Chapter 18

TV technology and government policy

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LESSONS FROM TECHNOLOGY PAST

In the 1960s, when color television was on the verge of becoming a reality, the United States failed to establish its technological system as the world standard. An unusual sequence of events changed what should have been a technical decision into one dominated by international politics and flawed American responses. What should have led to an American victory instead led to a defeat. America lost not only dominance of its technology as the single worldwide standard, but it also lost control of its domestic industry.[1]

Today, as discussions are again revolving around the future of television, the same issues are being rehashed in debate over whether the United States should develop an advanced television technology. It is *déjà vu*, except that this time the world players are much more sophisticated, the stakes are multi-fold greater, and the technologies involved are infinitely more complex.

Most important of all, the consequences of failing to succeed in establishing an advanced television technology extend far beyond the effect on the television industry. Impacts extend to broader areas of the economy and defense. US leadership in technology, as well as in future sales of American products and services in several industries, may shrivel.[2]

THE COLOR TV WAR

Following the Second World War, some thought that the United States aggravated its allies by flaunting its technological superiority, expecting Europeans submissively to adopt US technology. In *The American Challenge* (1967), Jean-Jacques Sérvan-Schreiber argued that unless European countries integrated their economies more effectively, Europe

would become a subsidiary of the United States.[3] For the French, economic and technological dependence upon the United States portended a threat to national survival and political independence. This led to a French policy during and since President de Gaulle to invest in large-scale technological developments meant to represent the glory and prestige and independence of France.

These projects have been heavily funded, and referred to as 'National Champions.' SECAM (Sequential with Memory) color television, the Concorde, the first tidal power plant, the largest solar energy furnace, Minitel – to cite just a few – have all been an outgrowth of the same policy.[4]

From failure to develop an indigenous computer industry, the French had learned that development of an industry depended upon owning patents, harnessing industrial capability to manufacture products, and invoking political, economic, and technical control to protect them. Protection of the industry was the key factor, and with SECAM, standards could be utilized as protectionist non-tariff barriers. Though based to a large extent on the American color television standard (NTSC – National Television Systems Committee), SECAM was French-owned.[5]

The SECAM patent offered the French all the requisite conditions to develop a domestic color television industry. The goal was to win international approval for SECAM as the European standard in order to obtain revenues from license and royalty rights, and create an export market for French manufactured goods and technical assistance. SECAM was marketed as technically superior, as the 'European versus American solution,' France as Europe's 'David' against America's 'Goliath.' NTSC was ridiculed as standing for 'never twice the same color,' and of 'horse and buggy' vintage.[6]

While the French were meticulously waging a political campaign to get their system adopted as the European standard, the American effort was plagued by adversarial government-industry relations over the alleged sensitivity of the video recording head (VTR), hindering the promotion and sale of the US technology.

The VTR export controversy which blocked RCA's ability to export the NTSC system, at first seemed to concern whether the VTRs could detect low-flying aircraft. However, documents that were later declassified showed that the primary objection had been based on a mistaken notion that the Department of Defense had funded the development of the VTRs.[7]

American companies were permitted to sell the system, but export restrictions were placed on the video recording head. Under such

conditions, what incentive was there for another nation to invest in only part of a system, and possibly not have recording capabilities? Indeed, this was perceived as further reason not to become dependent on US technology, lest it be wrested away. Eventually what happened was that the West Germans developed a third system, PAL (Phase Alternation by Line), incompatible with SECAM and NTSC, but heavily based on SECAM patents.

At the 1965 meeting of the CCIR in Vienna, which was held to determine a single worldwide standard, Europe could not agree on one standard. Though on the eve of the CCIR vote the US government reversed its position, permitting the sale of the NTSC system with the controversial VTR, the decision came too late. France had launched a bold strategy, making a surprise deal with the Russians, a strategy designed to guarantee an export market and prevent PAL from becoming the only European standard. It succeeded: The votes of the CCIR were split.

Ultimately three different systems (and their offshoots) divided the world along political and cultural alignments: France, the Francophone countries (mostly Third World, French-speaking), the Soviet Union, and the East European Bloc on one axis, adopted the SECAM system; West Germany allied with the rest of Western Europe opted for PAL; NTSC stayed in place in Canada, Mexico, Japan, and, of course, the United States.[8]

So, what should have been a technical decision – the choice of a single worldwide color television standard – became one dominated by international politics and inadequate American responses. What should have been a resounding victory for American interests, with a flagship technology, became an exercise in futility as US government interests undermined US corporate interests, and effectively destroyed the broader national interest.

Why is this important? The choice of an advanced television system presents the US government with the capability to rectify past mistakes, open new markets for US industry, and secure a technology base for the future, or follow a course which may be detrimental for the economy and national security.

ADVANCED TV AND THE ELECTRONICS REVOLUTION

The world is poised on the threshold of a dramatic revolution in electronics. What was too costly or impractical in the past will soon become inexpensive and feasible. Technologies will be available which may

radically alter industries dependent on or related to these developments. Like a food-chain, there is linkage between what is commonly known as advanced television and multiple other industries.[9]

ATV or advanced television, of which HDTV or high definition television is one form, is the focal point for a combination of these developments. Though consumer-oriented products such as TV sets will provide incredibly detailed images, the television aspects of the electronics are only a small part of the whole: it is crucial to envision the long-term and far-reaching implications of such technologies.

Traditional TV is a relatively 'dumb' medium: turn the knobs and select predetermined programs. New electronics could transform that traditional TV into an interactive central processing unit, with scope and potential for change limited only by the boundaries of our minds and wallets.[10] The software will enable people to use this unit for multiple purposes beyond mere entertainment. The new electronics which will constitute the guts of ATV will be unlike anything that is available today for they will contain more and more information on smaller and smaller elements. The forms will be flatter, the functions faster. In turn, the changes will have implications for other industries.

At stake is not just 'TV' but the very infrastructure of the economy, every industry dependent on or using the new electronics, every industry turning to 'smart' products. Pretty pictures may make great viewing, but it is the internal guts of the new technology that count – politically as well as economically.

There are divergent views associated with this issue. Some charge that the convergence of television and computers have one requirement: The signals must be digital, which means optimally they require a fiber optics network. So the argument is made, 'forget about HDTV, it's already outmoded,'[11] or that 'if HDTV were not a dog, industry would develop it,' meaning, of course, without any assistance from the government.[12] Others ask whether it makes any sense to spend vast sums of money on developing HDTV if the system will be changed in 10–15 years and a better system will emerge?[13] Still others protest whatever way the government chooses to allocate funds: There is always some more socially important cause.[14] Such critics have targeted efforts to buttress America's technological base as unworthy. Why bother to help industry?

There are many reasons to bother. Electronics today is evolving so rapidly, that failure to keep abreast with those developments make it impossible to move into the next generation: In some instances the next generation of technology is dependent on what already exists. That is, it

may not be possible to leapfrog ahead, particularly in advanced computers, without first using the existing technology to get there.

A mass market for a national video-equipment industry is essential to preserve a national technology base in defense electronics and a leading position in manufacturing for the information age.[15] Some counter that ATV might account for 'less than 5 percent of total US chip demand in the year 2000.'[16] But estimating the size of the market for ATV is so filled with shortcomings that such figures have little or no validity and should be regarded with utmost skepticism. The fact remains, that in order to build a viable ATV industry and all the other industries contingent on it, the US is going to need a massive and reliable supply of chips and electronic components.

It is necessary to bother about being in the ATV industry now as opposed to waiting for 10 or 15 years, to be in a competitive position, and to be advanced enough to manufacture for that next generation. Most important of all, there are products and services which will flow during that time which will have further benefits and lead to other new developments that otherwise might not be possible.

What critics would suggest is akin to saying that flying should have ended with the Wright Brothers, because better flying systems would emerge in time, leaving no need to bother with anything else until. . . space shuttles were invented, because these would be technologically superior. Would the development of the space shuttle have been possible without the generations of flying machines and experiences preceding its development? How can the benefits for world commerce created by the ability to commute great distances in short time periods be measured?

As for industry seeking government partnership, well, certain types of technologies are not 'dogs' but rather 'superstars,' whose value to the economy is vital, affecting the infrastructure of society, and whose development requires extraordinary research and development assistance. Hence the 'reluctance' to go it alone.

DEFINING THE MARKET POTENTIAL

ATV is more than just television receivers, studio equipment, and program development. In early efforts to capture the economic impacts, Larry Darby suggested that different markets have different growth rates. Projecting various scenarios over a twelve-year period *for just two product lines*, TV receivers and VCRs, his gross estimates were $70 to $150 billion.[17]

Engaging in estimating the potential market for certain product lines provides some 'hard data' to analyze. But it is essential to recognize some of the shortcomings of this approach: Many unanalyzed product lines may be more heavily affected in the future and may not be identified; processes and services which are likely to be affected are ignored, as well as the millions or billions of dollars these may generate or save through cost-reductions; future applications and spin-off industries are not factored into the equation.

Clearly there are industries used in manufacturing or producing for ATV (optics, glass, graphics, film, tape, VCRs, etc.) that will be affected. A short list must also include digital signal generation and transmission, data storage and processing (the importance of which many witnessed first-hand in the enhancement of photographs retrieved from Voyager II), digital interactive video, computers, software development, flat-screen and display technologies, microelectronics, semiconductors, and the like. A recent report from the National Telecommunications and Information Administration (NTIA) noted that:

> Despite this consumer-product orientation, the non-entertainment applications of ATV-related technologies outside the home are likely to be both substantial and quite diverse. . . . High resolution video imaging technologies are coming into increasing use in both the public and private sectors, including, for example, computer work stations, satellite photography, remote sensing and monitoring, command and control displays, surveillance and security, medical diagnostics, and numerous others.[18]

A Congressional Research Service study also found a diverse market for ATV-related applications in the defense industry:

> For its broad range of video applications in battle management, training and simulation, and intelligence analysis, DoD needs high-definition, low-cost, dynamic multimedia displays for presentation of motion video, real-time graphics, maps and photographs. Such technology is used in fighter airplane cockpits, command centers, training simulators, and analysis groups. . . .[19]

From publishing personal magazines to manufacturing design, the gamut of capabilities is almost endless; at present the many possibilities are a matter of conjecture. One might imagine the home of the future where the ATV set will be the entertainment center, produce daily personal newspapers and personalized television programs and

advertisements, conduct all business interactions between the home and external locations, monitor the health and well-being of all residents – linking them with medical centers, respond to specific queries for purchasing items viewed in programs, and even superimpose those items in screens of pictures of one's home. Or, one might compare the situation with that of the space program, where the problem of feeding astronauts in space led to countless innovations in the development of the freeze-dried food industry and all the packaging and processing employed to create it.

And there is the view from abroad. How do others estimate the market potential?

STRATEGIC IMPORTANCE OF ATV TO OTHER NATIONS

Competitors overseas are already spending hundreds of millions of dollars on research. Recognizing the strategic importance of ATV to industrial, technological, and scientific survival, a European consortium of seventeen countries is investing over $200 million annually in joint government-industry HDTV ventures.

The European Consortium, known as EUREKA '95, is divided into ten project groups with project leaders neatly divided up between the participating countries and industry strengths, as listed in Table 18.1.

Table 18.1 Project groups and leaders in EUREKA '95

Project groups	*Leaders*
(1) Fundamentals picture and sound	CCETT
(2) Production – standards and conversion	THOMSON
(3) Studio equipment	BOSCH
(4) Transmission	IBA
(5) HD-MAC encoding/decoding	PHILIPS
(6) Display standard and up-conversions	BBC
(7) Receivers	THORN EM
(8) Carriers	PHILIPS
(9) Programme material	RAI
(10) Bit rate reduction	THOMSON

Perhaps the European position is best expressed in the publication, *The Road To High Definition TV*: '. . . EUREKA is Europe's Answer to Star Wars. . . .'[20] No laggards, the Japanese pioneered ATV research and have been honing their version of ATV (MUSE) for the past twenty years. Estimates of joint government–industry investment to date total $300-$700 million. Japan is clearly not looking at ATV simply as a replacement for an aging TV technology. Quoting a Japanese front-page editorial, Richard Elkus, Chairman of the Prometrix Corporation noted in testimony before the Subcommittee on Telecommunications and Finance of the House Committee on Energy and Commerce: 'One of the key commercial technologies of the 1990s will be High Definition Television (HDTV). . . . Manufacturers of the new equipment will be in a position to move into various broad areas of microelectronics and telecommunications. . . .'[21]

Europeans and Japanese are pouring resources into the development of ATV systems; they share the view that the technology is critical to the future, not just for consumer toys. Both have developed technologies aimed at the US market. As television systems, they operate on different standards, which at this time are not compatible. Programs broadcast on one system cannot be received on sets manufactured for another – for now. One of the lessons that history has taught us is that technology can rise to almost any challenge and make feasible the seemingly impossible.

Can the United States afford politically to become dependent on another nation's standard, another nation's technology? Should the United States, as the French did, view dependence on another nation's technology as a threat to independence and national survival? Are there political risks inherent in relying on another nation's technology?

THE POLITICAL DANGERS OF DEPENDENCE ON FOREIGN TECHNOLOGY

In a recent publication translated from Japanese as *The Japan That Can Say 'No': The New U.S.-Japan Relations*, Shintaro Ishihara discusses the ability of a technologically superior nation to influence the course of action of a technologically inferior nation, specifically, Japan's power to control the United States military through American dependency on Japanese technology and industrial production:

> In short, without using new-generation computer chips made in Japan, the U.S. Department of Defense cannot guarantee the

> precision of its nuclear weapons. If Japan told Washington it would no longer sell computer chips to the United States, the Pentagon would be totally helpless. Furthermore, the global military imbalance would be completely upset if Japan decided to sell its computer chips to the Soviet Union instead of the United States.[22]

While this may represent an extreme and questionable view, the author makes clear that when vital technologies are owned and controlled by foreign powers, nations dependent upon those technologies can become dependent upon the foreign powers controlling them:

> History shows that technology creates civilization and determines the scale and level of its economic and industrial development. Eastern Europe and the Soviet Union want state-of-the-art technology and financial aid to make them productive. What country can provide them? Only Japan.[23]

When a nation becomes dependent on another nation's technology, national independence is jeopardized. As a nation becomes dependent on another for vital technology, independence in other spheres – political, economic, and defense – is at risk. The balance of power shifts to the technologically superior nation. It is Jean-Jacques Sérvan-Schreiber's nightmare redux:[24]

> The United States does indeed have cause for concern, if not hysteria. The one megabyte chip used in computer memory banks . . . this vital component is made only in Japan. Japanese manufacturers almost completely control the market.[25]

In Japan, the relationship between government and industry is a partnership, where government benefits from taxes on business profits. Thus, if business does well, government does well. In the United States, that relationship is adversarial. As the American bail-out for Chrysler showed, that need not be the case. When the company did well, the government made a healthy return on its investment, and Chrysler made a healthy return to the market. Yet, the US is the only nation among advanced industrialized countries that does not have a Department of Industry responsible for industrial policy.

Is the development of a strong indigenous technological base the solution? Is this a question of investing in superstar technologies, of 'picking winners and losers,' or is there something more at stake?

SUPERTECHNOLOGIES AND THE CASE FOR GOVERNMENT ACTION

ATV can best be defined as a 'supertechnology,' a new generation of technologies which are exceptionally complex and which affect an economy's infrastructure. Supertechnologies profoundly alter multiple industries, and make them dependent on one another. Development requires extraordinary outlays of capital, investment on a scale beyond the financial scope of a single company. A supertechnology is perceived as so critical to the national interest that other governments will invest heavily in it; and its development will make industries using pre-existing technology obsolete or uncompetitive.

Though many in Congress and the Administration recognize the implications if the United States is not a world player in ATV, the impetus to assist US industry in getting a firm foothold has not materialized. Funds are in short supply. Politicians are fearful of being labeled 'Uncle Sugar,' and the issue is down-played as 'high-tech pork-barrel.'[26] Yet, according to Robert Cohen of the Economic Policy Institute:

> The U.S. could face an annual trade deficit of more than $225 billion in electronics and lose more than two million jobs a year by 2010 if it fails to develop strong HDTV (ATV) and flat-screen industries ... As a result of this trade deficit the U.S. would lose 792,000 jobs in these four (ATV receivers, VCRs, personal computers, and semi-conductors) closely linked industries.[27]

Efforts which would seek to establish government–industry cooperation are labeled 'industrial policy,' and by virtue of this rubric, considered anathema. Though the US government protects various economic sectors through price and other supports, there is a notion that the US government should not provide an equivalent type of support for ATV, as that provided by other governments. This focus clouds the critical issue: Should there be a policy to keep America technologically competitive, economically viable, and secure in its defense?

In the past, losing an industry usually meant losing just that industry, though ripple effects were felt elsewhere. As a wealthy, healthy nation, America could withstand the loss of an industry, when the rest of the economy was vigorous. But, over time, industry after industry has been lost, and as a result, the US industrial base has been severely weakened. Moreover, losing an industry based on a supertechnology means the effects may devastate multiple sectors of the economy. Without a

coordinated strategy there is no control over orchestrating such effects. Left to develop such technologies on their own, companies will likely concentrate on what is feasible and affordable and fits with corporate objectives. These are not necessarily national objectives. That is why it is essential to have a national strategy for supertechnologies and for ATV: Competitiveness must be assured not only in those industries threatened by other nations' actions – in trade, special aid, and the like – but in new fields, where emerging supertechnologies have an inordinate influence on the economy and standard of living, and on the future of the political system.

CONCLUSION

ATV is a supertechnology representing a unique opportunity to rebuild the US industrial base. The potential market for ATV-related industries appears huge. Foreign governments and industries regard it as strategic to their national interests, and this is reflected in the enormous resources committed to its development. In contrast, though it is as vital to America's future, political will is lacking to spark government-industry cooperation, and without it, industry alone may be unable to afford the costs of development, or may focus on specific corporate objectives, not national objectives.

What may be at risk is America's political independence, defense, and economic health. There is a trend developing which, if left unchecked, could turn the US into a subsidiary of other nations, technologically dependent and politically no longer the master of its own fate. Like the Meiji Restoration in Japan, where the privileged class of samurai gave up their power, cut their special hairstyles, and tossed out their swords, it would be a bloodless revolution.

NOTES

1 Rhonda J. Crane, 'Making America Competitive: High Definition TV,' *The Chicago Tribune*, October 3, 1988, Op-Ed, p. 13.
2 ibid.
3 Jean-Jacques Sérvan-Schreiber, *The American Challenge* (New York: Atheneum, 1968).
4 Nicholas Vichney, 'Les Nouvelles Cathedrales,' *Le Monde*, November 5, 6, 7, 1974.
5 Rhonda J. Crane. 'Communication Standards and the Politics of Protectionism,' *Telecommunications Policy* (December 1978), 2, 4, pp. 267–81.

6 Rhonda J. Crane, *The Politics of International Standards: France and the Color TV War* (Norwood, New Jersey: ABLEX, 1979).
7 ibid., pp. 62-70. It was an avoidable and costly mistake leading to the eventual loss of the color television industry.
8 ibid., pp. 72-7.
9 Rhonda J. Crane, 'Staying Competitive in TV's "New Age",' *TV Technology*, January 1989, Guest Editorial, p. 5.
10 ibid.
11 George Gilder, 'Forget HDTV, It's Already Outmoded,' *The New York Times*, May 29, 1989, F2.
12 ibid.
13 Stephen Effros, President of an independent cable operators association, quoted by Evelyn Richards, 'Doubting the Focus on HDTV,' *The Washington Post*, May 21, 1989, H1.
14 Langdon Winner, 'Who Needs HDTV?,' *Technology Review* (May-June 1989) 92, p. 20.
15 David Hack, 'High-Definition Television,' *CRS Review*, June 1989, p. 13.
16 Kenneth Flamm, quoted by Evelyn Richards, *op. cit.*
17 Larry Darby, 'Economic Potential of Advanced Television Products,' *Report to the National Telecommunications and Information Administration*, Department of Commerce, April 1988.
18 National Telecommunications and Information Administration, Department of Commerce, *Advanced Television, Related Technologies, and the National Interest*, March 1989, p. 6.
19 David Hack, Congressional Research Service, CRS Issue Brief, *High Definition Television*, May 25, 1989, Library of Congress.
20 *The Road To High Definition Television*, Booklet based on the status report, High Definition Television System, Eureka Project EU 95 HDTV, March 1987.
21 Richard Elkus, Chairman, Prometrix Corporation in testimony before the Subcommittee on Telecommunications and Finance of the House Committee on Energy and Commerce (Edward Markey, D-MA., Chairman) September 7, 1988, 'Advanced Television and the U.S. Electronics Industry.'
22 Shintaro Ishihara, *The Japan That Can Say No: The New U.S.-Japan Relations* (New York: Simon & Schuster, 1991), p. 21.
23 ibid., p. 105.
24 Rhonda J. Crane, 'Advanced Television: An American Challenge,' *The Boston Globe*, November 8, 1988, p. 46.
25 Ishihara, *op. cit.*, p. 22.
26 Peter Passell, 'The Uneasy Case for Subsidy of High Technology Efforts,' *The New York Times*, August 11, 1989. Also see Robert Samuelson, 'HDTV: High Tech Pork Barrel,' *Washington Post*, May 17, 1989.
27 Robert Cohen, 'The Consequences of Failing to Develop a Strong HDTV Industry in the U.S.,' *Briefing paper*, Economic Policy Institute.