Why Now? A Transatlantic Initiative in Information Technology

Michael Borrus
Stephen S. Cohen

Working paper 119

Michael Borrus and Stephen S. Cohen are Professors and Co-Directors of the Berkeley Roundtable on the International Economy at the University of California at Berkeley.

This paper was prepared for Partners or Competitors? The Prospects for U.S.-European Cooperation on Asian Trade, Richard Steinberg ed., BRIE, forthcoming, 1998.

Generous support for production of the BRIE Working Papers Series was provided by the Alfred P. Sloan Foundation.

Introduction

In Europe and in the US, policy at the sector level, especially trade policy, is strongly reflective of organized interests, with both producers and big, organized users--as distinct from consumers--typically playing major, often determinant, roles.[1] This traditional analytic perspective provides a good approach to understanding the recent demarche in US - European trade negotiations in information technology (IT). It also leads to anticipating a new basis for US -European trade relations in that giant and critical sector that extends from semi-conductors, through electronic devices such as computers and peripherals, software, and telecommunications equipment and services--the digitized information processing, storage and transmission sector that is the emblem of modern technology and, for the US, the largest and fastest growing industrial sector and trade category.

Propelling the breakthrough in trade negotiations is a major realignment of the coalitions that shape trade policy in information technology. The driving force for realignment is not to be found in any new transatlantic vision at the level of high policy, but in the competitive dynamics of the industrial segments that constitute the sector. Major changes in competitive dynamics have substantially altered the interests and the relative power of producers and users in both Europe and the US. Power has shifted towards the big users, banks and insurance companies, automobile, chemical and oil companies, even retailers. But equally important to trade outcomes, within substantial segments of Information Technology, changes in the organization of production and in the dynamics of competition have blurred the distinction between users and producers, creating a radical realignment of interests. These changes, as we shall see, originated and were first broadly diffused in the United States. Europeans are adapting to them quickly, but in a catch-up mode. It is the European adaptation to the new structures and dynamics in information technology markets that unblocked US-European trade relations in IT, and that in turn prompted the rest of the world to sign-on to the transatlantic initiative.

This paper analyzes the changes in competitive dynamics that have brought about this realignment. It is important to note at the outset that it would be quite wrong to project such realignments into other sectors such as autos, pharmaceuticals, aircraft or agricultural products, or even to assume that in a generation or two, forces in this sector will not reverse themselves

[1] The standard work on this is still Bauer, Poole and Dexter, American Business and Public Policy: the Politics of Foreign Trade, 1963.

and precipitate a different political alignment (and, in advanced electronics, a generation is closer to two, than twenty, years). But for the moment at least, in IT, an important source of traditional contentions between Europe and the US has been sent into hyper-space.

The most conspicuous outcome as well as the most significant evidence of realignment is the Information Technology Agreement (ITA), negotiated late in 1996 between Europe and the US and then quickly signed by Canada, Japan and then by most other electronics producing nations (eventually accounting for over 92% of global IT production).[2] India signed on a few months later and, on the occasion of President Jiang Zemin's October 1997 visit to the USA, China announced that it too would sign the ITA--but no specific timetable has yet to be established. The ITA radically speeds-up the elimination of tariffs on information technology goods. Under the terms of the agreement, the signatory countries are scheduled to eliminate tariffs on most information technology goods by the year 2000. In addition, the agreement defines procedures for the inclusion of new products and sets-out measures for the elimination of non-tariff barriers.[3]

How the ITA was negotiated is as important as its terms. In its essentials, the agreement was not negotiated in the traditional way where each nation offers to disarm a bit if the others will disarm a bit more. Once Europe and the US had a common position, the international negotiation process, rather than tit-for-tat bargaining, was closer to a rush to Sign On, as each nation set out to eliminate its own tariffs and protections. Europe was the key to the success of this initiative. It would be difficult to identify what Europe got in the way of traditional

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[2] See US Bureau of National Affairs, International Trade Reporter, Vol. 13, No. 49, 11 Dec. '96 p. 1923 and Vol. 14, No. 14, 2 April '97, p. 586, for a summary description of US - European leadership, a listing of signatories (2 April) and terms and scope of the agreement. For the text of the agreement see USTR or ITO web Pages: www.ustr. gov or www.wto.org .See also John Perry, "World Information Technology Pact Moves Closer," *Tech Wire,* August 3, 1997 for positions of industry leaders in US and Europe . Also Financial Times, 27 March 1997 and American Electronics Association, Europe Highlights, 2 Dec. 1996, N.Y. Times, 12/21/96,p. 38. The Ministerial Declaration on Trade in Information Technology Products (ITA) was signed on December 13, 1996 in Singapore by 28 governments at the conclusion of the first WTO Ministerial Conference. It provides for the elimination of customs duties and other charges on information technology products through equal annual reductions beginning on 1 July 1997 and concluding on 1 January 2000. The ITA covers five main categories of products: computers (including printers, scanners, monitors, hard-disks drives, power supplies, etc.), telecommunications products (including telephone sets, fax machines, modems, pagers, etc.), semiconductors (including chips and wafers), semiconductor manufacturing equipment, software (e.g. diskettes and CD-ROMs) and scientific instruments.

[3] World Trade Organization, Information Technology Agreement, "Schedule of Tariff Concessions," April 2, 1997; see also World Trade Organization, "Implementation of the Ministerial Declaration on Trade in Information Technology Products, April 2, 1997, pp. 1-2.

reciprocal concessions in exchange for dropping its still substantial tariffs.[4] The US had little in the way of tariffs or quotas or frustrating rules of origin at the time of signing and was not contemplating any[5]. One could argue that the most important thing that Europe got in exchange was an excuse to accelerate the removal of its own tariffs. Significantly, since the ITA was formalized in March 1997, the EU professed its willingness to accelerate the reduction of IT tariffs, including the acceleration of tariffs on semiconductors, with full elimination by 1999. Further, the EU is reportedly considering the unilateral elimination of these remaining semiconductor tariffs by January 1998--an additional year earlier than the EU's original accelerated schedule for phasing out these tariffs under the ITA.

So to understand the new US-Europe trade relationship in Information Technology, it is necessary to understand why Europe felt such a change to be both necessary and possible and why it reached such a conclusion and acted on it at that specific time. Part III of this paper provides details and assesses where continued US-Europe cooperation on information technology could be most productively focused.

II: Changes in the competitive dynamics and structures of IT

Information Technology is the archetype Globalized sector and transatlantic discourse and can be parsed for meaning only in a Transpacific, or Global, context. From the early 1970s through the late-1980s, integrated Japanese electronics producers were all conquering. In short order, they had completely taken over consumer electronics, and gained the lead in world market shares in semiconductor chips, materials and equipment. The prudent estimate from a mid eighties vantage was that they would extend their domination to office systems (e.g., copiers, faxes), customer telecommunications equipment, and take a widening lead in computers. So anxious were American policy-makers and industrialists (lead by IBM and the Defense

[4] A last minute rider, to include liquor (e.g., Cognac, Scotch Whiskey) was obviously meant for the Europeans and constitutes a nice homage to traditional trade negotiation practice. More significantly, Europe "got" a formal position in the revised US-Japan Semiconductor Agreement arrangements on the newly created Semiconductor Industry Council, --something that has bothered the Europeans since the Agreement was first signed in 1986. The new version, however, while enshrining Europe's place, goes a long way towards taking the bite out of the Agreement, eliminating Government's role in establishing quantitative import penetration measures. This is something the Japanese have long and seriously sought. On the STA see, US National Research Council, Conflict and Cooperation in National Competition for High Technology Industry, National Academy Press, 1996, pp. 133-141 and Kenneth Flamm, Mismanaged Trade, chapter. 4, Brookings Institution Press, 1996.

[5] See Communications Week International, n. 177, 20 Jan. 1977 for a complete list of existing tariffs for US and other signatory nations.

Department) that the Reagan Administration, for whom industrial policy was an anathema, intervened to support the American microelectronics industry.[6]

By 1994, US producers of semiconductors, and semiconductor production equipment had reclaimed the lead that they had lost to the Japanese and were loudly enjoying their return to dominance. US producers of office and telecommunication devices and systems had reasserted product and technical leadership, and American makers of computers, data communications equipment and software had left the Japanese behind in the dust. By contrast, with few exceptions, their once formidable Japanese competition appeared disorganized, dismayed, and decidedly on the defensive.

Before joining the Silicon Valley chorus of self congratulations and analyses of the Japanese majors as dinosaurs too slow for the fast moving, idea-intensive, permanently changing electronics markets of the future[7], it would be useful to analyze the competitive shifts that lie behind the startling reversals of fortune in electronics. Perhaps the starting place should be to call it a change of fortune in the *latest* round of competition, for it is not the last round. Japan's giants faltered in part because of the bursting of the domestic Japanese asset bubble, the attendant, enduring recession in the Japanese economy, and multiple *endaka* (dramatic yen appreciations). Japan's success in electronics had been driven to a considerable degree by rapid growth in the sheltered domestic market.

Rapid domestic growth generated: 1) the rising demand that permitted producers to reach greater and greater scale economies, 2) the launch market for several generations of consumer and office systems, 3) premium prices to subsidize price competition on foreign markets, 4) cheap capital for continuous reinvestment, and not least, 4) quality- and feature-conscious consumers who rewarded corporate strategies built on incremental product revisions.[8] Advantageous access to cheap capital--for the Japanese majors during the early eighties, the stuff

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[6] Government support took two major forms--direct financial support of $100 million per year to the industry's manufacturing technology consortium, Sematech--amounting to half of Sematech's annual budget--and negotiation of the US-Japan Semiconductor Trade Agreement (STA). For details see Michael Borrus, (1988) Competing for Control: America's Stake in Microelectronics. For a detailed analysis of the STA see Kenneth Flamm, op. cit, on the on government intervention in semiconductors see Stephen S. Cohen and Pei-Hsiung Chin "Market Tipping and Managed Competition in Strategic High-Technology Industries" Towards a New Global Framework for High-Technology Competition, 1997.

[7] This position is argued explicitly by industry consultant William F. Finan and his academic collaborator Jeffrey Frey in their *Nihon no Gijyutsu ga Abunai: Kenshõ, Haiteku Sangyõ no Suitai* [Japan's Crisis in Electronics: Failure of the Vision] (Tokyo: Nikkei Press, 1994). It seems to be echoed in the NASDAQ.

[8] For a full analysis, see Borrus, M. (1988) *Competing for Control: America's Stake in Microelectronics* Ballinger, Cambridge, MA

was essentially costless[9]--ended when the capital market was opened to the outside world, and when the asset bubble finally burst, and thus eliminated the ingenious ways the majors (and the government) had used the asset inflation to prolong the flow of very, very, cheap capital to the major industrial companies. The surprisingly enduring recession that followed the pricking of the bubble, and the collapse of assets, put an end, at least temporarily, to the domestic economy's ability to support firm strategies premised on rapid growth. Recession, plus international and internal pressures for opening the import-resistant Japanese distribution system, reduced the willingness of retailers to support the producer-controlled pricing structure.[10] This combination radically increased the vulnerability of Japanese firms to price competition abroad and even at home. And no new, killer consumer electronics product--something comparable to the VCR--has yet appeared, or seems likely soon to appear to bail out the situation. HDTV (High Definition Television) was the great hope, but thus far it has failed.

When the asset bubble finally burst, the increased cost of capital and prolonged recession that followed, put an end, at least temporarily, to the domestic economy's ability to support firm strategies premised on rapid growth.[11]

While these economic and market factors begin to explain why Japan's electronic giants faltered in the 1990s, they do not account for the resurgence of US market and technical leadership. Rather, a more complex set of changes in the structures and competitive dynamics in the IT sectors account for that. For purposes of expositional convenience, those changes can be herded under the three analytic headings elaborated next, Cross-national Production Networks (CPNs), User-driven Markets, and Wintelism.

CPNs and the growth of networked production

American producers took the lead in innovating, developing, and mastering networked forms of production which they evolved in a desperate effort to free themselves from a near fatal

[9] See George Hatsopoulos, "High Cost of Capital: Handicap to American Business," American Business Conference, April 1983; and The Congress of the United States Office of Technology Assessment, *Making Things Better: Competing in Manufacturing,* Washington D.C., Office of Government Printing, February, 1990, pp. 9-10.; and Robert McCauley and Steven A. Zimmer, "Explaining International Differences in the Cost of Capital," *Federal Reserve Bank of New York Quarterly Review,* summer 1989, pp.7-28.

[10] Uchida, I. (1994) "Restructuring of the Japanese Economy: The End of Keiretsu & Lifetime Employee System" presented at the BRIE/Asia Foundation Conference *Japanese Production Networks in Asia: International Production Strategies in a Rapidly Changing World,* San Francisco, CA, September 26-27, 1994

[11] For elaboration, see Michael Borrus, Left for Dead: Asian Production Networks and the Revival of US Electronics, in Naughton, op.cit.

dependency on the Japanese majors for technology, production know-how, and components, as well as a debilitating weakness in the relative cost and availability of their capital.

US firms reorganized production away from traditional vertical integration to network forms of organization--especially, cross-national production networks (CPN) centered in Asia.[12] By a firm's CPN we mean the organization, across national borders, of the relationships (intra- and increasingly inter-firm) through which the firm conducts research and development, product definition and design, procurement, manufacturing, distribution, and support services. As a first approximation, such networks comprise a lead firm, its subsidiaries and affiliates, its subcontractors and suppliers, its distribution channels and sources of value-added product or service features, its joint ventures, R&D alliances and other cooperative arrangements (like standards consortia). In contrast to traditional forms of corporate organization, such networks boost a proliferation of non-equity, non-arms-length, cross-border, inter-firm relationships in which significant value is added outside the lead firm and entire business functions may be outsourced.

During the last decade of deepening investment in Asia and relationship-building with indigenous firms there, US companies divided their value chain into finer and finer pieces. Those constituent elements were parceled out across national borders to highly specialized independent producers. Companies in Thailand and China assembled printed circuit boards, software was written in India's Bangalore or Puna, Malaysian and Philippine companies assembled components, and Taiwan and Korea specialized in higher value-added services and products such as digital design services and semiconductor memory.

The growth of the new CPN form had several major effects on the competitive dynamics in the sector. It rescued the Americans from the near fatal embrace of their Japanese suppliers/competitors by providing them with low cost, high speed, high quality alternative sources of supply available at much reduced demands on their scarce and costly capital. As a bonus, it generated intense competition, and therefore lower margins, for the integrated, full-line Japanese producers in consumer electronics, and commodified a growing range of more advanced products such as DRAMS, the profits from which had served to propel the Japanese majors ever more boldly into the remaining American strongholds. Increasingly it is

[12] Ibid. and Introduction to "Exploiters of Regionalization: The Asian Production Networks of U.S. Electronics Firm," in Michael Borrus, Dieter Ernst and Stephen Haggard, (eds.), Riches and Rivalry: Production Networks and the Industrial Integration in Asia, (forthcoming 1997).

disaggregating the organizational form of the major, integrated producers, beginning with the Americans, as well as shifting the geography of production and capabilities. In doing so, it has created an open supply base for all producers, as well as a legion of new competitors for the Americans, and Europeans, as well as the Japanese.

In our view, networked production is better understood as a new form of industrial organization than as a compromise on the spectrum between hierarchy and markets. In electronics, networked production, especially in CPN form, has developed in a few short years to such an extent that it is quite reasonable to consider it as a likely candidate for the dominant organizational form and, as we shall see, the pace of its extension has not slowed: more and more core functions are contracted out by more and more companies, including production and final assembly itself. Indeed, specialized contract manufacturers such as Solectron--firms that do manufacturing for you, and increasingly, even sourcing--have grown in the last decade from trivial revenues to over $40 billion in 1995, and they are sustaining their growth rate.[13] World-leading, integrated producers such as Hewlett Packard, IBM and Ericsson increasingly outsource one formerly core function after another. HP now sources assembly of half of their 20 million circuit boards to contract manufacturers,[14] and every day there is an announcement of a major firm turning over major plants, in core businesses, to such firms.[15] Newer and very successful firms such as Dell (in PCs) Silicon Graphics (advanced workstations), Cisco Systems (networking equipment), Diebold (automatic teller machines), Octel (telecommunications) or LAM Research (equipment) have little in the way of manufacturing facilities of their own. These are not trivial examples: Cisco, for example, has (as of this writing) a capital value greater than the Ford Motor Company!

Networked production only works if producers can be sure of swift and cheap access to know-how, components, and technology available anywhere in the world. Thus, for our purposes here, it is a critical prerequisite to coalitional realignment: It means that even traditional European producers of electronics products--historically highly protective of their enclave home markets--had a sudden interest in open markets, for they needed access in a timely fashion and at

[13] Tim Sturgeon, "The Rise of Global Locality: Turnkey Production Networks in Electronics Manufacturing," (University of California at Berkeley, Ph.D. thesis, Forthcoming, 1998)
[14] Electronic Buyers News, 8 April, 1996, issue 1001, page 8
[15] For Example, Ericsson, the Scandinavian world class producer of cellular telephony equipment recently turned over its manufacturing plants to contract manufacturers Solectron and Flextronics, a dramatic change in strategy for a major European producer; it is likely to be followed by others.

a reasonable cost to the technology supply base centered on the Pacific rim. CPNs would also prove crucial to the emergence of a new generation of electronics producers in both the US and Europe who would use the form to produce products and market them globally at far lower cost than traditional forms of multinational organization. In effect, CPNs created an unusual constituency of producers in favor of ever more open international markets.

User-driven Markets

Major users, such as banks and insurance companies, auto and chemical companies, have realized that IT (information technology) is no longer an esoteric and minor novelty. It is key to their competitive strategies, their form of organization and their ability to compete. It also dominates their investment budgets.[16] Companies have come to this realization at different speeds in different places, much sooner in the US than in Japan and Europe. Major users have taken the lead in changing government policy: they have been the major impetus in telecommunications deregulation/de-monopolization. They have come to insist on interoperability of products and systems from their IT suppliers and refuse, where possible, to be locked into proprietary standards and systems as they once were in the heyday of IBM and the telephone monopolies. Deregulation of telecommunications has permitted the major users, and producer companies who have been able to stay very close to lead users, to develop new applications that have become leading large new markets in the area of data communications: intra-nets, exter-nets and Internet, and their precursors. It has been overwhelmingly American producers who have developed and dominated these big and exploding markets, and American corporate users who have reaped their benefits as efficiency, effectiveness and, critically, strategic and organizational possibilities. In recent years it has been these new networked applications that have driven the PC industry and propelled Intel and Microsoft, which dominate that industry, into massive new growth spurts. It has also created a generation of new, fast growing, American firms such as Cisco and Netscape, and in conjunction with the networked form of production, reestablished American leadership in computing/communications.

[16] "IT spending in 1994 tripled that of basic industrial equipment," reports Paul Strassman in "Information: America's Favorite Investment," *Computerworld,* Vol. 30, No 32. P. 64, 5 August 1996. Reuters reports that IT equipment accounted for 7% of total capital investment in the 1970s, but had risen to 47% by 1996 and was sustaining a 50% annual growth rate. Cited in Edmund A. Egan, The Spatial Dynamics of the U.S. Computer Software Industry, 1997, p. 2, Ph.D. Thesis, University of California, Berkeley.

Again, the shift to user-driven markets proved crucial to coalitional realignment. It brought major industrial users of information technology in the US and Europe directly into the trade debates on information technology. Historically protected IT sectors in Europe meant that major industrial users did not have timely access to the latest information technologies at a reasonable cost. When IT was recognized as an increasingly critical production input for both manufacturing and services, the status quo became increasingly intolerable. European users joined their American counterparts in clamoring for unrestricted access to information technology, no matter where its point of origin. They became the critical constituency that shifted European IT-trade policy away from protection of producers toward support for diffusion.

The Rise of Wintelism

The third structural change is a shift in value-added (and power) in the production chain from integrated producers--especially traditional, final assemblers--to holders of a standard located anywhere in the production chain. (We call this Wintelism, in homage to the great value capturers, Intel and Microsoft Windows), but many companies with more subtly held standards such as Sun Microsystems and Cisco have sprung to great size, and enormous capital value, by successfully following a strategy of networking "production" and procurement and by focusing on standard setting and maintenance.[17]

Underlying the latter shift, new electronics product-markets have begun to converge on a common technological foundation of networkable, quasi-'open', microprocessor-based systems (of which the PC is emblematic).[18] Such new product markets are characterized by a predominant form of market rivalry, namely competitions to set *de facto* market standards such as Dolby pioneered in sound, and Microsoft and Intel have done famously in PCs, or as Cisco is doing with routers or Cadence with chip design systems or Asyst in micro-environments. Over the last half decade, the domestic US market has been the principle launch market for such new products and the principle terrain on which the resulting standards competitions have been

[17] Michael Borrus and John Zysman, *Globalization with Borders: The Rise of Wintelism as the Future of Global Competition,* BRIE Working Paper 96B (Berkeley: BRIE, 1997).

[18] By 'open', we mean that key product specifications, especially the interface specifications which permit interoperability with the operating system or system hardware, are published or licensed and thus available to independent designers of systems or software who can produce complementary or competing products. See Borrus, M., "Left for Dead" op. cit.:

fought. With just a few exceptions-e.g., Japan's Nintendo in video games and Sony in 8 mm video camcorders, and Europe's SAP in software for control of corporate logistics. US firms have defined the products, set and controlled the standards (especially in the broad and overlapping realms of computing and communications) and, consequently, dominated the market. It is this exploding market, computing/communications that turned out to be the new "killer application," and it dwarfs the VCR or Camcorder. It emerged first in the US for many reasons (including the Defense Department's very early support of networking in the DARPA net, the precursor of the Internet), but mostly because of user-driven deregulation of telecommunications that made possible the rapid innovation and diffusion of new applications and equipment.

Up to the 1980s the American electronics industry was dominated by big, vertically integrated companies like GE, RCA, Philco, Sylvania, Westinghouse, Emerson, AT&T and IBM. Most produced a broad range of products. All were final assemblers who produced most of their key components and controlled their suppliers tightly. In Europe similar conditions prevailed with many National Champions filling key slots alongside the few EuroScale producers such as Phillips.

Competition was not about setting 'open-but-owned' standards. In "consumer electronics," (radios, televisions, recorders, clocks, microwave ovens etc.) the standards were fully open: anyone could obtain the necessary information to implement the standard on a non-discriminatory and timely basis. The big, integrated firms prospered by dominating their markets through traditional economies of scale, scope and hype. In this way they strongly resembled the auto makers. In other sub-sectors, especially telecommunications and computers, standards were fully closed: the necessary technical information was owned and not freely available. In telephony there was still essentially, no competition; in computers, IBM's closed proprietary systems and vast installed base provided a lock on mainframes. But for three main events, the situation might have continued in this way.

First was the virtual elimination of American consumer electronics producers by the Japanese majors. By the 1980s American producers had pretty much completely exited "consumer electronics," (TVs, VCRs, camcorders, faxes, clocks, portable recorders, sound systems, even displays). As a result, little remained in the way of organization, political power or political concern to protect integrated electronics producers--at least outside AT&T , IBM and

DEC. One ghostly reverberation of this vacuum in the US industrial structure was a sudden vacuum in political pressure. In 1986, when the US government met in Dubrovnik (now also a tragic ghost of its glorious self) with representatives of Europe and Japan to first discuss and select standards for High Definition Television, (the anticipated killer application) the absence of viable US producers and of a strong US position opened a hole that was nearly filled by the Japanese MUSE standard--at least until the Europeans jumped in as well as up and down.[19]

The second event occurred in telecommunications where the AT&T break-up/deregulation was entering high gear. Big users could finally free themselves from the hold of AT&T's monopoly of proprietary systems. They did not hesitate to take advantage of the opening to adopt new networking technology as the major instrument for restructuring every aspect of their businesses and organization ranging from production and procurement strategies through location and the structure of their organization. They demanded, and got, interoperability of products and systems from fast, innovative suppliers. In the process, a giant new high growth sector was opened--but first only in the US.

The third event took place when IBM lost its stranglehold over the industry along with its short-lived domination of the rapid growth segment of computing, PC s and networking, due to a mix of government policy (the anti-trust atmosphere that hung over IBM) and one of the world's classic bad business decisions. After Apple in the late 1970s created the Personal Computer market using a quite traditional proprietary system strategy, IBM rushed a competing product to market. IBM pieced together the first open-but-owned PC using its proprietary BIOS (basic input-output system), and a variety of components and software from numerous third party vendors. These included, famously, an operating system from a small firm now called Microsoft and a processor from the merchant semi-conductor producer, Intel. It invited cloning to establish the market. IBM expected that it would bring the product back in-house and make it increasingly proprietary through a strategy of scale (and, to give the benefit of the doubt, it could have been afraid of anti-trust) Whatever the motive, IBM legitimized Wintelism, as only IBM then could: competition among specialized producers to set and dominate standards, anywhere in the production chain, for products that function together (hopefully!) with seamless interoperability from the users perspective.

[19] See Jeffrey A. Hart, "The Politics of HDTV in the United States," Policy Studies Journal, 22, (Summer 1994), pp. 214 -5.

In the end, de facto standards are far more effective barriers to entry and competition than traditional barriers built on scale or vertical integration, for they are far harder to reproduce, they encourage support from those who produce to the standard, and once established, are far harder to eliminate. But for de facto standards to be well-entrenched and act as competitive entry barriers, they must be established globally and pretty nearly all at once. Wintelist producers thus have a strong interest in the globally open markets that are necessary to establish and maintain the standard. In short, the rise of a new generation of Wintelist producers in both the US and Europe was the third major impetus for coalition realignment.

III: Europe's Diplomatic Demarche

Europe's diplomatic demarche in promoting and signing the International Technology Agreement (ITA) takes on meaning within this context of thoroughly new competitive structures and dynamics; indeed, as the present blurs into the recent past, it seems to have been quite inevitable.

European policies initiated in the mid eighties and extending through the mid nineties had multiple objectives such as eliminating deep and complex barriers to cross-nation commerce within Europe, promoting technological cooperation among European firms of different nationalities, and of course, enhancing European competitiveness in electronics.

For the most part they were designed to strengthen integrated producers. The forms they took combined traditional industry and trade policy with a European scale effort to transform Europe from a tartan of national markets into a single market. At both the national and the European level the goal was to transform National Champions into European champions by encouraging economies of scale. Toward this end, disparate national standards were homogenized into single European standards, cooperation between firms from different European countries was encouraged as were, crucially, mergers, takeovers and consolidations of various forms. In telecommunications equipment for example, the eighties began with about ten European producers of central office switches and ended with about three. Massive producer focused EU subsidization programs such as Jessie and ESPRIT as well as national programs such as Eureka were aimed at this sector, as were a policy of tariffs and local content definition in such key segments as semiconductors.

Perhaps because of these policies, perhaps despite them, Europe maintained strong competitive positions in public telecommunications switching (Alcatel, Siemens), in automotive electronics (e.g., Robert Bosch, Magnetti Marelli, Valeo), in industrial applications and industrial software (BAAN, SAP) and in cellular (though less through European policy than through the arrival of the Scandinavians into the EU (Ericsson and Nokia). Yet, by the mid-nineties, its position in such critical areas as consumer electronics, computers, and data processing had weakened considerably and, critically, it was way behind the Americans in the most rapidly growing and innovative segment, networking technologies that are not wireless and private network technologies (intra-net, exter-net, Internet). Overall, Europe's position in Information Technology remained weaker than either that of Japan or the US.[20] The contrast with the Americans, who at the mid to late eighties looked weak and wounded, was particularly striking. Europe was well behind the Americans in key segments as *user* as well as producer, its IT market smaller and growing much more slowly--just at the time when international competitive position for user industries, banking and finance, chemicals, autos, distribution seemed to top managers and investors to be in large measure a function of rapid and effective deployment of new and innovative information technology.

By the mid-nineties, the European Commission was convinced that it had to change its strategy for the information technology sector in fundamental ways and accept the reality of the new competition paradigm. Its change in conviction was propelled by the big users, Europe's largest and most powerful firms, just as they had propelled Europe's bold program of telecommunications de-monopolization/deregulation. But it got critical impetus from a new generation of successful European IT "gazelles," Europe's highly visible, young, fast growing firms such as SAP, Nokia, S-T who began from this approach (networked production, competition in standard setting, etc.) as well as some old line majors such as Ericsson and Robert Bosch who were determinedly and very successfully transforming themselves in this direction. Even the established integrated electronics producers were no longer united or even for the most part strongly convinced that the benefits of continued protection exceeded the costs to themselves; many actively campaigned for ITA. Networked production was now a competitive necessity, and it demanded an open market. They also argued that, in the final analysis, their

[20] See, among several such reports, Ministry of Economic Affairs, "Enabling the Information Society" (prepared by Booz-Allen), 1997.

biggest weakness was the relatively small size and slow growth of Europe's IT market. An open market would drive up demand for IT. [21]

Acceptance and then affirmation of the new structures and dynamics of competition in IT came much later in Europe than in the US, but by the mid-nineties, it drove the realignment of coalitions that enabled Europe to take a lead in initiating a new US-European trade relationship in Information Technology. It is worth noting in this context, that the ITA strongly resembles a bill tabled in the US Senate about sixteen years ago by Senator Sam Gibbons which got nowhere, largely because major producers, such as IBM, objected. This time US "producers" including IBM strongly supported the ITA, as did the Europeans, both companies and bureaucrats, who, as described, were now pursuing very different industry and trade strategies.

Both the US and the Europeans claim to have been the initiating party for ITA and both surely are right. The Japanese quietly boast of a statesman-like paternity to a negotiating process that converted, at least partially, the US-Japan Semiconductor Trade Agreement, with its permanently threatening practice of counting market shares--and perhaps one day counting correctly what it claims to count--into the feel-good, free-trade realm of ITA. Even the philosopher-king rulers of some ASEAN nations could and did claim credit. But it is best to remember that it was the realignment of producers and users in the major countries that permitted (indeed instructed) the governments to take a bold free-trade position. It is also interesting to note that ITA was a substantial demonstration of the continuing power in international trade negotiations of a common US-European point of view and position.

The present trade environment in advanced electronics is very different from both the long-term and the recent past. It presents, and is often presented, as approaching hard Manchesterism: if not a rush, then at least a stately march--by all parties, users and producers, European, American and Asian governments--to remove barriers to trade less in terms of tit-for-tat reciprocity than in a kind of Atlantic conception of concerted unilateralism. It is well to bear in mind that the celebratory vocabulary of free-trade is convenient and fun; but it is the special--and not necessarily permanent nor generalizable--conjuncture of market dynamics that has so

[21] See, for example, the role of Sr. Lamborghini, Board Member of Olivetti and key figure at the ConfiIndustria (Italy's Big Business Association) and Chair of Eurobit, (European Association of Manufacturers of Business Machines and Information Technology Industry), in lobbying for ITA: on Eurobit Web Site . See also American Electronics Association Europe Highlights, 2 December 1996. On Siemens' active support of ITA see Financial Times, 27 March 1997. See also article by Peter Chapman in The European, 9/18-24/97 analyzing lobbying on the European side.

significantly changed the trade agenda; it also points towards an agenda for expanded US-European cooperation.

In IT that agenda consists not in further efforts to pull down traditional barriers to trade such as tariffs and quotas. All further steps, even the preservation of recent gains, imply cooperation, harmonization, and reform not at the customs house but deep in the structures of the national economies. The first is Government procurement, especially in telecommunications equipment, but that leftover bone of contention is quickly shifting into the realm of Competition Policy which becomes the new locus of trade policy. The new trade openings in IT derive from, and depend upon, opening markets in telecommunications. But, as a note of caution, telecommunications reform has not yet been fully implemented in most countries.

The next step for US-European cooperation in IT would be to work together in a very concerted way to help the governments of the various Asian nations who, for the same reasons as the US and European governments are quite eager to open trade in IT, to actually succeed in implementing that goal. Many face substantial difficulties at home. They will need external leverage. Japan is critical. The much heralded privatization, break-up and reform of NTT has thus far culminated in the creation of a new holding company for the NTT pieces armed with new authority to go international. The National Champion approach, it seems, has strong support within the different vertical satrapies of the Japanese system. And Japan is not the only case; successfully maintaining the new trade environment in IT depends upon implementing the opening of telecommunications in Europe too.

A second major area for European-American cooperation concerns China's entry into the world system of trade. WTO accession is not the relevant question: the terms of that accession--and the prolonged negotiations that are likely to follow upon accession are what is key.

Although China is not yet a major producer or exporter of Information Technology, it is moving up a trajectory that will make it one at a speed attainable only by crossing Chinese rates of growth with those of Information Technology.[22] Information technology will play an important--perhaps a leading--role in defining the terms and the day to day reality of China's full entry into the world system of direct investment, trade, and technology transfer. ITA is both a

[22] Data on Chinese I.T. industrial production and consumption is not very reliable. It is, for example, estimated that the Chinese market for semi-conductors has been growing at about 25% per year for over ten years and that by 2010 China will have become the world's second largest semiconductor market. See, statement by George Scalise, President of Semiconductor Industry Association to US House of Representatives, Committee on Ways and means, Subcommittee on Trade, 4 November 1997.

model--and a warning. China will sign-on, but it is not clear when and with what schedule. As a model, ITA shows the necessity of European-US cooperation for any major changes in trade arrangements as well as the power of such cooperative leadership. But it carries a warning. It was the special competitive dynamics of information technology that prompted Europe's demarche and once Europe and America had moved, the others had to follow. Those same competitive dynamics operated on them--and with heightened intensity once the Atlantic nations had made their move. Their entire development in Information Technology is now predicated on their linkages into cross border production networks. Trying to sustain protection for fledgling industries would risk swift and severe punishment--not by other nations--but by the producer networks. This is true even for China. But it is not true in the most industries outside information technology. The same restructuring forces are not nearly so powerfully at play.

To date, outside of ITA, there has been little, perhaps negative, US-European cooperation on how the world trade system could be redesigned to accommodate China. In the absence of cooperation with a system-stability concern, China has been playing the Europeans against the Americans, quite successfully, case by case: an order for Boeing today, one for Airbus tomorrow. There are serious questions of system redesign and stability that are simply not being addressed in any cooperative way by the whipsawed Atlantic partners. The success of the US-European ITA initiative indicates the potential power of such cooperation.