, dominates the musical instrument scene. Japan has the toys.

Gilder believes that "as software hardens into crystals of silicon, the balance of power shifts in America's favor." But:

□ Silicon manufacturers, not the pattern specifiers or their distributors, will accumulate the real toys because only producers create fundamental wealth. The rest just trade information (about design, which tends to become a commodity with time) or trade tokens for things.

□ Most software will continue to be "soft," will reside in foreign-produced memory, and will come from software authors in places like America, China, India, and Japan. It won't reside in hardware. A shift from

more complex computers to simple ones like the reduced instruction-set computer (RISC) indicates that more of the system is software.

□ Much of the transition from hardware to more complex hardware, or from hardware to software, is simply a low-level replacement of smaller "jelly bean" part assemblies that National Semiconductor and Texas Instruments used to supply (at higher prices). A few companies such as Chips and Technology build, design, and market these parts. Japanese semiconductor foundries are preferred because of their superior service and quality.

□ Products like Nintendo that are manufacturing-intense and consumer-oriented are not U.S. products, but they filter down from earlier low-volume and complex U.S. products or prototypes.

□ Leading-edge products require leading-edge silicon, much of which is Japanese. Intel's advanced processes go into a chip made only for the Intel/Microsoft canonical PC, often called the IBM PC or PC clone.

□ While the United States leads in computer-aided design of complex chips, this software is transferred simultaneously to designers everywhere. Based on my recent experience in building graphic supercomputers for technical users, including mechanical designers (those who design for manufacturing), Japanese users go for the leading-edge systems first.

The bottom line: entrepreneurs, especially Noyce and Rodgers, are great; startups are fun and are two or three times more productive than their large-company relatives—but often accumulate only a few toys. Lots of startups build product templates for large companies to copy. Some even become large enough themselves to create a positive balance of toy flow for the country. (This balance, however, is short-lived; large companies are increasingly downsizing, becoming distributors, and helping the toys leave the country.) Entrepreneurs still are no match for trained and committed foreign manufacturers. Noyce, who's played and won at all the games, understands this and is trying to help.