

IDENTIFYING STRATEGIC ALLIANCES IN THE GLOBAL INFORMATION SECTOR, 1989-1998*

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ABSTRACT

An increasingly prominent form of interorganizational relationship is the strategic alliance, involving at least two partner firms that: (1) remain independent after the alliance is formed; (2) share benefits and managerial control over the performance of assigned tasks; and (3) make continuing contributions in one or more strategic areas, such as technology or products (Yoshino and Rangan 1995:5). Rates of strategic alliance formation among large corporations in the global information sector seem to have increased dramatically during the past decade, continuing a trend initially uncovered in the 1980s with the MERIT database (Hagedoorn and Schakenraad 1992; Hagedoorn 1993). Firms are collaborating in complex research and development, production, marketing, and distribution arrangements that cross national and industrial boundaries. Research on strategic alliance formation should pursue explanations at two levels of analysis: the factors that encourage the initiation of individual alliances (dyadic relational level) and changing patterns of overlapping alliance partnerships (the network systemic level). Investigating interorganizational relations and networks as they evolve over time requires thorough and accurate longitudinal data collection, measurement, and analysis. We report on the initial phases of project to investigate strategic alliances in the global information sector, emphasizing a sequence of methodological decisions that we confronted.

To define the global information sector, we retroactively applied a modified version of the new North American Industrial Classification System (NAICS), combining its four information subsectors (publishing; motion pictures and sound recording; broadcasting and telecommunications; and information services and data processing) with selected manufacturing industries (primarily computers, electronic products, and semiconductors). To identify the largest world corporations in these industries, we extracted all applicable names from ten annual Fortune 500, 1000, and Global 500 lists, then added their closest competitors as cataloged by Hoovers' online corporate profiles. After sorting these 400 organizations according to their primary products and services into four-digit Standard Industrial Classification (SIC) categories directly corresponding to the NAICS, we ranked them by their most recently available annual revenues. Finally, we selected the top half of each category, resulting in a target population of 150 corporations. About two-thirds are headquartered in the U.S., one-sixth in Europe, and the remainder mostly in Asia.

To reconstruct the 10-year history of strategic alliances among these organizations, we conducted online searches of three newspaper, magazine, trade-journal, and publicity release archives. We examined all articles generated by the unions of each company's name with the keywords "alliance" and "venture." Whenever we encountered a report about a collaborative activity involving two or more of the organizations on the list, we downloaded and entered that article into a searchable database. Next, we tagged every discrete event by reported date of the alliance, the names of all participating organizations, and a brief description of the primary purpose of their relationship. This method yielded approximately 3,000 alliances spanning the 1989-98 decade. The final version of our EGOS colloquium paper will display our classification of the events by types of strategic alliance and display descriptive graphs of general trends over the decade.

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Fierce rivals Apple Computer and IBM launch a new joint venture, Taligent, to develop a PowerPC microprocessor to compete against software and hardware from Microsoft and Intel (Lewis 1992). Popular America Online agrees to a marketing alliance making the Microsoft browser its preferred Internet access, then two years later buys Microsoft's archrival Netscape and forges an alliance with Sun Microsystems (Jervis 1996; Lohr and Markoff 1998). Sony Pictures Entertainment, Bertelsmann, EMI, and Warner Music Group--multinational corporations based respectively in Japan, Germany, England, and the U.S.--buy a 50 percent equity stake in Hong Kong-based Star TV's satellite music channel. But, the agreement leaves programming decisions to Star's executives, who are controlled by the venture's major owner, Australia's Rupert Murdoch (Levin 1995). These, and thousands of other, strategic alliances and joint ventures exemplify the energetic "coopetition" among giant corporations engaged in fast-paced global information technologies at the end of the 20th century. This multi-industry sector is expanding at a tremendous rate and has already emerged as a major economic engine driving world economic expansion and integration. A 1997 study, sponsored by U.S. computer chief executives, led by Microsoft's Bill Gates and Intel's Andy Grove, revealed that the software business has become America's third-largest manufacturing industry (behind automobiles and electronics). Since 1990, employment in the software industry grew at an annual rate of 12.5 percent, more than twice the national average, and in 1996 was paying annual wages of \$57,300, also double the national average (Lohr 1997). Telecommunications, computing, data processing, publishing, and television, radio and film production span the two dozen advanced European and Asian nations and, through satellite networks, are penetrating the developing nations of Latin America and Africa. An accurate empirical description and theoretical explanation of the complex interorganizational relations in the global information sector require a major undertaking in data collection, measurement, and analysis.

At present, we have few answers to many vital questions about the changing composition and social network structures of the interorganizational relations within this sector. Which companies most frequently form strategic alliances, and for what purposes? How persistent or evanescent are such agreements over time? Is the trend toward accelerating numbers of deals, or has it reach a plateau? Do alliances proliferate randomly or do certain companies dominate and control relations in the sector? Are formal network characteristics, such as density and centralization, shifting in specific directions? What cleavages and opposing blocks of partners emerge from these networks, along which industry and national dimensions? What social, political, economic, and technological factors explain the formation of collaborative agreements? Are these patterns more consistent with hypotheses from transaction-cost economics, resource dependence, institutionalist, or network theories? And, ultimately, do strategic alliances contribute to the success or failure of companies to grow, generate profits, provide jobs, and introduce consumer innovations?

Despite an abundant theoretical literature on strategic alliances (e.g., Lorange and Roos 1992; Gomes-Casseres 1995; Ebers and Jarillo 1997; Oliver and Ebers 1998), organization research offers scant precedents for an empirical project on multi-industry networks of information firms. Most commonly, researchers have conducted intense case studies of specific companies (Garud and Kumaraswamy 1993), geographic locales (Saxenian 1990), or narrowly defined industries (Gulati 1995). The only direct precedent for our undertaking was the MERIT database assembled and analyzed by Dutch scholars (Hagedoorn and Schakenraad 1992; Hagedoorn 1993). Using published sources such as newspapers, specialized business journals, and company annual reports, researchers compiled information on 10,000 cooperative agreements (including 4,000 strategic technology alliances) among 3,500 international firms from 1980 to 1989. The six industries included computers, microelectronics, telecommunications, industrial automation, software, and telecommunications. Strategic alliances were defined as “those inter-firm agreements that can reasonably be assumed to effect the long-term product market positioning of at least one partner” (Hagedoorn and Schakenraad 1992: 164). Trends over the decade revealed a sharp rise in numbers of alliances during the mid-1980s, followed by slower rates of increase in network density at the end of the decade (p. 164-5). Separate multidimensional scaling and cluster analyses of the networks of alliance ties among the 45 most active firms in each of the six industries disclosed relatively stable patterns for both halves of the 1980s (p. 185). Many market leaders, as measured by sales, played prominent but not dominating roles in strategic partnering. However, little evidence supported an hypothesis that strategic technology alliances were a game led by “second-tier competitors.”

Our project examines alliance networks in the global information sector for the period following Hagedoorn’s study. Our basic objectives are to identify the core industries, organizations, and relationships defining the sector’s networks and to explain how the structure of interorganizational ties changed during the decade 1989-98. In following subsections of this methodological report describes the issues we faced and the decisions we made while designing the research plan, collecting the data, and classifying the alliances.

DEFINING SECTOR BOUNDARIES

Most people have a tacit understanding of which types of companies should be considered information organizations; for instance, Microsoft, IBM, Siemens, and Toshiba all readily spring to mind. However, formally defining the global information sector is more difficult than simply conjuring up lists of companies having an evident global presence. To identify the industries belonging to the information sector we followed a process of successive approximation. We began with the recently developed North American Industry Classification System (NAICS), which was constructed to permit comparability across the U.S., Canada and Mexico. The NAICS replaces the U.S. Standard Industrial Classification (SIC) coding scheme used for more than half a century in U.S. governmental analyses, such as the Economic Census of 1997. As shown in Table 1, the NAICS classifies industries into 24 two-digit sectors, one of which is an “Information Sector” consisting of four three-digit subsectors: Publishing; Motion Pictures and Sound Recording; Broadcasting and Telecommunications; and Information Services and Data Processing. Table 2 displays excerpts defining these four NAICS subsectors.

The NAICS also reorganized the Manufacturing Sector to recognize new high-tech industries, including computers, electronics and software reproduction. Table 1 also shows four manufacturing categories which we initially considered for inclusion in our expanded version of the global information sector. After careful examination of their detailed industries, we decided to add only the Computer and Electronic Product Manufacturing (334) subsector and the Semiconductor Machinery Manufacturing (333295) industry. Both groupings involve frequent technological innovations that require close coordination with the software companies in the Information Sector. However, we decided to exclude the Printing and Related Support Activities (323) and Electrical Equipment, Appliance, and Component Manufacturing (335) subsectors because we felt their technologies were too remotely related to core information sector innovations. Given the fast growth and advances in information technologies, we also excluded any industries that seemed unlikely to make major contribution to the development and transformation of the sector. Industries whose firms simply sell consumer information products, as opposed to creating innovative alliances for developing new products or new services, should be omitted. This decision eliminated such manufacturing industries as heavy construction equipment, electricity production, household electronics and appliances, electronic retail stores, lighting and wiring equipment manufacturing, electronic components, defense contracting, business form publishing, and printing.

Although business and government are already using the NAICS in their current industry classification projects, those coding have not retroactively applied to data collected in the period of our project. Fortunately, the U.S. Bureau of the Census produced an elaborate conversion table showing in great detail how the new NAICS codes map onto the old SIC categories. Using this translation, we could readily identify which corporations operated in the industries corresponding to our expanded version of the global information sector. Table 3 displays the final set of industries by their NAICS classifications, and how they relate to the SIC codes, which we believe most closely approximates the global information sector.

IDENTIFYING ORGANIZATIONS

To identify prominent organizations for inclusion in the global information sector project, we again followed a successive approximation approach. We began with *Fortune* magazine's annual series of rankings; more specifically, we extracted names appearing in the Fortune 500, Fortune 1000, and Global 500 lists between 1989 and 1998. The various Fortune rankings were compiled from public financial data on the companies. From 1989 to 1994, the list of top 500 U.S. manufacturing companies was based on the prior year's revenues. Until 1994 two separate rankings were reported for the top 50 Utility companies, based on assets, and for the top 100 Service companies, based on sales figures. In 1995, *Fortune* changed its practice, combining the three groups and expanding it to 1000 companies in a dozen broad industry categories, ranked by revenues. In all years, subsidiaries of foreign companies incorporated in the U.S. were excluded because they were not required to file 10-K reports with the U.S. government. However, the largest foreign companies were included in the Fortune Global 500, ranked by sales or revenues using the average official dollar-exchange rate during a company's preceding fiscal year.

In the later years' Fortune lists, every company was classified in the industry that represented its largest volume of sales or revenues. The magazine did not use the SIC system, but the categories established by the U.S. Office of Management and Budget. We selected any company appearing at least once in a subset of industries that closely approximate our definition of the global information sector. For the 1989-94 we used four categories: Computers; Electronics; Publishing/Printing; and Scientific and Photographic Equipment. With the change to the Fortune 1000 in 1995, the relevant industries expanded to seven categories: Computer and Data Services; Computers; Office Equipment; Electronics, Electrical Equipment; Entertainment; Publishing/Printing; and Scientific, Photo, and Control Equipment, Telecommunications. In 1997, Computer Software and Computer Peripherals appeared as new industry categories.

The Global 500 industry categories for 1990-1994 were identical to those for the U.S. Fortune 500. However, in later years the number of Global 500 industry categories did not increase to the same extent as the Fortune 1000. For 1995 and 1996, Telecommunications and Entertainment were added and Scientific and Photographic Equipment disappeared, but in 1997, Scientific and Photographic Equipment returned to the roster. In 1998, Computer Services and Software and Electronics/Semiconductors were added. The recent addition of Computer Software in both schemas shows the increasing prominence of software companies in the late 1990s.

Altogether, our ransacking of the *Fortune* lists yielded about 250 U.S. and international companies. To determine each company's primary industry, we needed detailed information about their production and service activities. We downloaded corporate profiles from Hoovers, a commercial firm that provides online information about publicly traded companies, primarily to stock brokers and financial analysts. We extracted Hoovers' general descriptions of each company, recent annual revenues, number of employees, postal and webpage addresses, plus the names of three main competitors. We entered these data into a searchable database program (AskSam) for quick access. Whenever the name of a major competitor appeared that had not been previously identified from the Fortune 500 lists, we added it to the database if it fell into one of the industries defining the global information sector. In addition to Hoover's individual

company profiles, we also read Hoovers' narrative industry profiles for eight industries related to the sector: Consumer Electronics and Appliances; Internet/Online; Movies/Music; Office Equipment & Supplies; Publishing & Printing; Semiconductors; Telecommunications Services; and TV and Radio. We added to our searchable database any companies mentioned in these narratives that had not been previously identified. Altogether, these additions increased our database to 400 companies.

Next, we consulted Edgar, the Securities and Exchange Commission's online database of public company stock offerings, mergers and acquisitions, and other financial transactions. Using Free Edgar, a noncommercial online service, we extracted the four-digit SIC code for the primary industry of each U.S. company in our database. For each non-U.S. firm, we used the information Hoovers company profiles, especially about its major U.S. competitors, to assign a four-digit SIC code for its primary economic activity. By this point, we realized that many of the 400 companies were not major players in the global information sector, and were unlikely to participate extensively in strategic alliances and the sector's overall development. Furthermore, a longitudinal network analysis of 400 companies would be difficult to conduct. Therefore, we needed a substantively and methodologically defensible strategy to reduce the list to a more manageable number that would still capture the sector's most important participants.

We first eliminated all companies whose primary SIC codes were for industries falling outside our definition of the global information sector. Next, within each four-digit SIC category, we ranked the remaining companies by size, using the most recently available data on annual revenues (primarily from the 1998 Fortune 1000 and Global 500 lists, or from a prior list if the company had disappeared by merger). Then we selected approximately the top half of each SIC category. This procedure reduced the number of Global Information Sector companies to 144, which we presumed would yield a manageable number of strategic alliances for network analysis. See Table 4 for an alphabetical listing of the organizations.

LOCATING SECTOR EVENTS

Once we had identified the core global information sector companies, we needed an efficient and low-cost procedure for locating all possible interorganizational events that might qualify as joint ventures, strategic alliances, and other types of interorganizational relations between 1989 and 1998. Keyword searches of comprehensive online news archives was the only feasible solution. Although locating events through keyword searches of newspaper and magazine articles and publicity releases may not uncover every joint venture and strategic alliance, but it does identify events deemed most salient and newsworthy by business reporters, publishers, and corporate public relations departments. By using multiple, overlapping sources we expected to capture events that were deemed most relevant by the business community.

Our primary source was the Information Access Company's keyword-searchable online InfoTrac Searchbank *General BusinessFile ASAP*, from 1982 through 1998. Original sources in that archive were more than 400 business general and specialty magazines, major newspapers, and wire services. To supplement the InfoTrac findings, we searched two other online services: University Microfilms International Company's *Newspaper Abstracts* of article summaries from 25 national and regional newspapers from 1989-98; and the general business and financial

sources archive of Reed-Elsevier's *Lexis-Nexis Academic Universe* Company News file from 1989-98.¹

To locate articles about interorganizational relations, we searched each company name in all three archives in union with key words "alliance or venture." Because journalists and public relations agents might apply other labels to relevant relationships, we also broaden our searches within InfoTrac to include "deal, contract, license, merger, plan, pact, join* or partner*", where an asterisk finds variant endings to those root words. We read headlines and abstracts for tens of thousands of articles, then downloaded the most promising full-length reports. The initial selection criterion only required that an article or press release mention some type of formal relationship between two or more organizations on the master list. This culling produced approximately 10,000 stories, some of which referred to the same event or series of events.

We entered these raw journalistic and public relations reports into a new searchable database, tagging each distinct event by date of the report, names of all the participating organizations, and a brief description of the primary purpose of the relationship. Whenever we encountered incomplete information, we made further targeted searches of the supplementary sources in Lexis-Nexis.

CLASSIFYING STRATEGIC ALLIANCES

Along with another project participant Song Yang, we coded the purposes of every strategic alliance, using the nine-category scheme in Table 5. We classified each event under one or two types, recorded the names of the core partners, and counted the total number of organizations in the alliance. As of this date (May 21, 1999), we are still engaged in data entry and cleaning for about 3,000 alliances. We expect to have some preliminary tabular displays in time for the EGOS colloquium in July. Our conclusions about the merits and shortcomings of the procedures we used will depend in part on our empirical findings, so we plan discuss them in-person at the colloquium rather than in this first draft.

¹ Among the most frequently accessed sources were: (1) general newspapers: *Wall Street Journal*, *New York Times*, *Financial Times*, *San Jose Mercury News*, the *Knight-Ridder/Tribune News Service*; (2) business news and public relations services: *PR Newswire*, *Business Wire*, *AFX Newswire*, *Jiji Press Ticker Service*, and *Comline Daily News Tokyo Financial Wire*; (2) general business magazines: *Fortune*, *Business Week*, and *Forbes*; (3) English-language foreign magazines and press services: *The European*, *Reuters European Business Report*, *European Report*, *Nikkei Weekly*, *Far East Economic Review*, *Reuters Asian-Pacific Business Report*, *Japan-US Business Report*, *Japan Economic Newswire*, *Business Korea*, *Japan 21st*; and (4) specialized industry journals: *Advertising Age*, *Billboard*, *Broadcasting*, *Broadcasting & Cable*, *Chilton's Electronic News*, *Computerworld*, *Computer Weekly*, *Editor & Publisher*, *Electronic News*, *Mediaweek*, *Publishers Weekly*, *Telecommunications*, *Telephony*, *Telecom Markets*, and *Variety*.

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Table 1. Major Industry Categories in the 1997 NAICS

Code	Sector and Subsector Titles
11	Agriculture, Forestry, Fishing and Hunting
21	Mining
22	Utilities
23	Construction
31-33	Manufacturing
	323 Printing and Related Support Activities
	333 Machinery Manufacturing
	333295 Semiconductor Machinery Manufacturing
	334 Computer and Electronic Product Manufacturing
	335 Electrical Equipment, Appliance, and Component Manufacturing
42	Wholesale Trade
44-45	Retail Trade
48-49	Transportation and Warehousing
51	Information
	511 Publishing Industries
	512 Motion Picture and Sound Recording Industries
	513 Broadcasting and Telecommunications
	514 Information Services and Data Processing Services
52	Finance and Insurance
53	Real Estate and Rental and Leasing
54	Professional, Scientific, and Technical Services
55	Management of Companies and Enterprises
56	Administrative and Support, Waste Management and Remediation Services
61	Educational Services
62	Health Care and Social Assistance
71	Arts, Entertainment, and Recreation
72	Accommodation and Food Services
81	Other Services
92	Public Administration

Table 2. Definitions of Four Subsectors in the NAICS Information Sector

51 Information

Perhaps the most important change in NAICS is the recognition of a new Information sector. This new sector includes those establishments that create, disseminate, or provide the means to distribute information. It also includes establishments that provide data processing services. Industries included in this new sector are newspaper, book, and periodical publishers, previously included in the manufacturing sector in the SIC; software publishers, previously included in services; broadcasting and telecommunications producers and distributors, previously included with utilities and transportation; and motion picture and sound recording industries, information services, and data processing services, previously included in services.

511 Publishing Industries

Industries in the Publishing Industries subsector group establishments engaged in the publishing of newspapers, magazines, other periodicals, and books, as well as database and software publishing. In general, these establishments, which are known as publishers, issue copies of works for which they usually possess copyright. Works may be in one or more formats including traditional print form, CD-ROM, or on-line. Publishers may publish works originally created by others for which they have obtained the rights and/or works that they have created in-house. Software publishing is included here because the activity, creation of a copyrighted product and bringing it to market, is equivalent to the creation process for other types of intellectual products.

512 Motion Picture and Sound Recording Industries

Industries in the Motion Picture and Sound Recording Industries subsector group establishments involved in the production and distribution of motion pictures and sound recordings. While producers and distributors of motion pictures and sound recordings issue works for sale as traditional publishers do, the processes are sufficiently different to warrant placing establishments engaged in these activities in a separate subsector. Production is typically a complex process that involves several distinct types of establishments that are engaged in activities, such as contracting with performers, creating the film or sound content, and providing technical postproduction services.

513 Broadcasting and Telecommunications

Industries in the Broadcasting and Telecommunications subsector include establishments providing point-to-point communications and the services related to that activity. The industry groups (Radio and Television Broadcasting, Cable Networks and Program Distribution, and Telecommunications) are based on differences in the methods of communication and in the nature of services provided. The Radio and Television Broadcasting industry group includes establishments that operate broadcasting studios and facilities for over the air or satellite delivery of radio and television programs of entertainment, news, talk, and the like. These establishments are often engaged in the production and purchase of programs and generating revenues from the sale of air time to advertisers and from donations, subsidies, and/or the sale of programs.

514 Information Services and Data Processing Services

Industries in the Information Services and Data Processing Services subsector group establishments providing information, storing information, providing access to information, and processing information. The main components of the subsector are news syndicates, libraries, archives, on-line information service providers, and data processors.

SOURCE: Bureau of the Census (www.census.gov/naics)

Table 3. Correspondance Between NAICS and SIC Codes for Industries in the Global Information Sector

NAICS: Industry	SIC: Industry
334111: Electronic Computer Manufacturing	3571: Electronic Computers
334112: Computer Storage Device Manufacturing	3572: Computer Storage Devices
334119: Other Computer Peripheral Equipment Manufacturing	3577: Computer Peripheral Equipment, NEC
33431: Audio & Video Equipment Manufacturing	3651: Household Audio & Video Equipment
33421: Telephone Apparatus Manufacturing	3661: Telephone & Telegraph Apparatus
33422: Radio, TV Broadcasting, Wireless Communications Equipment Manufacturing	3663: Radio & TV Broadcasting & Communications Equipment
334413: Semiconductor & Related Device Manufacturing	3674: Semiconductors & Related Devices
51111: Newspaper Publishers	2711: Newspapers: Publishing or Publishing & Printing
51112: Periodical Publishers	2721: Periodicals: Publishing or Publishing & Printing
51121: Software Publishers	7372: Services-Prepackaged Software
51211: Motion Picture & Video Production	7812: Services-Motion Picture & Video Tape Production
513111: Radio Networks; 513112: Radio Stations	4832: Radio Broadcasting Stations
51312: Television Broadcasting	4833: Television Broadcasting Stations
51321: Cable Networks; 51322: Cable & Other Program Distribution	4841: Cable & Other Pay Television Services
513321: Paging	4812: Radio Telephone Communications (paging carriers)
513322: Cellular & Other Wireless Telecommunications	4812: Radio Telephone Communications (cellular carriers)
51333: Wired Telecommunications Carriers	4813: Telephone Communications
51411: News Syndicates	7383: News Syndicates
514191: On-Line Information Services	7375: Information Retrieval Services
51421: Data Processing Services	7374: Computer Processing & Data Preparation & Processing Services
541512: Computer Systems Design Services	7373: Services-Computer Integrated Systems Design

Table 5. Classification of Strategic Alliances

Contract (CON)	To purchase vendor's off-the-shelf product or service To order product or service according to buyer's specs
License (LIC)	To obtain rights to market an existing product or service in exchange for royalty or fee paid to original owner
Production (PRD)	To manufacture standardized goods or to provide direct services to particular clients
Product Adaptation (PA)	To support or integrate existing technology with another firms' specific systems, programs, or devices (includes vendor alliances?)
Research and Development (RD)	To create or demonstrate a new product or service by application of scientific principles
Marketing (MKT)	To sell, promote, publicize, distribute, or survey about products or services for end consumers
Industry Standards (STD)	To create, adjudicate, or support industry-wide standards for products or services by a group of companies
Legal-political (LAW)	To sue competitors; to seek to enact or repeal legislative or regulatory decisions
Equity stake (EQS)	To invest for less than complete ownership of an organization without mention of a specific project To attempt an equity takeover of a company in co-ownership with other firms

Table 4. Organizations in the Global Information Sector project

1 3Com	54 Intel	107 SAP
2 ABC	55 Intergraph	108 SBC
3 Airtouch	56 Italtel	109 Seagate
4 Alcatel	57 KDD	110 SGI
5 AMD	58 KPN	111 Sharp
6 Ameritech	59 KR	112 Siemens
7 Andersen	60 Lagardere	113 Sony
8 AOL	61 LGE	114 Sprint
9 AP	62 Loral	115 Sun
10 Apple	63 Lotus	116 Swisscom
11 ATT	64 Lucent	117 Sybase
12 BA	65 Mannesmann	118 Symantec
13 Baan	66 Matsushita	119 Tandem
14 BCE	67 MCA	120 TBS
15 Bertelsmann	68 McCaw	121 TC
16 BS	69 MCI	122 TCI
17 BT	70 Micron	123 Telebras
18 Bull	71 Microsoft	124 Telefonica
19 Cadence	72 Mitsubishi	125 Telstra
20 CAI	73 Motorola	126 TI
21 Canon	74 NAI	127 TM
22 CBS	75 NBC	128 Toshiba
23 CC	76 NCR	129 Tribune
24 Cisco	77 NEC	130 TSA
25 Comcast	78 Netscape	131 TW
26 Compaq	79 NewsCorp	132 Unisys
27 Cox	80 Nokia	133 USAN
28 CSC	81 Novell	134 USCell
29 CVS	82 NS	135 USR
30 CW	83 NTT	136 USW
31 DDI	84 Nynex	137 Viacom
32 DEC	85 NYT	138 Viag
33 Dell	86 Oki	139 Wang
34 Disney	87 Olivetti	140 WD
35 DJ	88 Oracle	141 WorldCom
36 DT	89 Pactel	142 WP
37 DW	90 Paramount	143 Xerox
38 EDS	91 PB	144 Zenith
39 EMC	92 Pearson	145 MGM
40 Ericsson	93 PeopleSoft	
41 FT	94 Philips	
42 Fuji	95 Pioneer	
43 Fujitsu	96 PN	
44 Gannett	97 PT	
45 Gateway	98 Quantum	
46 GTE	99 Racal	
47 Hachette	100 RDA	
48 Havas	101 Reed	
49 Hearst	102 Reuters	
50 Hitachi	103 Ricoh	
51 HP	104 Rogers	
52 IBM	105 Samsung	
53 Informix	106 Sanyo	

