GLOBAL ELECTRONICS

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AN ALTERNATIVE APPROACH TO HIGH-TECH INDUSTRIAL POLICY IS NEEDED

The growing discussion in Washington over how to aid the development of an "American" television production industry, centered around high definition television (HDTV) technology, illustrates an important policy shift. In the early years of the Reagan Presidency, Republicans uniformly rejected proposals to promote U.S. competitiveness by targeting specific industries. They favored, as an alternative, tax incentives for investment and research. When, in early 1985, the presidential Commission on Industrial Competitiveness issued a report diverging from that point of view, its findings were ignored.

In 1987, dissatisfied by the Reagan team's inaction, the head of that commission—Hewlett-Packard president John Young—founded the bipartisan Council on Competitiveness, with participation from universities and labor as well as major companies. It appears that Young's Council has already forged a consensus that will guide both Congress and the Bush administration: the U.S. will systematically promote private sector efforts to compete internationally in key technologies.

Macroeconomic subsidies such as the R & D tax credit and capital gains tax reductions are still a keystone of high-tech industry's political agenda, but today industry associations and study groups are also building support for government-backed development or manufacturing consortia in a variety of important fields, such as superconductivity and biotechnology. Already the government supports Sematech, the Semiconductor Manufacturing Consortium, and the American Electronics Association is seeking $1.3 billion in grants and loan guarantees for its proposed HDTV venture.

Although some type of targeted industrial policy makes sense at this time, high-tech industry's facts are misleading, its analysis is faulty, and its approach is dangerous. Unfortunately, no national group exists to challenge either the analysis or proposals of high-tech companies. Consequently, the press has accepted industry's facts and analysis, and industry's proposals have received widespread support from across the political spectrum.

The central theme of the high-tech drive for Federal hand-outs is that we are now at war with EastAsia, in the form of economic combat with Japan. Japanese companies, they suggest, have taken over the chip industry, computer industry, and other bastions of advanced technology through collusion and other unfair practices. If Americans don't circle their wagons and arms themselves with magic weapons from Washington, we will slip quickly into peonage.

As we have pointed out in earlier issues of **Global Electronics**, Japan-based companies may be coming on strong, but the U.S.-based companies—IBM in particular—have a strong lead in the global high-tech market. Japan may lead in areas of manufacturing technology, but U.S. firms generally dominate circuit design and software technology.

Consequently, there is little need for the U.S. government to provide additional support for the design and software efforts of U.S. firms. (It would make sense, however, to reduce Pentagon efforts to direct computer science research into weapons development programs.)

The U.S. position in manufacturing, where there is genuine cause for concern, is clouded by the global organization of U.S.-based firms. Even before Japan became a player in high tech, U.S. firms that market high volume products, such as

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Our Schedule Slips Again

Long-time subscribers to **Global Electonics** have been through this more than once. We are behind schedule, so we are skipping the March and April, 1989 issues. Since subscriptions are based on the issue number, not the date, all subscribers will get what they've ordered.

semiconductors and personal computers, chose to carry out or subcontract abroad for substantial portions of their production.

Furthermore, there is as much, if not more cooperation between Japanese and American firms as there is competition. Joint ventures, technology-sharing agreements, and other strategic alliances are the norms, and they involve even the most stridently "patriotic" U.S. companies. In addition, major Japanese firms manufacture their products in the U.S.

Thus, there is little reason to believe that government programs aiding the development of electronics manufacturing technologies will help protect or create U.S. manufacturing jobs—at least in the form proposed by industry. In the case of HDTV, a new U.S.-owned venture could actually threaten the employment of the 30,000 Americans now employed in the domestic color television production industry. (See **Global Electronics** No. 91.)

Competitiveness is not an economic version of the Olympics, in which Americans can cheer at the market achievements of victorious U.S.-owned firms. We need a more conscious industrial policy because, in the present climate of global competition, our economy appears unable to generate the volume and quality of production jobs necessary to maintain our standard of living. We need to stimulate domestic economic activity to pay the taxes that build the infrastructure, sponsor the schools, and provide the services to make future economic growth possible.

The time is ripe for public involvement in shaping the direction of America's high-tech economy. In fact, a limited form of central planning may be inevitable. However, as long as the companies, their trade associations, and their political supporters are the only voices on these issues, the press will continue to parrot industry's line. Congress and the executive branch will fail to assure that the taxpayers who fund the programs will benefit.

There is a need for an organization to promote an alternative high-tech industrial policy. Those who independently study high-tech understand the industry, its needs, and its impact. But we currently have no policy voice. It is time to consciously raise questions in Washington and to reach out to organizations across the country that currently do not currently have an agenda for high tech. If we wait, then industry's proposals will be implemented with scarcely a protest.

CUTTING BACK ON C.F.C.'S

Scientists around the world now agree. The release of chlorofluorocarbons (CFC's) into the atmosphere is destroying the Earth's protective ozone layer. The governments of the major industrial powers agree as well. In 1988 they signed the Montreal protocol, committing to a dramatic long-term reduction in the production and sales of CFC. As scientific evidence accumulates, it is likely that CFC's will be eventually banned around the globe.

The electronics industry consumes 12% of the CFC market. it is not the largest consumer, but it may be the "dirtiest.". Electronics companies use CFC's to clean circuit boards, disk drive parts, and other components, letting the chemicals evaporate. Other major users—producers of cooling equipment and foam—do not directly release as much into the environment.

On Earth Day (April 22), 1989, hundreds of environmentalists marched on IBM's massive disk drive plant in San Jose, California. The plant is California's largest emitter of CFC's and probably the largest CFC consumer in the world electronics industry. **Electronics** (April, 1989) reports that IBM consumed 11 million pounds of CFC's in 1987, or nearly 12% of the electronics industry's global total. A company spokesperson said, "We are, without doubt, the biggest electronics users of CFC's in the world." The San Jose plant consumed about a quarter of IBM's total.

Faced with increasing costs for the chemical and potential cut-off of supplies, IBM and others are experimenting with conservation and recycling,

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"better late than never"

alternate cleaning and production methods, and alternate chemicals. A variety of chemical suppliers are offering non-CFC solvents to the electronics industry.

The move away from CFC's illustrates how quickly industry can move when it must, but finding safe and environmental sound alternatives for all CFC uses will not be easy.

To eliminate CFC's or any other group of chemicals from electronics production will take unprecedented cooperation—cooperation between competitors; cooperation between chemical suppliers, manufacturers of production equipment, and makers of end products; and cooperation among industry, regulatory agencies, and concerned members of the workforce and the public.

In fact, it makes more sense for government-backed technology consortia to focus on problems such as cleaning up high tech production than it does to promote international competition.

T.I.-ACER JOINT FAB

Texas Instruments and Acer, Inc, Taiwan's largest computer manufacturer, have announced plans to build a plant in on the island to fabricate wafers for dynamic random access memory (DRAM) chips. Acer will provide most of the money, and it will be guaranteed half the output. TI will provide manufacturing and design technology, plus a small amount of cash, for its 26 percent stake. TI also has a five-year option to raise its ownership to 51 percent. (**Dallas Morning News**, reprinted in **San Jose Mercury News**, May 12, 1989)

The factory is scheduled to produce wafers for either 1-megabit or 4-megabit DRAM's by 1991. The announcement did not say whether TI expected to use manufacturing techniques it acquires through Sematech, the U.S. government-funded semiconductor manufacturing consortium, at the Taiwan plant.

INTERNATIONAL PRINTERS

It is widely known that Japanese companies, such as Canon, provide the "engines" that drive the laser printers marketed by well known U.S. printer-makers such as Hewlett-Packard and Apple.

The global network of production is even more complicated, however. Silicon Valley-based National Semiconductor supplies Canon with all its embedded laser-printer processor chips—spin-offs from National's Series 32000 microprocessor line. And National assembles most of its chips in Southeast Asia. So, if you buy a LaserWriter or LaserJet, it really should say, "Made in lots of places." (**Electronics**, April, 1989)

"APPLIED" SCIENTOLOGY

Three former professional employees at Applied Materials, a Silicon Valley producer of semiconductor production equipment, have are charging the company with violating their religious civil rights, and they've taken their complaint to the federal Equal Employment Opportunity Commission (EEOC).

The three say that they were required, by their managers, to take "communications" courses taught by affiliates of the Church of Scientology. The seminars, reports the **San Jose Mercury News** (May 9, 1989) included techniques such as "staring into a co-worker's eyes without twitching, moving, or changing positions for hours at a time."

The **Mercury News** says the EEOC has receive a number of complaints about employers using "'New Age' techniques and training courses." It reports, "A ruling by the EEOC's legal department issued last September said that such courses may be discriminatory if they are 'explicitly based on religious beliefs.'"

That ruling offers hope for the three from Applied Materials, but it provides no institutional relief for workers forced to take non-religious "New Age" training courses.

Meanwhile, Applied Materials says its dropped the disputed seminars after receiving complaints from employees.

INDIAN SOFTWARE

India has a plentiful supply of English-speaking scientists and engineers, but its computer hardware industry has been held back by the country's limited resources and ill-timed protectionist measures. Still, India is regarded by many as a sleeping software giant, with its low-cost computer scientists and programmers exporting increasing volumes of computer code to the industrialized world.

Though small Indian ventures are capable of producing software, few have the financial resources or marketing reach to succeed internationally. The **Far Eastern Economic Review** (March 2, 1989) reports that India's software industry is dominated by two firms from the powerful Tata group and by the local affiliates of multi

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national financial and computer firms.

Foreign computer firms export software from India because government rules allow them to import computers in exchange, while banks, such as Citicorp, develop software in India because technical labor is cheap.

Captive software production, however, requires continuing contact with users or supervisors overseas. Sending personnel abroad is a partial solution, but **FEER** reports, "the best software writers tend not to return."

Writing and testing programs to run on a variety of computers also requires access to a number of up-to-date machines. However, advanced computer hardware is difficult (or expensive) to bring into India.

To overcome the isolation—both from associates and advanced hardware—of their Indian software labs, some foreign firms are establishing dedicated international data links. For example, Texas Instruments, which employs 70 Indian software engineers in Bangalore, transmits their output overseas via satellite. But TI's satellite transponder has much more capacity than the company can use, and unless it finds several other firms to share the cost, it will continue losing money on the operation.

DON'T BANK ON IT

Computers have changed the way America banks, from the back office to the front office to the streetside automatic teller machine, but home banking, in which retail banking customers link their own personal computers to the banks' data processing systems, has not lived up to the expectation of its promoters. **Business Week** (April 10, 1989) reports, "Only 36 banks offer the service, down from 70 several years ago, and 100,000 people subscribe to the programs, a tiny fraction of the 28 million households that have personal computers."

Essentially, the service has had a limited impact because customers don't want it. There are many reasons, only a few of which were identified by **Business Week**: Banks have priced the service to appeal only to affluent customers; software is generally not user-friendly; less intimidating (as well as less costly) alternatives, such as voice call-in, have proliferated; and Americans still like the feel of cold cash.

Some banks will keep pushing on-line banking, since a relatively small clientele of affluent home banking customers can provide substantial revenues. But home banking is unlikely to catch on as a stand-alone service. If Americans start using "videotex"—multi-service electronic information systems including electronic mail and on-line data bases, in large numbers—then many will experiment with home banking as part of the larger package.

Still, of the millions of people who have personal computers in their home, few use them to communicate over any kind of network. As the U.S. telecommunications network is rebuilt to accomodate data transmission with a minimum of additional investment by PC users, that number should increase.

But for the foreseeable future, the home users of on-line services will remain a small fraction of the population, and electronic bankers will attract only a fraction of that fraction.

Pacific Studies Center
222B View Street
Mountain View, CA
94041 - USA

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