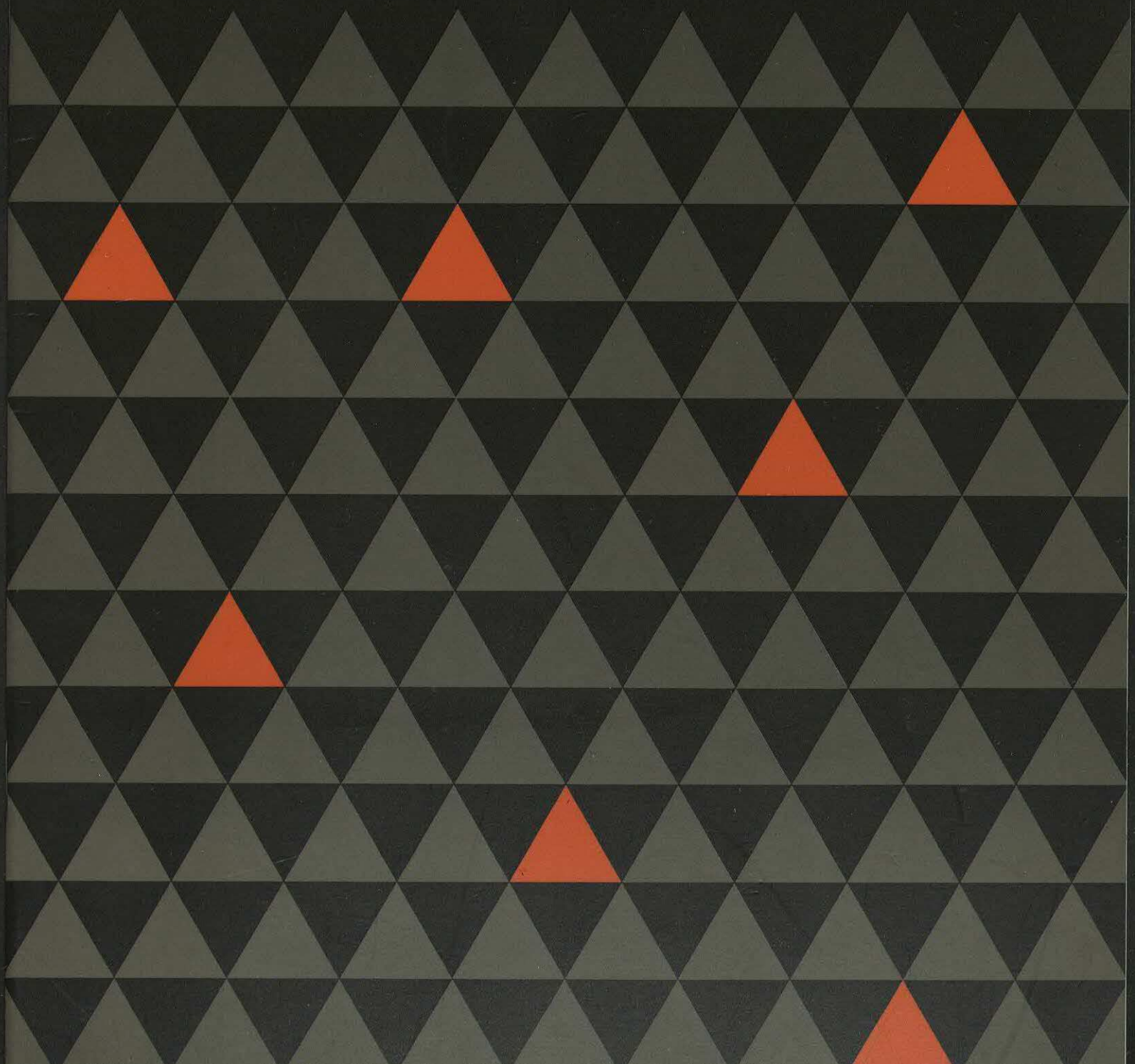
The Changing Information Industry
An Investment Banker's View

BUTLER COX FOUNDATION

A Paper by Bernard Goldstein



1987

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Bernard Goldstein is a partner with Broadview Associates, the merger and acquisition investment bank based in Fort Lee, New Jersey. Broadview Associates plays a leading role in the information industry's merger and acquisition activity. During his career Mr Goldstein has been involved, either as principal or agent, in more than 150 completed acquisitions. He is a past president of the Association of Data Processing Service Organisations (ADASPO).

In October 1986, he addressed the International Conference of the Butler Cox Foundation held in Rome. His presentation described the structure of the information industry, and he forecast that it will soon be the world's largest industry. He highlighted the fact that the number of mergers and acquisitions in the information industry is increasing significantly, whilst the number of such transactions in all other industries is declining. Many of the world's largest corporations have entered the information industry through mergers and acquisitions. Some of them will fail, but others (the majority) will gain substantial benefits from their investments.

Within the information industry, Broadview Associates has identified the systems-integration business as a major growth area for the future, and Mr Goldstein stressed that major corporations are likely to position themselves to take advantage of this growing market sector. Mr Goldstein's presentation concluded with a review of the 'infotrends' that are reshaping the software and information marketplaces.

His presentation is reproduced in full in this paper.

Published by Butler Cox & Partners Limited
Butler Cox House
12 Bloomsbury Square
London WC1A 2LL
England

Photoset and printed in Great Britain by Flexiprint Ltd., Lancing, Sussex.

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The information industry will soon to be the world's largest industry. By 1990, the worldwide information industry is predicted to be a $2 trillion industry, about half of which will be in the United States. Enormous amounts of capital are being redeployed from the traditional smokestack industries and 'brick and mortar' industries into the information industry because it offers investors superior financial returns. The number of mergers, acquisitions, and combinations in the information industry in the United States is staggering. Both users and suppliers will be affected by these changes.

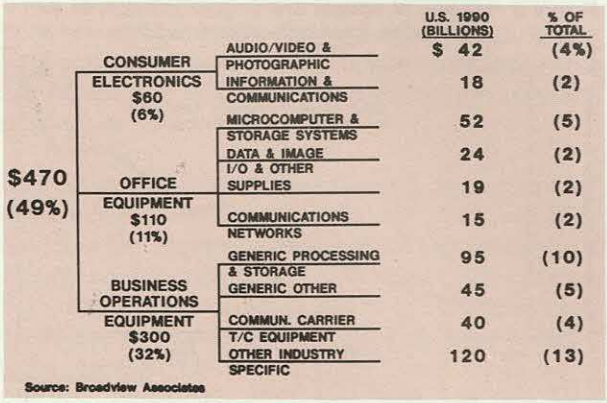
STRUCTURE OF THE INFORMATION INDUSTRY

The information industry has two main segments — products and services. The products sector represents 49 per cent of the total and is predicted to be worth $470 billion in the United States by 1990. A detailed breakdown of the products segment is shown in Figure 1.

The services segment has three components — communications, information itself, and entertainment. You may be surprised to see entertainment as part of the information industry but I believe it belongs here: the information content of a television news programme, for instance, is very high. Not all of these components are evenly divided between the United States market and the worldwide markets. The United States accounts for about 60 per cent of the world market for software, but for substantially less than 50 per cent of the communications market, for example. Figure 2 shows a detailed breakdown of the components of the services segment of the information industry.

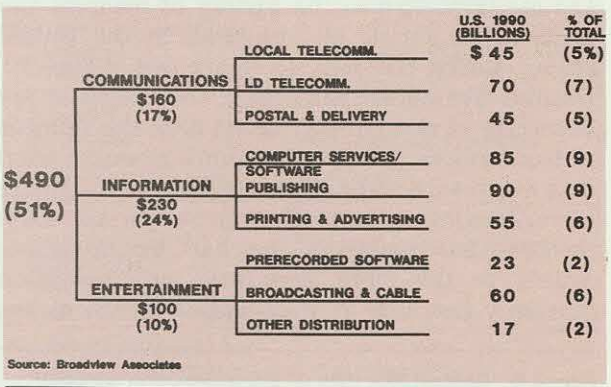
Within the services segment, the computer (or information) services/software element is of particular importance. In the United States, the information-services/software industry is growing at 20 per cent compound, significantly better than the growth in the hardware market. The components of this industry are analysed in Figure 3, which shows three sub-segments — processing services, software products, and professional services. The definitions used in the

Figure 1 Information technology (IT) industry products structure



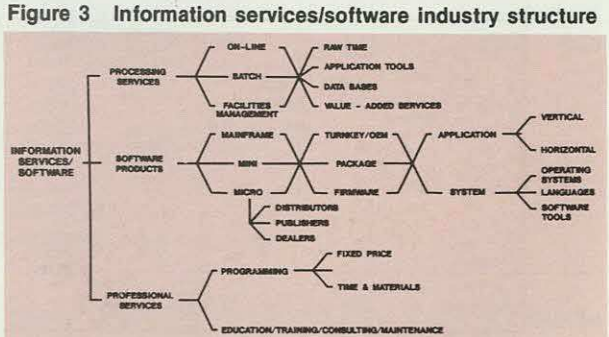
Source: Broadview Associates

Figure 2 Information technology (IT) industry services structure



Source: Broadview Associates

Figure 3 Information services/software industry structure



Source: Broadview Associates

schematic shown in Figure 3 are continually changing. For example, education and training are shown under professional services, but I suspect that when we draw this chart next year (and we redraw it every year) they will be shown as part of the software-products segment of the industry as well. This very uncertainty demonstrates how exciting certain segments of this industry are.

I believe that the most defensible part of the processing-services segment is databases. Owning a database is rather like owning mineral rights, except that constant mining does not exhaust the underlying asset. It is probably the only segment of the industry that will permit monopoly or oligopoly positions because, eventually, the capital required to compete with an established vendor will become a barrier to competition.

The importance of databases is illustrated by the map of the information industry (Figure 4) constructed by Broadview Associates. We have ranked information services on two axes: services/products, and facilities/content. Thus, in the upper right corner you find online databases, having the highest value-added in terms of facilities and of products, while in the lower left corner you find supplies and hardware, which have the lowest.

MERGERS AND ACQUISITIONS IN THE INFORMATION INDUSTRY ARE INCREASING

Let me now turn to the history of mergers and acquisitions among all industries in the United States during the past 15 years (see Figure 5). Despite the public perception that mergers are occurring at an ever-increasing rate, the number of transactions per year has, until recently, been on a downward trend. The trendline on the figure is now moving up, and will continue upwards when the 1986 data is added to the chart, but this is due mainly to the more permissive administration currently installed in Washington, which makes merger and acquisition activity easier. Nevertheless, the general trend is downwards. At first sight, the dollar value of the transactions shown in Figure 5 seems to have grown substantially (from $23.7 billion in 1969 to $179.6 billion in 1985), but the 1985 figure has not been adjusted for inflation. In fact, the 1985 dollar is worth about one-third of the 1969 dollar.

However, the merger and acquisition trend in the information services and software industry contrasts sharply with the general downward trend, as Figure 6 shows. In 1985, we were aware of 203 separate transactions in the United States, which accounted for an investment of $2.68 billion in the industry (and there were certainly other transactions that we were not aware of). And both of those numbers will increase in 1986.

In the United States, the information-services industry is the industry with the greatest number of acquisitions. We detect an enormous amount of interest from corporations anxious to buy a position in the marketplace. Every major public information-services company has grown by acquisition. And there is a ready supply of smaller companies prepared to sell out to an acquirer. In the United States, it is not a sign of failure to sell one's business; in fact, it is a sign of success, and the financial rewards are very substantial to the entrepreneurs who began the business.

Figure 4 Broadview's map of the information services industry

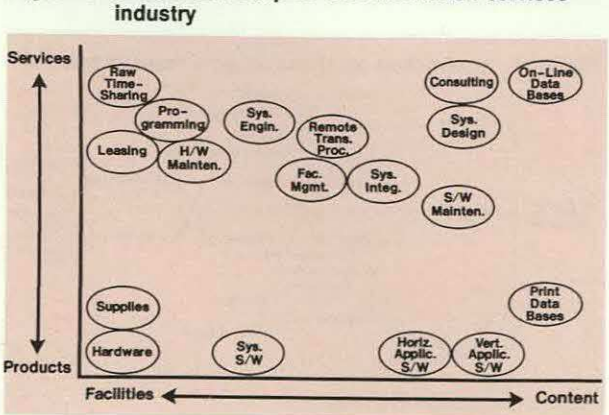


Figure 5 History of merger and acquisition activity — all industries

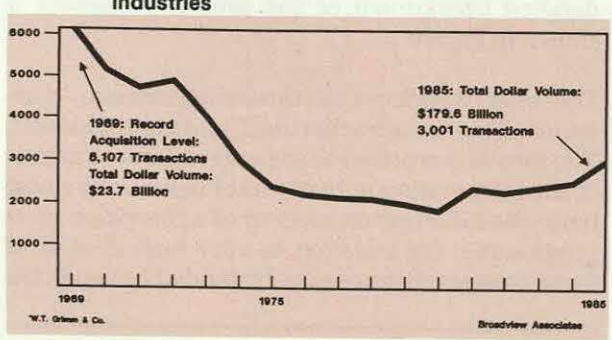
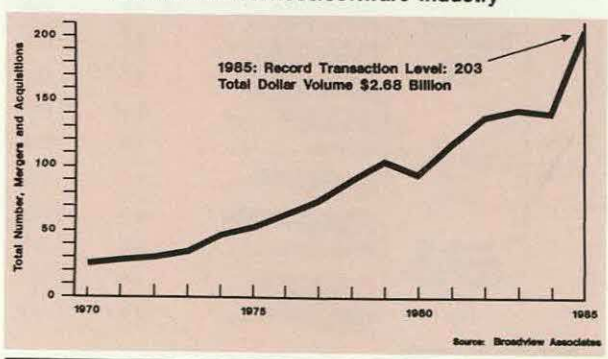


Figure 6 History of merger and acquisition activity — information services/software industry



Recently, many major corporations have acted to position themselves in the information services/ software marketplace, the most notable being General Motors Corporation and its $2.5 billion acquisition of EDS. Every year, major corporations enter the industry, usually by acquiring an existing company. Indeed, half of the Fortune 500 companies have now taken a position in the marketplace. Some have established only a small and insignificant presence; others (like General Motors) have made major commitments.

The number of new participants in the information industry has grown from 12 in 1980 to 23 in 1985. However, the rate is increasing, with 27 new corporations entering the market in the first six months of 1986 — more than in the whole of 1985, which itself was a record year. We believe that this phenomenon is not restricted to the United States. Leading European corporations are also buying their way into the marketplace (Schlumberger and International Thomson, to name but two).

Organisations from many different industries have entered the information-services marketplace through mergers and acquisitions (Figure 7). Publishing firms, such as Dun and Bradstreet, and McGraw-Hill, have been acquiring information-services/ software companies. Insurance companies have also been actively entering the market, as have financial-services companies. American Express, for example, provides major processing services for credit-card transactions in the United States for other banking organisations.

Aerospace manufacturers are also entering the information-industry marketplace. Every aerospace manufacturer in the United States has taken a position, but I believe that not all of them will succeed. In fact, I predict that most of these companies will fail in their information-industry venture because the information-services business is so different from their mainstream business. There is a distinct cultural incompatibility when the price of one new aeroplane can exceed the total annual revenue of a computer-services or software business. The cultural gap creates a tension between the parent and the subsidiary that, in the long run, will mean the aerospace companies will not be able to survive in the information-services marketplace.

Bell operating companies, formed as a result of the consent decree that broke up AT&T, are also entering the market. It is of particular interest to European organisations to note that these operating companies are restricted to specific business areas in the United States, but that those restrictions do not apply to international business. I predict, therefore, that you will see the Bell operating companies entering the European information marketplaces by acquiring software companies. I believe that the Bell operating companies

Figure 7 Firms entering information-services marketplace through merger and acquisition, by industry sector

Industry sector	*Comments*
Publishing Dun & Bradsheet (20)* McGraw-Hill (11)* Simon & Schuster* Commerce Clearing House* Encyclopaedia Britannica* Dow Jones Knight-Ridder	49 information-services firms acquired by 14 publishers Dun & Bradsheet and McGraw-Hill are the most active acquirers
Insurance Travelers* Wausau Maryland Casualty Hartford Insurance St. Paul Company Cigna* CNA Financial Blue Shield of Virginia Equitable Life Assurance Prudential	11 insurance companies, over 20 acquisitions Strategic fit to financial services Changes in health care Many more will be active
Financial services MTech* Citicorp* First National Bank of Chicago* Bank of America* *Mellon Bank* Security Pacific Corp. Crocker National Bank American Express	13 financial institutions 34 transactions 50 per cent by MTech and Citicorp
Aerospace manufacturers Lockheed* McDonnell-Douglas* Martin Marietta* TRW Grumman Litton	6 acquirors Over 25 acquisitions Heavily oriented towards system integration Most will probably fail
Bell operating companies US West* NYNEX Corp.* Cincinnati Bell* Ameritech Bell Atlantic Bell South Pacific Telesis	Major new participants Over $500 million invested All will continue to be active
Health care Baxter Travenol Squibb Corp. McKesson Hospital Corp. of America	Competitive and regulatory reasons are motivating health care providers
Electronics manufacturers NCR* Burroughs* Hewlett-Packard* Xerox* Wang Labs* Convergent Technologies Honeywell Fujitsu Altos Nixdorf Textronix Gould	16 manufacturers 45 transactions Manufacturers must differentiate products

*Multiple acquirors

Source: Broadview Associates

will use their European operations to experiment, in the hope that the restrictions placed on them in the United States will eventually be lifted. The experience gained in Europe will give them a head start in their domestic marketplace when the restrictions are lifted.

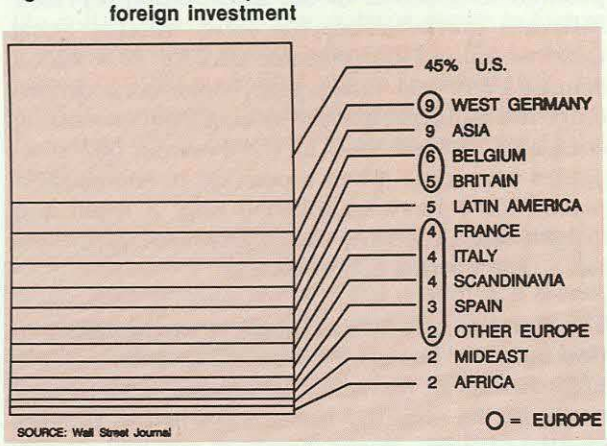
Health-care institutions are also entering the marketplace, as are electronics manufacturers, particularly the second-tier hardware manufacturers (that is, everybody except IBM and DEC). In order to secure their positions in the marketplace, these companies will acquire vertical line companies — VARs (value-added resellers) or software companies that have built expertise in various vertical or horizontal software lines. If they fail to do this, they will become targets for acquisition themselves. Those companies that do manage to build effective vertical product lines will be handsomely rewarded with high profitability.

Communications, transportation, oil and gas, and auditing firms are also involved in the information services marketplace. To my mind, it is questionable whether auditing firms should be in this business; they may have a conflict of interest in serving their clients that precludes their proper involvement in the industry. I will not expand on that topic further here, but I think it is something that you ought to keep in mind as you select your suppliers.

European companies are also active in entering the information-services industry, and we expect to see more of them buying a position in the United States marketplace. Recently, the *Wall Street Journal* conducted a survey that showed that the first choice of European executives for foreign investments was still the United States (see Figure 8). Of the executives surveyed, 45 per cent put the United States as their first choice. Why should this be so? Apart from the favourable rates of exchange, the United States does represent 50 per cent of the world market, and this inevitably means that the market for software products and services will be inviting. Moreover, the market is deep enough to allow specialised and distinct vertical-line applications to be developed successfully. This has not been the case in the more fragmented markets of Europe, and it explains why in Europe the professional-services companies (those organisations building custom software and working in the field of systems integration) have developed into much larger companies. The fragmented markets have simply not permitted the highly developed software products that the enormous market of the United States has facilitated.

Overseas firms, particularly the French, have been very aggressive and active in the United States

Figure 8 Western European executives' first choice for foreign investment



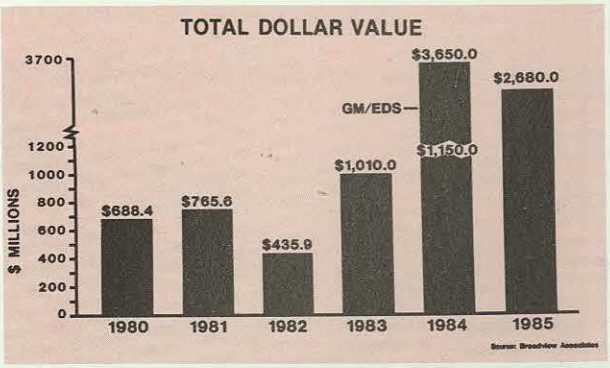
marketplace. You are probably aware that the French government has supported the computer and software industries in their bids to become major exporters. Hence, I am not surprised to see that the major pan-European software and computer services companies are controlled by French companies, not by American.

Figure 9 shows the number of mergers and acquisitions in the US information-services/software industry for each of the last six years. The trend is firmly upward, and is even more pronounced in 1986. During the first half of 1986, 130 companies were acquired in the United States, significantly more than the equivalent figure (82) in the first half of 1985. The same trend is evident when we look at the dollars invested in the market (Figure 10). The dollar value for 1984 is distorted by the $2.5 billion paid by General Motors for EDS, but even eliminating this huge amount, the trend is still upwards. Even without the EDS transaction, the investment in 1984 was $1.1 billion. It grew to $2.6 billion in 1985, and we have no doubt it will exceed $3 billion in 1986.

The General Motors acquisition of EDS is very interesting. I think it will take five years to determine whether this transaction is really successful. Any judgement before that will be premature. In the

Figure 9 Information services/software industry mergers and acquisitions: historical growth 1980-1985

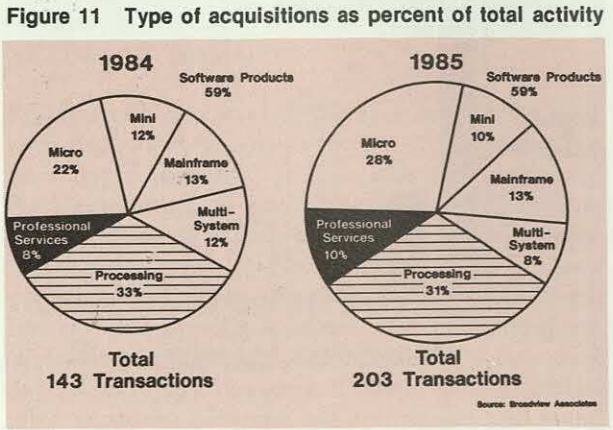
Figure 10 Information services/software industry mergers and acquisitions, historical growth 1980-1985



United States, some wags are saying that General Motors really wanted to buy a milkshake, but actually bought a cow, but I do not think we should jump to that conclusion. Others say that General Motors' substantial internal information needs were not being met by its internal data processing function, and that the EDS transaction was necessary to support General Motors' mainstream business. That may well be true, but it will take several years to see if the problem was corrected. However, if the acquisition of EDS is successful, this type of transaction will be imitated by other corporations, and not just in the United States. Perhaps some of the companies represented here today will follow this route, particularly if you, as the executives in charge of the inhouse systems function, fail to deliver the goods in the eyes of your parent company.

So what type of companies are being acquired? Figure 11 gives a breakdown for 1984 and 1985. About 60 per cent of the transactions involve companies that provide software products, 10 per cent involve professional-services companies, and 30 per cent involve companies providing processing services. That pattern has been fairly consistent for the past few years. About two-thirds of the companies acquired were privately owned, and about a quarter were subsidiaries or divisions of existing companies. (The remainder were public companies.) The fact that an existing company decides to divest itself of an information services/software subsidiary or division does not necessarily mean that the company has made a mistake. Many companies realise they have a valuable asset in their information-systems subsidiary. A shift in overall corporate strategy, or a need to raise capital, coupled with the ease with which a buyer can be found, often means that the time has come to realise that asset.

Figure 11 Type of acquisitions as percent of total activity



INFORMATION-INDUSTRY COMPANIES ARE ATTRACTIVE TO INVESTORS

You may be surprised at the small proportion of publicly owned companies that are acquired. The data shown in Figure 12 illustrates why I believe it is dangerous to acquire a publicly owned company. Quite simply, you will pay substantially more than you will for a privately owned company. First, the information industry commands higher price/earnings ratios than the average of all industries in the United States. Figure 12 shows that the Standard and Poor average multiple for all industries in the United States in 1985 was 12, whereas it was 16 for public companies in the information industry. In addition, when these public information-industry companies were acquired, they commanded a 49 per cent premium over the current public price, compared with an average premium of 37 per cent for companies in other industries. Taken together, the higher price/earnings ratio and the higher premium account for the double mark-up. I believe this explains, for example, the mistake that Schlumberger made when it acquired Fairchild and Manufacturing Data Systems Inc. The plain fact is that you get a better deal if you acquire a privately owned company.

Despite the continuing growing pains of the information-services industry, it rewards its shareholders handsomely (see Figure 13). The average market-to-book ratio of information-services companies is 3.5,

Figure 12 Acquisition premiums paid for public software/information services companies, 1985

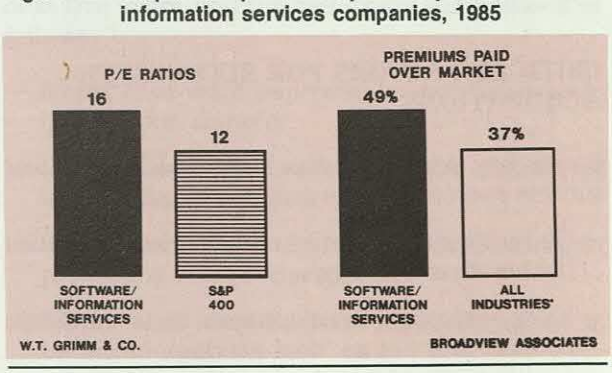
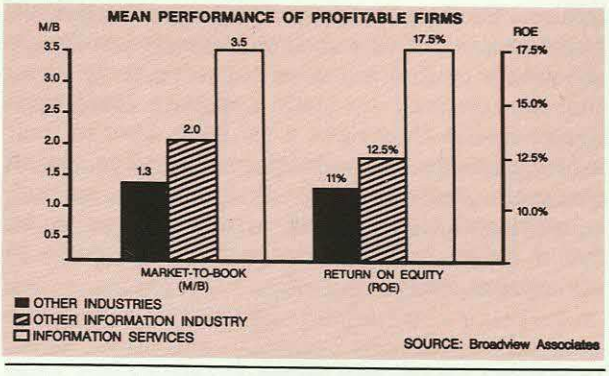


Figure 13 Information service sector rewards for shareholders



whereas all information-industry companies (hardware, communications, etc.) average a market-to-book ratio of 2.0 (compared with 1.3 for all industries). Moreover, information-services companies have an average return on equity of 17.5 per cent compared with 12.5 per cent for all information-industry companies and 11 per cent for all industries.

Different segments of the information industry provide dramatically different shareholder values, as Figure 14 shows. In this figure, I have charted return on equity against market-to-book ratio. The data shows that information services generally is superior to business equipment, office equipment, entertainment services, and consumer electronics. The worst segment of all is communications services. The superior performance of information-services companies is highlighted further in Figure 15. One out of every five publicly held information-services companies in the United States earns over 20 per cent return on equity. That really is a remarkable performance. Compare this with the data for hardware companies (Figure 16), where relatively few companies had a superior return on equity. Even IBM at a 22 per cent return is only just above average performance. Indeed, the average return on equity of hardware companies in this period in the United States was 7.5 per cent, not much better than you could get by leaving your money in the bank.

CRITICAL FACTORS FOR SUCCESSFUL ACQUISITIONS

Broadview Associates has identified four critical success factors for mergers and acquisitions:

- Go for longer-term market-driven opportunities (rather than synergy).
- View external development in a strategic context and not as 'deal-making'.

Figure 14 What business you're in has a dramatic effect on shareholder value

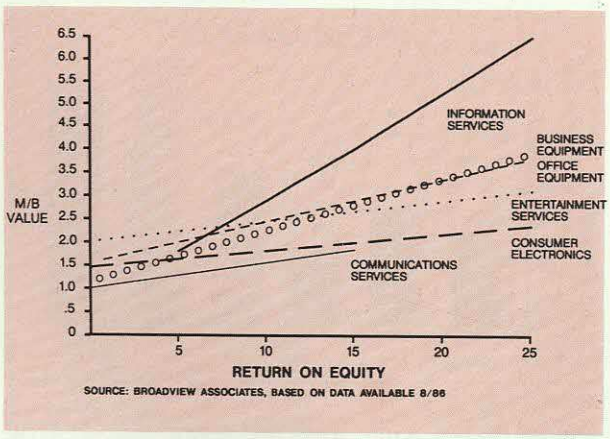


Figure 15 One out of every five publicly held information service firms earns over 20% return on equity

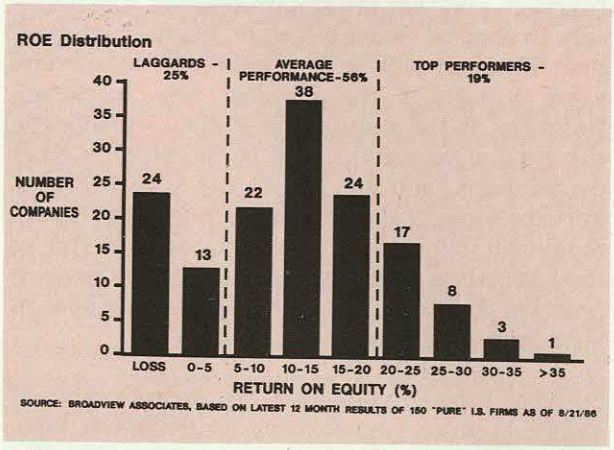
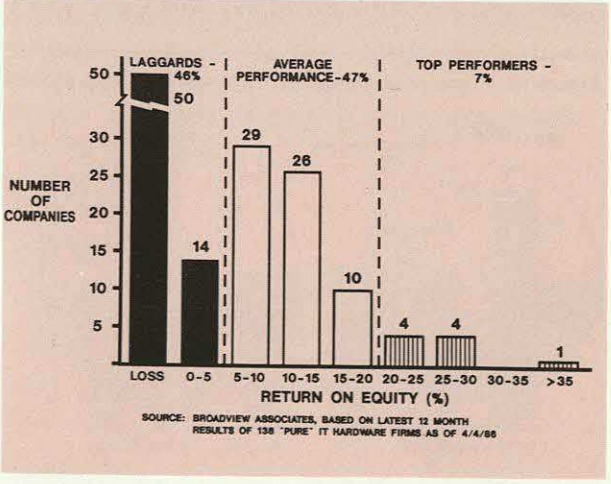


Figure 16 Relatively few publicly held hardware product firms earn a superior return on equity



— Stay close to known experience and available expertise.

— Consider cultural-compatibility issues.

These factors are described in more detail in Figure 17.

Figure 17 Four critical success factors in external development

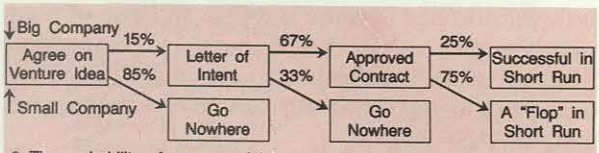
1. Go For Longer Term Marketplace-Driven Opportunities, Rather Than Synergy	3. Stay Close To Your Experience And Expertise
• "One Of The More Exaggerated Concepts" • "Don't Anticipate Any Synergies-They're Just The Jam" • "Synergies Don't Just Happen-You Have To Work At It Step-By-Step"	FORTUNE 100 SURVEY Percent Of Companies Regarding Their Past Acquisitions As Successful Unrelated 27% Partially Related 38% Related Product/Market/ Technology Extension 64%
2. View External Development In Proper Corporate Strategic Perspective-Not Deal-Making	4. Consider Cultural Compatibility
• "First You Get Them Interested, Then You Find Synergy" • "In 1985 Investment Bankers Earned Billions" • "Managerial Intellect Wilted In Competition With Managerial Adrenaline"	CONTROLLABLE • Compensation • Reporting Format • Management Delegation LESS CONTROLLABLE • Top Management Style • Firm Personality • Decision Making

ACQUISITION IS MORE ATTRACTIVE THAN THE ALTERNATIVES

Instead of buying its way into the information industry through a merger or acquisition, an organisation may decide to build its own product. However, there are some very substantial risks associated with a 'make' decision. A study by McKinsey showed that if, as a result of a make decision, a product is six months late in getting to the market, 35 per cent of the profit on that product will be lost. If the product is priced 10 per cent too high, 9 per cent of the profit will be lost. If the development cost overruns by 50 per cent, 3.5 per cent of the profit will be lost. Within the information-technology industry, it is never easy to predict how long or how much it will take to develop a new product, so you can see why mergers and acquisitions are so attractive. As users of the technology, you may feel you are disadvantaged by some of the combinations (the recent Burroughs/Sperry merger, for example). But in my view, such mergers are inevitable, particularly as technology 'windows of opportunity' narrow.

An alternative to an acquisition or merger is a joint venture. I observe that European companies are much more prepared to enter into joint ventures than companies in the United States. The fragmented markets in Europe have forced companies that wish to reach broader markets, or to achieve economies of scale, to contemplate joint ventures. But the number of joint ventures, particularly in technology, that are successful is very small indeed, as Figure 18 shows. If one looks at potential joint ventures between big companies and small

Figure 18 Joint venture dynamics



• The probability of a successful long-term joint venture is 2%

Source: McKinsey & Co.

companies, 85 per cent of the proposed agreements do not even get to the letter-of-intent stage. Of those that do, only two-thirds get to the stage of approved contracts between the parties. Of those that get to approved contracts, only 25 per cent are successful in the short term. Thus, the probability of a successful long-term joint venture is only 2 per cent. That is a very frightening statistic if your company is depending on the joint-venture relationship being successful in the long term.

For a small company, the road to a joint venture usually begins as a search for inexpensive capital. However, the corporate partner usually asks for market exclusivity, R&D priorities, board seats, manufacturing priorities, and so on. The outcome is that a joint venture for a small company frequently become a very risky way to acquire low-cost capital. At the outset of the relationship, the joint venture seems very logical. In effect, the strategic trajectories of two companies cross each other, and it seems very logical that they should form some kind of alliance. But what happens is that the two trajectories continue on their separate paths and rapidly diverge.

SYSTEMS INTEGRATION WILL BE A MAJOR GROWTH AREA

We believe that the professional-services element of the information industry will be a major growth area in the future, particularly in the area of systems integration. Evidence for this comes from a survey by Booz Allen and the *Wall Street Journal*. The survey sought the views of chief executive officers about systems priorities over the next five years, and the results are summarised as follows:

— 68 per cent want improved communications in information transfer.

— 54 per cent want improved access to internal information databases.

— 30 per cent want improved document/report processing and preparation.

— 24 per cent want decision-support systems to be introduced.

The survey showed that there is an enormous demand, an enormous hunger, for information. Information has become not just an issue of competitive survival; it has become a competitive weapon in the marketplace, and chief executive officers (and you) know that it will be used increasingly in that way.

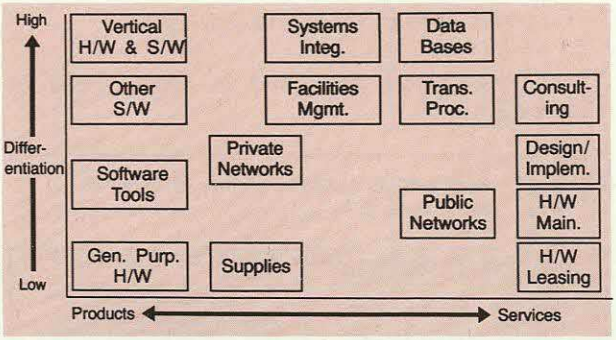
As systems managers, how do you set about satisfying this demand for information? One way, which we believe will become increasingly attractive, is to use an external professional services firm. The continuing shortage, and high cost, of systems designers and consultants creates an increasingly favourable attitude towards the use of outside resources. The result is that the professional-services segment of the information-services industry (which used to be known as the 'body shop' business) is now growing at a rate consistent with the entire information-services industry and is beginning to produce profit margins approaching those historically associated with software-products companies. We are seeing the emergence of a new type of professional systems-integration services firm. We believe that the growth of this new segment is being funded by the cutback in the amount of money firms are spending on computer hardware. It is not that they are spending less in the area of information processing, it is that they are spending the total differently.

Traditionally, the response to a lack of information in a firm was to install another mainframe computer. Today, though, that is not happening. Instead, firms are investing in the development of systems that are long overdue — systems that give the firm a competitive advantage. We believe that this explains why the systems-integration segment of the industry is prospering at a time when there is a slump in the computer industry in the United States.

Systems integration is at the highest end of the professional-services market. The major purpose of system integration is to ensure interoperability — that is, the free and immediate exchange of information between the varying hardware elements within the systems. Increasingly, organisations are turning to systems integrators who are capable of ensuring interoperability between the multiple resource elements within a system (hardware, software, networks, information, and people), which may be disparate in terms of suppliers, protocols, location, and availability. Systems integrators can ensure that systems interconnect with each other throughout the whole life cycle.

The systems-integration area is therefore the meeting ground for all the participants in the information-technology industry (see Figure 19); it brings

Figure 19 Systems integration: The meeting ground for IT players



together the products and services, and all the elements that are necessary to create a massive system. EDS is one of the early players in the systems-integration marketplace, as is Cap Gemini in Europe. The need for systems integrators arose originally in government and military applications, but it is now growing quickly in the larger product-sector enterprises because the world is becoming more complex. If there are four different computing environments in an organisation, the number of possible linkages is 11; if there are six environments, there are 57 possible linkages.

Other factors adding to the complexity of the environment, and hence to the need for systems integrators, are:

— Proliferating protocols and sources of supply.

— More complex and embedded architectures and technologies, including widely dispersed information-technology elements, networks, fourth-generation software, mixed voice-data-image processing, and fault-tolerant hardware.

— More integrated, but slower, decision-making processes where information is used competitively by departmental executives, by the MIS director, by telecommunications managers, and by top executives.

The alternative to systems integration is what I call the Tower of Babel approach, where information is processed and massaged, but is difficult to use, and is unacceptable to many people in the organisation. The systems integrator puts all the pieces together and acts as consultant, analyst, and programmer. He is also responsible for buying the hardware, and often may then take on the responsibility for operating and maintaining the systems.

The systems-integration business provides an organisation with a very attractive resource. This is one of the reasons why General Motors acquired EDS. Other large corporations may contemplate similar business ventures because systems integra-

tion is a very attractive marketplace. The main attractions are:

- A large, established multibillion-dollar public-sector market.
- Rapid growth, primarily in the private sector.
- High return on investment potential (more than 20 per cent).
- Low asset intensity.
- Fragmented competition.
- 'Big-ticket' sales with recurring revenue potential.
- Limited technological risk (compared to product businesses).

Some minicomputer manufacturers believe their future lies in buying positions in vertical, niche marketplaces. I would certainly advise them to consider becoming very expert in fewer things, but I would also advise them to enter the systems-integration marketplace. Indeed, I believe that if there is a future to the merger between Sperry and Burroughs, the new Unisys company must become a major player in the systems-integration marketplace.

Nevertheless, there are some risks associated with the systems-integration marketplace:

- There will be occasional overruns and systems failures, which can be highly visible.
- The private-sector market is unproven.
- It is difficult to transfer resources between public and private sectors.
- Interoperability tools ('bridges') are still not readily available or proven.
- An extremely broad base of skills and knowledge is required.
- Historically, the industry has high turnover rates.
- There is a long, expensive, and intensely competitive sales cycle requiring very sophisticated marketing expertise.

Any organisation seeking to enter the systems integration business has to evaluate the risks by considering the strategic issues listed in Figure 20.

Figure 20 Those seeking to enter into or expand their systems integration business face several strategic issues

- Target Markets:
  - Private vs. Public Sector
  - Specific Industry/Agency Segments
  - Customer Needs Profiles
  - Geographic Selectivity?
- Stimulating Demand in Newer Markets:
  - Civilian Federal Government
  - State and Local Government
  - Other Non-Profits
  - Choice Private-Sector Segments?
- Range of Services to be Offered:
  - Development and Design Only
  - Special Capabilities, e.g. Manufacturing, Classical Engineering
  - Operational Role
- Relevant Existing Resources and Other Attributes:
  - Speed of Entry
  - Develop Internally or Acquire
  - Strategic Affiliations?
- Levels of Investment and Expected Paybacks?
- Organizational Placement and Structure?
- Decision/Risk Control Points?

FUTURE OF THE SOFTWARE BUSINESS

Let me look now at the software side of the industry. There are several 'infotrends' that are reshaping the software business, and these are listed in Figure 21. First of all, the software industry is an international business. Software can be delivered electronically (and instantly) throughout the world, and it is adaptable. New software technologies are emerging — application generators, artificial intelligence, the physical distribution of software through compact-disc technology and downloading techniques, and transportable languages and operating systems. Another major trend is the joint marketing of complementary services and products. There is also the deepening penetration of the software business by computer manufacturers, specifically by the second-tier computer manufacturers.

Figure 21 A number of Infotrends are reshaping the software business

- New Technologies
  - Applications Generators
  - AI – Mainly Expert Systems, Pattern Analysis, Process Control
  - Physical Distribution – CD-I, Downloading
  - "Transportable" Languages, Operating Systems
- Joint Marketing of Complementary Products/Services
  - Different Categories of Software with...
  - Hardware, Electronic Data Bases and/or Remote Processing Services
- Deepening Penetration by the Computer Manufacturers
- Downsizing Pricing Pressures
- Globalization – Systems Software First, then Applications
- Certain Horizontal Software Becoming Vertical
- Integration of Specialized Hardware Components
  - Interfaces
  - Other Special Function Chips and Boards
- Mounting Pressure on Marketing Effectiveness

There is also the problem of down-sizing pricing pressures on software. It was acceptable to put an $80,000 price tag on software that added value to a $1 million mainframe. Now that the equivalent of that mainframe has fallen in price to $40,000, it is not as easy to sell software for $80,000. Another trend is for 'horizontal' software (traditional general ledgers, accounts receivable systems, even word processing systems, and the like) to become increasingly sophisticated and 'vertical' as they are directed at specific markets.

The final software 'infotrend' (mounting pressure on marketing effectiveness) is one of the reasons I believe that, in the long run, the French will be successful in the software business. Packaging of software will become very important, and the French have a long history of exporting products (perfume and champagne for example) where the contents of the bottle is less important than the bottle itself. The same is also true for many types of software.

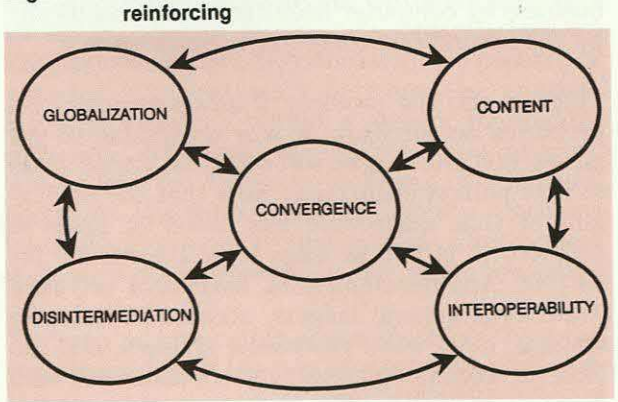
The software market is developing rapidly. Historically, it has produced very high rates of return, but there is some evidence to suggest that software companies cannot grow beyond a particular size, particularly those companies aiming their products at specific market niches. Moreover, software companies are very vulnerable to changes in technology, particularly to changes introduced by IBM.

THE INFOTRENDS SHAPING THE MARKETPLACE

The 'infotrends' shaping the information marketplace are interrelated and reinforce each other (see Figure 22). These trends are the driving force behind the acquisitions and strategic partnerings that are occurring in this marketplace. The first infotrend concerns the importance of content. Earlier, I said that the database business is the most defensible position in the marketplace. My own research shows that hardware and telecommunications firms are seeking to diversify into software and databases and other special resources, and this is driving their acquisition programmes.

The second infotrend is what I call 'interoperability', which is a shorthand way of describing the need for all machines to talk to each to other for the free and immediate interchange of data between machines and their users. User pressure for interoperability will become irresistible. Without interoperability, user organisations will not be able to control their information, or their competitive positions.

Figure 22 The infotrends are interrelated and mutually reinforcing



I describe the third infotrend as 'disintermediation'. As information becomes more complete and more available, there will be changes in the business environment because the need for intermediaries will disappear. For example, there is no need for a travel agent if every member of your staff has some form of terminal on his desk through which he can immediately book a flight that fits in with his schedule. This is a very difficult thing for me to say because I am a financial intermediary in the business of mergers and acquisitions. I can only hope that disintermediation will come to my market later than it comes to the travel-agency market!

The fourth infotrend is called globalisation. I have pointed out that the United States marketplace represents 50 per cent of the world market. That has to be attractive to large European companies and to Japanese companies as well. Anybody who wants to be a major player in the information industry has to recognise that it is a global market.

The final infotrend is the process of convergence, which ties all of the other trends together. Convergence is the underlying reason that 20 or 30 new companies a year take positions in the marketplace; it is also the reason they are attracted to the higher rates of returns in this marketplace. In my belief, it is also the reason why you will see the same phenomenon in Europe (indeed, it is already evident), as the information industry becomes the largest industry in the world.

THE FUTURE

Let me conclude with some predictions based on the mass of data I have presented. History has shown that no information-technology supplier, no matter how large (and I include IBM) or entrenched, is secure. Today's winners could easily become tomorrow's vanquished. The mid-1980s slowdown in the demand for mainstream computers and voice equipment has harmed even the most successful and self-confident suppliers. In general, all the main product segments will be dominated by powerful product suppliers in search of higher returns on equity, greater stability, and more value-added content. These suppliers will elbow their way in on the strength of their new technologies and their vigorous (and rigorous) management disciplines — qualities that have frequently been absent from traditional service suppliers.

All three product segments (office equipment, consumer electronics, and communications) will continue to experience ever shorter product life cycles, driven by 'technology leapfrogging', as well as by much more information-technology-literate customers. The cumulative effect will be sharp

fluctuations in sales cycles. Product differentiation based purely on computing 'horsepower' will be increasingly difficult to achieve. Instead, marketing, service, and pricing strategies will often determine whether a supplier prospers or goes to the wall. Moreover, the distinctions between the product segments will continue to blur.

The user and supplier quest for content differentiation and for interoperability will become all consuming, and will cause a shift from the traditional 'not-invented-here' attitude to the external development activities that I call mergers and acquisitions. Understanding these trends, either as a user or a supplier in the information marketplace, will help you to minimise the risks that you face, and will increase the future rewards of using information technology.

BUTLER COX FOUNDATION

Butler Cox

Butler Cox is an independent management consultancy and research organisation, specialising in the application of information technology within commerce, government and industry. The company offers a wide range of services both to suppliers and users of this technology. The Butler Cox Foundation is a service operated by Butler Cox on behalf of subscribing members.

Objectives of the Foundation

The Butler Cox Foundation sets out to study on behalf of subscribing members the opportunities and possible threats arising from developments in the field of information systems.

New developments in technology offer exciting opportunities — and also pose certain threats — for all organisations, whether in industry, commerce or government. New types of systems, combining computers, telecommunications and automated office equipment, are becoming not only possible, but also economically feasible.

As a result, any manager who is responsible for introducing new systems is confronted with the crucial question of how best to fit these elements together in ways that are effective, practical and economic.

While the equipment is becoming cheaper, the reverse is true of people — and this applies both to the people who design systems and those who make use of them. At the same time, human considerations become even more important as people's attitudes towards their working environment change.

These developments raise new questions for the manager of the information systems function as he seeks to determine and achieve the best economic mix from this technology.

Membership of the Foundation

The majority of organisations participating in the Butler Cox Foundation are large organisations seeking to exploit to the full the most recent developments in information systems technology. An important minority of the membership is formed by suppliers of the technology. The membership is international with participants from Australia, Belgium, France, Italy, the Netherlands, Sweden, Switzerland, the United Kingdom and elsewhere.

The Foundation Research Programme

The research programme is planned jointly by Butler Cox and by the member organisations. Each year Butler Cox draws up a short-list of topics that reflects the Foundation's view of the important issues in information systems technology and its application. Member organisations rank the topics according to their own requirements and as a result of this process members' preferences are determined.

Before each research project starts there is a further opportunity for members to influence the direction of the research. A detailed description of the project defining its scope and the issues to be addressed is sent to all members for comment.

The Report Series

The Foundation publishes six research reports each year. The reports are intended to be read primarily by senior and middle managers who are concerned with the planning of information systems. They are, however, written in a style that makes them suitable to be read both by line managers and functional managers. The reports concentrate on defining key management issues and on offering advice and guidance on how and when to address those issues.

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