

**SWP 31/90 ELECTRONIC DATA INTERCHANGE STANDARDS AND
THE SINGLE EUROPEAN MARKET**

**ANDY BYTHEWAY
Cranfield School of Management
Cranfield Institute of Technology
Cranfield
Bedford MK43 OAL
UK**

(Tel: 0234 - 751122)

and

**ROBERT NEELY
Security and Communications
Cranfield Information Technology Institute**



ELECTRONIC DATA INTERCHANGE: THE LONGER TERM EFFECTS ON INTERNATIONAL TRADE

Introduction:

This series of working papers has been prepared as part of the early work in a new programme of research, based at the Cranfield School of Management. The topic for research is the "Longer term effects of Electronic Data Interchange" on business, in the United Kingdom, Europe, and elsewhere in the world.

Contents:

Seven working papers are available, as follows:

Topic	Date
Glossary of EDI terms and acronyms	18th July 1989
EDI: Technical Opportunity or Business necessity?	18th July 1989
Survey of EDI users and service providers in the UK	October 1989
An update report from the "EDI '89" conference in London	6th November 1990
EDI and advanced information processing - the way ahead	15th September 1989
EDI Standards and the Single European Market	11th September 1989
The effects of EDI on the financial sector	18th December 1989

Acknowledgement

We are grateful to the **International Foundation for Artificial Intelligence** and to the **Cranfield Ecotechnology Research Centre**, without whose support and encouragement this project would not have been possible. We are also grateful to the authors who contributed to the different papers; the author and source of each paper is detailed on the cover sheets.

Andy Bytheway,
Information Systems Group,
Cranfield School of Management,
Cranfield Institute of Technology,
Cranfield,
Bedford, MK43 0AL,
United Kingdom.

Telephone: 0234 751122
Telex: 826559 (CITMAN G)
Facsimile: 0234 751806



Introduction

1992 is the date set for the completion of legislation designed to create a Single European Market among the nations of the European Community.

1992 legislation is wide ranging and affects many different aspects of business and industry. Of the 432 European Community regulations relating to 1992, 15 relate directly to Telecoms and IT, 36 relate to Financial Services and 79 (the second largest number) relate to Industrial Harmonisation.

Key developments and issues

In financial services one major IT effect is on the European standardisation of payment cards. In public procurement and under the heading of Telecom and IT, the issues are adherence to Open Systems Interconnection standards, harmonised telecoms and IT standards, progress towards a European ISDN system and distributed processing standards beyond OSI for Europe. The main constraint on rapid take-up will be the deep concern about the privacy and security of the electronic communications.

In the EC regulation areas of Company Law, Consumer Protection, Control of Goods, Control of Individuals, Environmental, Financial Services, Indirect Taxation, Industrial and Transport, the IT effects will be felt in changes to international freight, delivery and shipping systems, in standardised export documentation and in cross-border information flow, where again the legal aspects of controlling cross-border data transmission are still under investigation.

Effect on Information Technology providers

A recent study showed that the main effect of the Single European market on IT hardware, software and service providers will come indirectly through their customers, particularly their customers in the finance sector. The structural changes occurring within companies in all industries as they adjust to the new European conditions mean that new, different IT systems and software packages will be required. Pan-European marketing will require sophisticated product and price information systems and increased use of Electronic Data Interchange (EDI). As European companies grow, their finance departments will demand international company information and make increasing use of systems such as Electronic Funds Transfer (EFT). In addition to this, Financial Services such as in Banking and Insurance will demand certifiably secure international networks and computer systems to operate them.

Already subject to constant change, the IT industry is going to see an even greater upheaval up to, and past, 1992. Motivations for this increased pace of change are not only the 1992 legislation but social and political re-alignment in Europe and the continuing advance of technology, particularly the coupling of artificial intelligence software into network servers.

Major organisations throughout Europe are gearing their operations to take advantage of the opportunities for further foreign trade offered by 1992 and to protect themselves from those in other countries doing the same. Inevitably this leads to changes in structure, organisation and procedures which in turn are translated into new requirements for IT products and



services. Again, the rapid deployment of the IT services is critically dependent on internationally agreed standards for protocols, networking services and application program interfaces. In the UK, the Cranfield Information Technology Institute has, via the Department of Trade and Industry, studied and advised on the impact of EDI on industry and organisation structures. This work was carried out in connection with the UK VANGUARD initiative, which considers ways to accelerate the uptake of EDI and in connection with the EDI exploitation strategies of UK "blue chip" organisations.

In opening its borders, Europe exposes itself to further penetration from US, Japanese and Far Eastern companies. One IT effect already seen is that national variants of standards can be used to lock out some competitors while still permitting an attack on their home market.

Distribution to the Single Market

Re-positioning of IT customer companies has a major impact on the way products and services need to be delivered and hence on IT distribution channels. Increased volumes and geographical spread of distribution are needed to gain necessary economies of scale and to offer local service to pan-European users.

More companies are starting to look at Europe as a single market rather than as a collection of linked markets. Even the companies that already operate a co-ordinated Europe-wide policy are reviewing their structure in the light of changes taking place.

Changes in organisation demand new IT structures to support corporate computing strategies. This perception by the top management of multinationals has led them to seek advice on how best to restructure the IT functions. Cranfield Information Technology Institute is giving this guidance to top management in a chemicals multi-national that needed to restructure their voice and data communications services.

American multi-nationals have already reacted to 1992 by accelerating the integration of their European development, production and distribution. As a result, they are among the main beneficiaries of a Single European Market. Other multi-nationals from other parts of the world are starting to follow this path with the inevitable consequences of fundamental changes to existing information systems.

Pan-European company structures also make international data communications increasingly important. Electronic Data Interchange is one activity already set on a rapid growth path. This will accelerate as service providers see the opportunities to provide multi-VAN capability on an international scale.

As a result of American multi-national targetting of the European IT market, their European perception is that the key Open System Interconnection standards initiative is passing into the control of U.S. commercial and government organisations. The current debates over the security enhancements to OSI and the role of the U.S. Secure Data Network System consortium are evidence of this growing concern.



The effect on siting policy

As transport between parts of the European market becomes less restricted, companies with international manufacturing and distribution will want to re-assess their policy for siting manufacturing plant and for locating distribution centres.

Companies will also want to have access to stock levels on a pan-European basis to give customers a better response in a situation of high competition.

With easy cross-border travel, service companies will reassess such issues as siting of service centres. This may mean servicing from centres geographically close to the customers but not necessarily in the same country.

The effect on corporate marketing policies

Companies that have succeeded in rationalising their marketing on a pan-European basis have already made considerable savings through rationalising brands, simplifying manufacturing and reducing inventories. International marketing means increasing the horizontal communications in companies. This strongly impacts their IT networking and telecommunications strategy. The aim of this improved communication is enable pooling of information across boundaries on relevant market conditions and to co-ordinate future marketing plans. Co-ordinated marketing means having a Europe-wide policy for marketing information and control which will lead in many cases to adopting international standards at the expense of some nationally-based systems.

A bigger market means widening the spread of purchase options on the international market. Buyers need to know where they can buy supplies at the best price and will need to locate suppliers who can deliver to distributed sites across Europe. This creates opportunities for providing computer-based international services on product/price information. If such systems are to be used effectively, the multiplicity of user interfaces and command sets to the various systems must be reduced or hidden by the use of agent technology. Also the information overload on users must be removed by advanced use of information refinery software incorporating A.I. techniques and supported by dedicated hardware accelerators. In many cases the information processing load requires the use of multiprocessor systems and federated architectures.

Purchasing systems will also be required to deal in multiple currencies although there may be slow convergence towards a single European monetary unit. Trading in a pan-European market with different currencies and tax regimes complicates the financial aspects of companies' information systems. The constantly growing demand for Electronic Funds Transfer will continue to be in the context of financial systems dealing with international pricing and encompassing multiple tax rates and different classifications of taxable items for some time.

Financial services are already becoming more international, assisted by communications technology which eases the transfer of information and funds on an international scale. Despite this, services such as banking and insurance have tended to be nationally based because of different legislation in each country. Specific EC legislation is directed at removing these national differences. This will allow financial services to operate on a trans-national scale across Europe.



Such internationalisation of financial services will fuel an expanding need for secure international networks and associated secure computer systems. It will also demand increased standardisation which is being met by the 1992 legislation particularly in the areas of Open Systems Interconnection (OSI) and standards for payment cards (both of which are covered by specific 1992 legislation).

European Community Public Procurement

Spending on public procurement currently represents 20% of the the Community GDP and currently less than 2% of this goes to firms outside the public body's parent state.

Protectionist national procurement policies impose massive economic costs estimated at 0.5% of GDP. They also perpetuate fragmentation and underpin divergent national standards.

For these reasons, the Commission has already imposed a directive on public procurement which involves opening up business to competitive tender from companies outside the originating state. This gives more IT companies opportunities to tender for government business. At the same time, the major European-based computer companies which have received a good deal of protection from their states in the past stand to suffer from the new legislation if they are not competitive and operating to European, or preferably international, standards. What has not been adequately addressed in Europe is the certification issue, without which end-user organisations have no real knowledge of whether the systems they buy are OSI-conformant and, even if they were, whether interoperability is likely.

1992 is seen as a major boost to Open Systems Interconnection and to the UNIX operating system market place. There are several reasons why the European IT industry sees standards as important.

Firstly, variations in national standards make it difficult to gain the benefits of scale in the European market. Secondly, European companies see standards as one way of attacking the dominance of the U.S. and Japanese companies by blurring product differentiation and giving less of a platform for sales on grounds other than price and performance.

Co-operation in Europe on standards-setting is already well established with such bodies as SPAG, X/Open and the Open Software Foundation. A significant development here is the growing number of Japanese companies participating in the OSF. Apart from the major companies such as Hitachi, Toshiba, and Sumitomo Electric Industries, smaller companies are now joining. The most recent being a Tokyo based publishing company with interests in the provision of networking services.

In general, the likelihood of organisations issuing international invitations to tender after 1992 is much higher. For many companies the protection of national boundaries will disappear after 1992 and the market will open to importers and exporters.

The emergence of international software and the utilisation of multi-lingual consultancies are the main qualifications for increased choice of software and services. Where the choice of products and services is widened, many organisations perceive the increased availability to be focussed more specifically in the software and services areas.

Existing IT information structures in organisations are determined by: the balance between national and international focus, and the balance between a centralised and decentralised policy.



Vendors already operating on a Europe-wide basis are perceived to benefit most from the Single European Market legislation but these vendors are primarily the large US ones: IBM, Digital, Unisys. European vendors who want to compete successfully need to accumulate critical mass to survive. To achieve this, they will need to participate in strategic alliances to compete with American and Japanese companies. One example of such an alliance was the link-up between the UK's International Computers and Japan's Fujitsu.

The alternative to growth in size is to seek niche markets and to specialise in specific horizontal/vertical market sectors. For IT vendors, 1992 has most impact on niche market specialists. Opening up Europe gives them a wider market and more acceptability in foreign markets as the procurement net spreads. Surveys confirm that users are not very concerned with the country of origin when they make IT purchases, so for the European IT vendor, their European origin confers no sales benefit as regards customer perception.

As US and Japanese companies focus on the single European market, existing installed bases will become much harder for European IT vendors to protect.

The main effects on hardware are likely to result from the standards on open systems and telecommunications which are a natural development within IT but are also part of the 1992 legislation.

National languages, however, are the biggest variant in terms of fundamental design affecting both software and hardware. Differing character sets are needed for most European countries and that implies different keyboards and (sometimes) different printers. This often prevents complete systems from being shipped unmodified from one country to another and is a barrier that will not be overcome by 1992 legislation.

Technological developments are changing the nature of IT distribution towards a mass market approach. This is seen in both the PC "shrink-wrapped" software market and in its counterpart, the Architecture-Neutral Distribution Format of the Open Software Foundation.

International technology is by nature an international business with international products. User companies in Europe are accustomed to accepting hardware and software products not made in their own country. This will continue through 1992 with the overwhelming majority of users not concerned about product nationality. This gives all IT vendors the opportunity to succeed in marketing outside their own country.

USA/ Japanese Competition

While the European IT industry has grown substantially in the last twenty years, it has not grown as fast as the global market as a whole.

Europe represents 12 separate markets, the largest of which, Germany, is less than half the size of the Japanese market and a quarter of that of the USA. On its own, no European country can compete with the massive resources of Japan and the U.S.

Europe makes less use of IT products and services than Japan and USA. For example, only half as much per capita is spent in Europe on communication services as in the U.S.

The home markets available to American and Japanese companies, therefore, provide a solid foundation and economies of scale to attack the more difficult European market.



As a result, European IT is dominated by Japanese and U.S. companies that have achieved significant penetration in all European countries despite the difficulties of trading across borders.

This domination will not diminish in 1992. Many economists expect Europe's trade balance with the U.S. and Japan to deteriorate during the initial stages of the single market.

To counter protectionist measures, Japanese companies have been making significant capital investments in Europe and embarking on joint ventures with companies in Europe. The alternative ways that European companies have in the short term of alleviating the effects of dominance of Japanese and other Far Eastern companies is to cooperate either with other European ventures or with them in joint ventures on production and marketing.

The major American IT companies are already well established in Europe (which, from their transatlantic viewpoint, they have always tended to regard as a single market). Because of this, they are likely to be the major beneficiaries of 1992.

American companies have not been slow to ensure that they make the most of the 1992 legislation and have been studying its effects in detail to ensure that they are positioned to take best advantage of it. This has led them to take up leading positions of influence both in OSI standardisation and in the further development of UNIX technology.

For UK companies with international objectives, this means that competition from the established IT industry leaders from the USA and Japan will intensify in the years immediately up to and following 1992.

Conclusion

The key enabling technologies for EDI to be used effectively in the emerging Single European Market are:

- o implementations of Open System Interconnection standards that are conformance tested, interoperability tested and certified to the application sector to be fit for the service provision purpose
- o security provision in the networking services, the host operating systems, the EDI applications, the database subsystems and the user interface components
- o agreement on the standards that describe cross-community business functions.

