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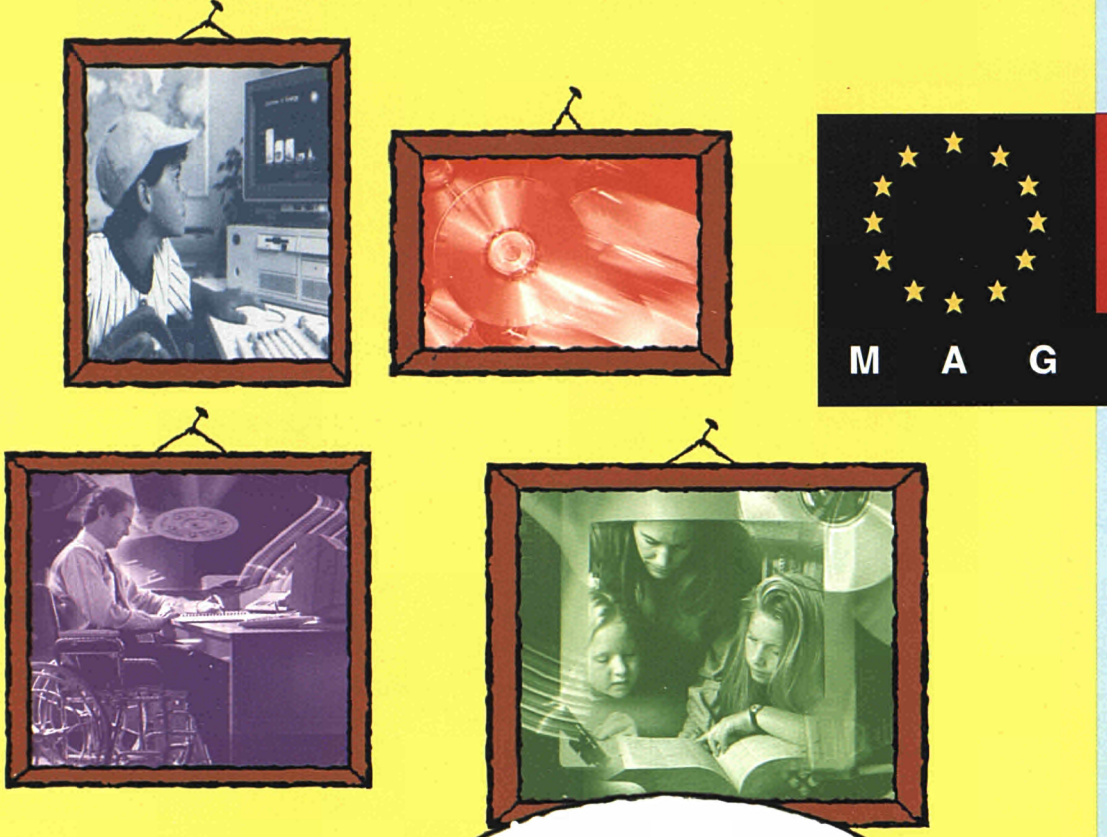

Human aspects of the information society

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I&T MAGAZINE

APRIL 1996 No. 19

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Editorial

THE INFORMATION SOCIETY has often been spoken of as a revolution in the way we live our lives – a revolution as wide-ranging in its impact as the Industrial Revolution was in its day. In fact the 'information revolution' promises to have a greater effect than its predecessor.

First, the speed of change is far greater. We only have to reflect that the power of the steam engines that Boulton and Watt were producing in the 1780s was little different from that of engines 60 years before. By comparison, the computing power you can buy for an ECU doubles about every three years.

The second difference is that the information revolution is global from the outset. While the industrial revolution can be seen as having a genesis that is fixed in time and geography, the information revolution is diversified and dispersed, coalescing from disparate technologies developed in different places and times. Furthermore, taking place in the context of increasingly global markets, the information revolution forms a feedback loop that serves to accelerate the speed of globalisation.

The third difference is that the information society by its very nature has a direct impact on the individual. An impact that can be either inclusive or exclusive. It has the potential to create a 'global village,' open to all, but also to create an exclusive club limited to those with the right equipment and the right know-how.

So the question we must ask ourselves is: how can we ensure that the Information Society *does not* lead to exclusion, adding to the divisions that still exist in society? How can we avoid creating a society in which the computer-illiterate and the non-connected are left on the margins?

By the people, for the people?

The Commission's commitment to liberalisation of the information and telecommunications market will be a key factor in ensuring that the products of the information society will be available and accessible to the broadest possible user base. We want to create a virtuous circle. If there is a high demand for new services, suppliers will naturally seek to satisfy that demand. Choice of services will grow, alternatives and competition will force quality up and prices down. More users and customers will come into the market, and demand will grow further.

Of course, there are practical steps we can take to ensure that people are not left behind. Education and training is a vital tool in preparing to meet the new challenges of the information society. Young people who grow up in a PC-dominated world will see nothing unusual in the information society. It is the older generations who are likely have problems with this new challenge. Therefore, it is vital that the concept of 'Life-Long Learning' is taken to heart, not only by individuals, who must be prepared to be flexible and open to new experiences, but also to businesses, who need to view training as an exercise that adds value to their workforce. We need to invest more in education and training, both for the information society and through the information society.

The information revolution differs from its predecessors in one further respect: it contains within itself many of the answers to the problems it raises. Just as it offers new learning tools that can make education and training more efficient, the information society also offers the potential to help some of our most disadvantaged and isolated citizens. Disabled people can use the Internet as easily as anyone else. It doesn't matter what class, sex or race you are – you don't even need an e-mail address, thanks to the rapidly expanding network of Cyber-cafés!

In December 1995, the City of Stockholm hosted a conference on 'Implementation of the Information Society in Cities and Regions' which it was my pleasure to attend. This conference provided an ideal opportunity to see what is going on at ground level: local authorities, local groupings of businesses and the citizens themselves are working hard to ensure that the information society does not leave them behind. This 'just do it' mentality offers us the greatest hope for the future.

It is no longer a question of whether Europe will join the information society. The information society is happening all around us already. Our goal now should be to make sure that its benefits are spread throughout society. ■

Stefano Micossi *DGIII*

User-friendly government

Berlin officials on the infobahn

"BARKING RATHER THAN ASKING" was how the *Spiegel* headed its article of last May on the training offensive mounted by the Berlin authorities to curb city officials' allegedly cavalier treatment of the public. However, this abrasive manner, often known as "Berliners' sharp tongue," because of its unmistakable origins, is all too understandable, and not just amongst public servants. One need only think of the many Berlin taxidrivers who now find their time-hallowed routes blocked off by roadworks.

For in no other city is change quite so painfully apparent as in Berlin. Take construction: more than 300 building projects now dominate the skyline, including the largest building site in Europe, on the Potsdamer Platz. On the other hand, many international companies such as Sony and Asea Brown Boveri are transferring their European head offices to Berlin, sending out a clear signal that the city is a good place to do business. The largest industrial city between Paris and Moscow is a hive of activity.....

The local authorities have not been spared the consequences. The extension of the city boundaries, the population increase to some 3.5 million and the disparities in infrastructure on either side of the former East/West divide have brought huge administrative challenges.

Innovative information and communications technology has become the order of the day, coordinated across Berlin by the Land's information technology department (LIT). And a structural disadvantage – the outmoded computer infrastructure in the former East Berlin – has been turned to advantage in the process. New IT projects need not take old hardware into account – with the result that new applications can run on new infrastructure from the outset.

The Metropolitan Area Network

At the heart of the new infrastructure is the LIT-designed metropolitan area network (MAN). The first development phase came on stream in September 1994 – bringing high-speed communications to sections of the municipal government and the local education and research organisation, linking some 100 locations. In 1996, Berlin council's production network is due to switch to ATM, with a transmission bandwidth of 155 megabits per second.

Using modern fibre optic cables, the MAN carrier is scheduled to gradually provide high-speed communications link-ups for all Berlin's government offices and universities. The lines circle the eastern part of the city, meeting up with the existing circuit in the western half to form a figure of eight.

But MAN cannot live by speed alone: content is crucial too. That is why administrative applications planned for Berlin over the last few years have been integrated into the network: automated budgeting, an automated property register, integrated personnel management, automated social security and an environmental information system. Online applications that predate the MAN have also been included, for instance in the fields of crime control and resident and vehicle registration. These applications are chiefly intended for Berlin's 23 district authorities and, in conjunction with the MAN, help make government more user-friendly. The following are a few of the improvements:

- Departments can now set and coordinate deadlines electronically.
- Authorised persons can access text and graphics from any terminal, regardless of the workstation from which the data is sent.
- People moving home inside Berlin need no longer traipse across the city to obtain specific records and certificates from their former district authority: their new authority can access the data on the network.
- Ideally, one official should be able to perform an entire administrative procedure from A to Z. So someone making a claim for benefits at 9 am could have the entitlement decision within just half an hour.

For the time being, cross-sectoral cooperation between departments on the MAN – on applications for planning permission for example – is still a somewhat futuristic proposition. However, thought is already being given to how a number of applications which have hitherto been confined exclusively to individual departments might be adapted for intersectoral economic functions. Multimedia applications are also to be integrated into the MAN at a later stage.

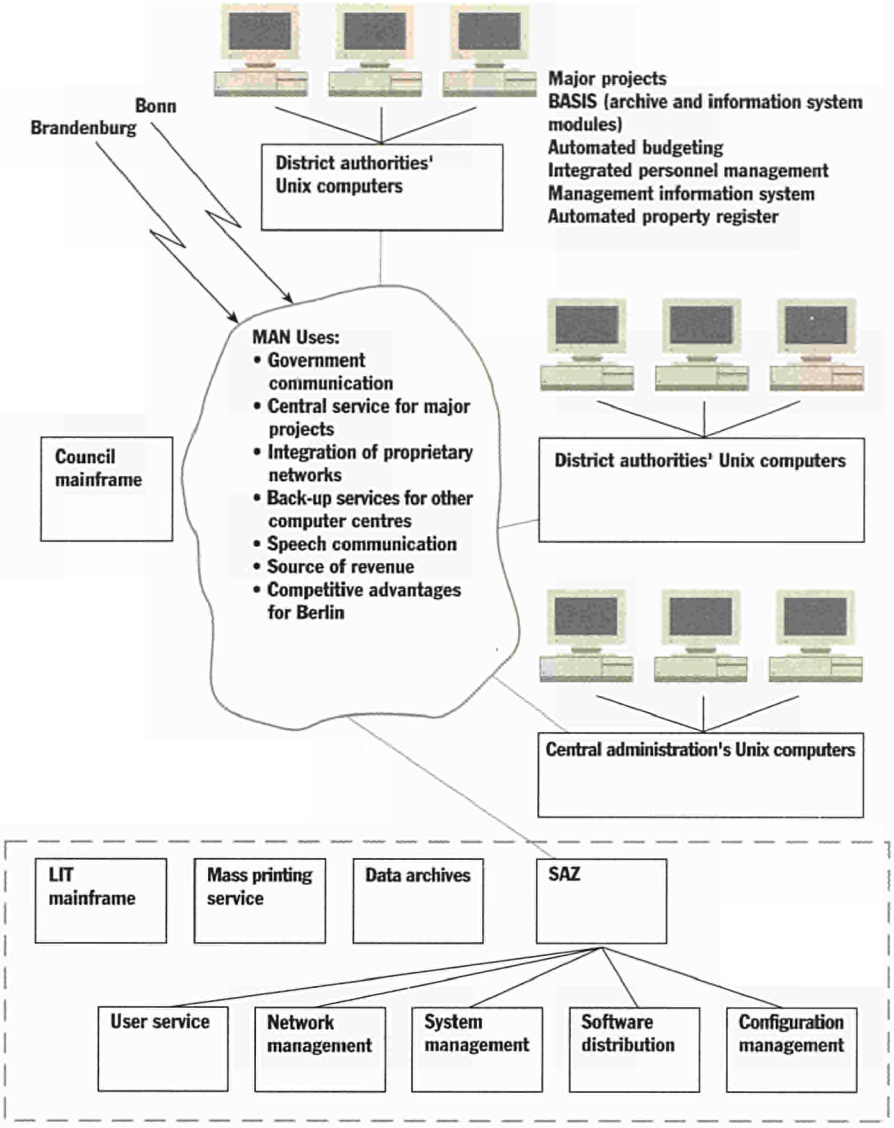
A full 6,000 posts are now being networked for the new applications alone. By 2002, the number of networked stations in Berlin council

offices is set to rise from the present 15,000 to around 40,000. The MAN will enable better and far faster communication between these workstations than with the Deutsche Telekom 64K connections used up to now, and can drive a large number of applications with a high graphics content as well.

The basic technological initiative was prompted by user needs. The civil servants in Berlin are interested not in the overall network structure, but in the on-line services it supplies. The design of the MAN is therefore not static, but can be adapted to the location and technical set-up. And that in turn is in the interests of the "customers" – the citizens of Berlin.

Sharing out the management function

Alongside the metropolitan area network, the LIT has set up a service and administration centre (SAZ), in conjunction with IBM, for general infrastructure management. Only a combination of the support and management functions could ensure effective control of the heterogeneous client/server structures set up on around 200 separate networks. The SAZ works with a series of local administration centres (LAZs). Management of the system as a whole is thus based on a division of centralised and decentralised functions: central support and network/systems coordination by the SAZ and local management of decentralised tasks by the LAZs.



This helps streamline the system: specialist know-how is concentrated at the SAZ, so only a small team is needed at LAZ level to oversee infrastructure. While the local staff require wide-ranging skills, they need not concern themselves with matters of detail. It also takes some of the pressure off individual council departments, and all users can call on the value-added services of the SAZ when necessary. The SAZ/LAZ structure offers the following services:

- **Configuration management:** management of resources and configuration data (e.g. user profiles, access rights and computer names). Also distribution and installation of software and associated licence management.
- **Software and data distribution:** dissemination of software modules via the network to government departments, using suitably designed interfaces. Also supply of standard tools on the network (such as word processing).
- **Fault management:** detection, location and recovery of faults. Remote reconfiguration of malfunctioning components of the MAN system.
- **Load management:** monitoring and measurement of resources to locate bottlenecks. The information obtained is used for planning purposes (e.g. resource extension).
- **Accounts management:** recording of data on use and maintenance of statistics. Also assignment and monitoring of quotas and cost allocation to users.
- **Security management:** protection of sensitive data against loss, misuse and manipulation by means of special encryption algorithms and authentication techniques.

The resulting automation, standardisation, resource sharing, integrated planning, coordination and skills training combine to make the structure as a whole entirely cost-effective. Moreover, the balanced division of tasks between the SAZ and the LAZs promotes the decentralisation of information technology and administrative structures – moving the whole closer to the citizen. In all, a substantial shift away from the concept of "applicant" to that of "customer."

Cash for Council coffers

And that is not all. Owing to the cost of using Deutsche Telekom's high-speed lines, Berlin Council has had recourse to municipal rights-of-way and been able to use Land-owned lines – in fact sections of the 1,300 km network laid for the city fire service and the traffic signalling authorities. Only lines linked up to the MAN from outside run on Deutsche Telekom's ISDN network. Private-sector involvement in running the network is planned for the medium term.

This puts Berlin a step ahead of the network liberalisation across the EU, which is not due until early 1998. The city is also killing two birds with one stone, for not only are running costs relatively low, but prospects on the extra revenue front are rosy as well. Surplus capacity on the MAN is to be made available by fibre to other institutions and companies – for a price, naturally. A number of Berlin banks have already shown a keen interest in the idea.

German capital: enough to reduce even a Berlin official to silence. Not least because, once the numerous federal subsidies are withdrawn, Berlin will have to meet the future costs of the system alone... ■

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Selected points of the voice and high-speed data transmission network of the Land of Berlin (FDDI/ATM)

Other projects for the German capital

Besides the MAN, other major projects are in hand as part of Berlin's preparation for its role as the capital of Germany: the Berlin-Bonn information link (IVBB) and the development plan. In line with Germany's federal structure, they are both financed from a variety of sources: federal, Land and local government.

The Berlin-Bonn information link (IVBB) operates on the principle "move data, not people." The German Bundestag's decision of 20 June 1991 to move the capital to Berlin will lead to the transfer of some 11,000 of the more than 20,000 government officials currently based in Bonn. Yet, as the decision also calls for a fair division of tasks between Berlin and Bonn and compensatory measures for the latter, a long-term division of the State institutions between the two cities is in prospect. This creates new pressures for cooperation between the various ministries, particularly as regards spanning the geographical distance between them. Long-distance postage, geographical obstacles to decision-making and an explosion in travelling expenses must all somehow be avoided. The IVBB project, now at the implementation stage, solves some of these problems by enabling simultaneous, direct and interactive processing of procedures via various system platforms:

- end-to-end video-conferencing on a "virtual office" basis,
- access to all sub-applications of the system, including archives,
- integration of a wide range of components such as telephones, PCs, videos and CD-ROMs,
- development of a comprehensive multimedia application within the client/server architecture.

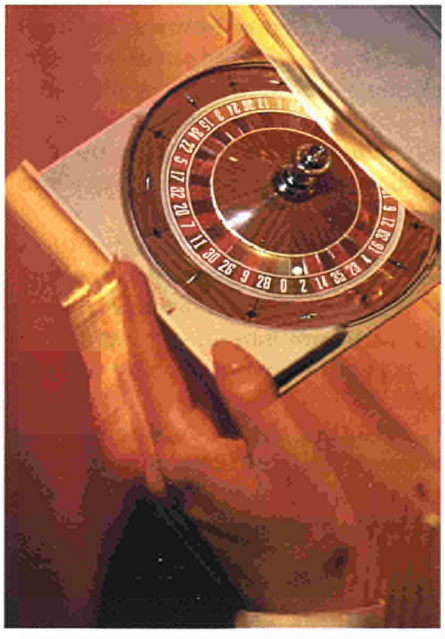
"Telecooperation" is the key objective in the IVBB project, hence the choice of IBM's project for remote cooperation and document management in the office under a call for tenders issued by the Federal Ministry for Research and Technology. The application is not limited to use under the IVBB system: it can also be used elsewhere, at present as part of a collaborative venture between a number of federal ministries, the Land of Nordrhein-Westfalen and the German Bundestag.

The Berlin development plan is currently at the design stage. It is intended as an infrastructure strategy to accompany the transfer of the seat of government from Bonn to Berlin. It makes use of computer-assisted planning procedures, as, in addition to the construction of buildings for parliament, ministries and the civil service, adjustment is needed in a great many areas such as:

- adapting existing buildings to the requirements of effective government,
- bringing communications infrastructure into line with the needs of a seat of government by the year 2000,
- bridging the development gap between the two halves of the city and establishing a homogeneous infrastructure throughout Berlin.

"Faites vos jeux . . . Les jeux sont faits"

Games will be the paradigm and premier product for tomorrow's audience, because of youth's obsession with interactivity and the downstream impact of video games as successive generations mature.



***"Les jeux sont faits"* – final call of croupier to roulette gamblers**

FORGET MONTE-CARLO: the global video games market is the ultimate casino. The wheel is spinning and the ball is rolling for the video games industry, gambling that a new generation of technology will power it back beyond the $10 billion level it reached in 1993. Sales of games based on 16-bit processors peaked then and the market has since shrunk. The industry is betting that the next generation will restore growth, just as earlier generations did – 4-bit, 8-bit and 16-bit in their time – by revealing new creative vistas and pulsing the adrenalin faster through the veins of young devotees, quick to tire of yesterday's toys. The gamers themselves are waiting for something new. There is an air of expectation, even outside the industry because some experts believe the business will supply the paradigm for the new, undefined interactive services of the Information Society...a far cry from the traditional video games profile: Boys 'n' Toys.

This time Nintendo and Sega, the warring giants of earlier generations, are being joined by new players. Step forward 3DO with its vision of a global, multi-vendor standard and promises of compatibility and upgradability....but where are the killer games promised earlier? Cue Sony Interactive with its proprietary Play Station. According to many, Sony will have the most powerful system, well-supported with specially developed games titles and uncompromised by any compatibility requirements with earlier products. This will use 32-bit technology and a proprietary CD-ROM system. It will knock heads Sumo-style with Sega whose 32-bit Saturn system also features a proprietary CD-ROM. But 3DO has yet to exploit the capabilities of its M2 graphics engine.

It is interesting that Nintendo will stay faithful to traditional ROM cartridges – where the game is etched into a chip – rather than migrating to CD. The respective merits of cartridges and CDs are hotly debated in the business and amongst gamers. CDs are cheap and can store a lot of graphics and even some digital video, an important consideration as games get bigger and more complicated.

"Ah," reply a chorus of Nintendo fans, "CD-ROM isn't as fast, and who needs digital video? Video limits the game to whatever video sequences are stored. MegaTedium: real gaming is about creating a virtual environment which calculates the moves of the player in real time with almost infinite possibilities."

"Cyber Twaddle," ripost the CD folk, "Designers of cartridge games just don't understand how to use CD real estate efficiently. Gamers ate Walt Disney's *Lion King* alive; they also freaked out on Virgin's haunted house epic, *The Seventh Guest*, and the best–selling *Burn Cycle* – and these both have video..."

This is an argument that will run and run; much depends on the *genre* of game you want to play. Clearly an adventure game based on a hit Hollywood movie will benefit from some movie sequences – or even new scenes shot specially for the game. What's certainly true is that the rapidly growing segment of games published for PC is on CD-ROM.

To understand the increasing importance of games in computing, consider two things:

Fact A: all the computer manufacturers are telling us that we should buy a new multimedia PC with a CD-ROM drive;

Fact B: many generations of adolescents have matured since Atari started the market in 1977 with the Ur-ancestor of all games, *Pong*. This was in glorious monochrome analogue technology and based on ping-pong. The boys who used to play on console systems at home are now sitting in front of PCs in the office, and increasingly at home too. The equation is (A+B=O)$, where O equals Opportunity.

Demographics, time and Moore's Law[1] have converged to expand the market for PC CD-ROM games, by 50-60% over the last year. The US entertainment magazine *Variety* – read by film and TV executives – has been reviewing CD-ROM titles over the same period. That's market credibility.

Traditional media have woken up. But it's not all plain sailing, as Disney discovered when a high proportion of

their Lion King CD-ROMs came winging back to dealers: gamers hadn't been able to get the game to run because of the chaotic incompatibilities imposed by unstandardised sound and video cards. No wonder a UK spokesman for Philips Media Systems recently stigmatised CD-ROM as "Plug and Pray" compared with CD-i where the standard guarantees "Plug and Play."

Getting beyond Space Invaders

Grown-up people need grown-up games so designers have had to come up with games that are much more sophisticated than the "Shoot'em up, blow'em out" action games in the console market.

Simulation is one of these new categories: *Sim City* allows you to take over the running of a major city and adjust variables like population, taxes, investment... and you have to answer to the voters for your decisions, as in real life.

Games based on movies are also significant, although even Hollywood is having trouble converting all hit movies into hit games... Super Mario failed as a movie, but powers onward in the games world... Primitive and mechanistic attempts to achieve convergence and synergy should not discredit the idea of exploiting an idea in different media. *Wired* recently interviewed one of the few people who is both a successful movie screen writer and games designer: Mike Backes[2]. He explained the difference between the two.

"The enjoyment of a game is the direct experience of structure. You try to understand the gaming structure, the mechanisms, the trade-offs... Whereas in a film, you don't want the audience to be so conscious of structure. If it is conscious of structure, you've probably lost some of the emotional grip."

Just as the Hollywood studios hired many actors from theatre when they introduced talking pictures, the established audiovisual sectors are contributing both creatively and financially to the games market, even if they are not the sole ingredient.

A good example in Europe is the French pay-TV operator Canal+. It recently set up its own Media Lab to develop digital imaging and Canal+ Multimedia to finance the development of new titles for PC and console platforms, plus interactive TV programming.

The motivation is interesting: "TV doesn't really attract young people anymore," says Chine Lanzmann, anchor of the Canal+ *Cyberculture* TV programme and closely involved in the games venture. Films are the paradigm and premium product for today's audiences, but games will be tomorrow's paradigm because of youth's obsession with interactivity and the downstream impact of video games, as successive generations mature.

This is a bold statement for anyone involved in broadcasting to make, but there's more. Canal + wants to address both the core market of adolescents and develop a broader consumer appeal for future games products, beginning in 1996.

Apropos, one of the starkest features of the console video games segment is its bias towards adolescent – or even younger – males. What about women?

"Young girls don't play console video games because their brothers monopolise the machines and none of the software fits their taste – or their faster pace of development," argues Lanzmann.

There are exceptions. *Tetris*, an early Nintendo gameboy involving geometric shapes, had female appeal.

Women have much better access to PCs when grown-up and the card game *Solitaire* is very popular. This is bundled with every Windows system shipped and is rumoured to have helped many DOS users to migrate painlessly to Windows, a miniature example of the effect games may have in schooling people for the wider range of interactive services in the information society.

For Europe, the opportunities clearly lie on the content side. Encouragingly, the star of this years E3 show in Los Angeles was Virgin's *Heart of Darkness*, developed in Paris by Eric Chahi's team at Delphine Sofware. This displayed the so-called "French Touch," a cinematic look and approach to story-telling. Chine Lanzmann reckons that the opening sequence – which sets the scene and hooks the player – is as good as anything Disney has produced.

There are many games developers in UK as well, including Rare, responsible for *Donkey Kong* and equipped with one of the finest networks of Silicon Graphics work stations in Europe.

So far European companies are optimistic about their prospects. There seems to be room enough for all cultures to contribute to the games themselves. Hollywood is already contributing but is far from dominant. If there's room for Japanese Manga comic books to inspire games, there's plenty of scope for European creativity to make a strong and diverse contribution to the global games market.

More impact in future

The idea that better technology will expand the video games market by enabling more creative games and widening the new medium's appeal is a recurring one. Last year Sony organised an enlightening series of presentations for Commission officials on music, movies, TV.... and videogames.

"The video games industry is targeting broadcast image quality," said Nick Garnell of Sony Electronic Publishing, "because greater realism will enable the market to make the transition from niche consumers to the mass market."

Picture quality delivers impact and realism to gamers. It is ironic that the games companies have discovered this just as broadcasters themselves seem set to sacrifice broadcast image quality in order to have more programmes in the dawning digital era. Broadcasters currently spurn high definition television, the ultimate large-screen, high-impact TV format.

Meanwhile in games, the transition from simple two-dimensional depiction of characters and settings to computer-rendered 3D is well underway. The relaunch of Nintendo's *Donkey Kong* in 16-bit computer rendering was recently hailed by the press, but is just a foretaste of things to come since it was scaled down from an unreleased next generation 64-bit version.

Gazing into the future from Paris, Chine Lanzmann reckons that the ultimate future of video games lies in interactive broadband network systems.

"On-line will ultimately kill today's formats based on packaged media; the multi-player possibilities of wide-band are much greater, and that will attract women."

This has already begun in a small way, with the Sega Channel tested on US cable nets. Games are downloaded via an insert which replaces the cartridge in the games unit. Sega has already reported encouraging results from these trials. Cable companies were impressed both by the level of utilisation and a reduction in churn between the "Basic" tier of services and "Extended Basic" containing the Sega Channel. Meanwhile, Nintendo will participate in British Telecom's customer trial of video-on-demand in 2,500 UK households this summer... and there are plenty of games on the Internet.

For the moment, Virtual Reality is just being as a tool for market positioning, rather like "Digital" labels on consumer electronics products which are mainly analogue but contain some digital processing.

"True VR is about ten years away," according to Yoeri Geutskens of Philips Media, "It's a matter of processing power and appropriate LCDs for the head mounted device."

He has recently completed an internal study on video games for Philips and sketches the changes in the industry structure that are taking place. The value chain has come to resemble audiovisual. Instead of vertically integrated games companies, there are developers and publishers just as there are independent TV producers. Budgets for games development have soared as high as $6m and its still cheaper to film or video certain types of live action than to synthesise the same thing in the computer. Hardware is a means to an end in the console market.

"It's the razor blade philosophy: give away the razor and make your money on the blades," he opines. Perhaps it is a sign of maturity that both Nintendo and Sega have been criticised for this approach in a recent report by the UK competition authorities.

And the video games business is maturing fast. It's inconceivable that the business won't impact the information society. Already traditional media are adapting: broadcasters crave interactivity; MTV's visual style mimics video games; movies are being edited to a faster pace for the younger generation accustomed to the pace of interactive entertainment. The density of job advertisements in the games press is an impressive testimony to growth... and the promise of interactivity more broadly.

Amid all the talk of G7 projects, we should also keep an eye on how the video games market develops. The superficial often masks the profound in real life – just like a strategy game really. ■

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(1) Moore's Law states that the number of transistors on a chip doubles every two years or so. The capacity of memory chips quadruples with every generation, about every 2-3 years. Computer power increases inexorably therefore.

(2) "Shape Shifter," interview with Mike Backes by Ron Martinez in *Wired*, April 1995.

There seems to be room enough for all cultures to contribute to the games themselves. . . . If there's room for Japanese Manga comic books to inspire games, there's plenty of scope for European creativity to make a strong and diverse contribution to the global games market.

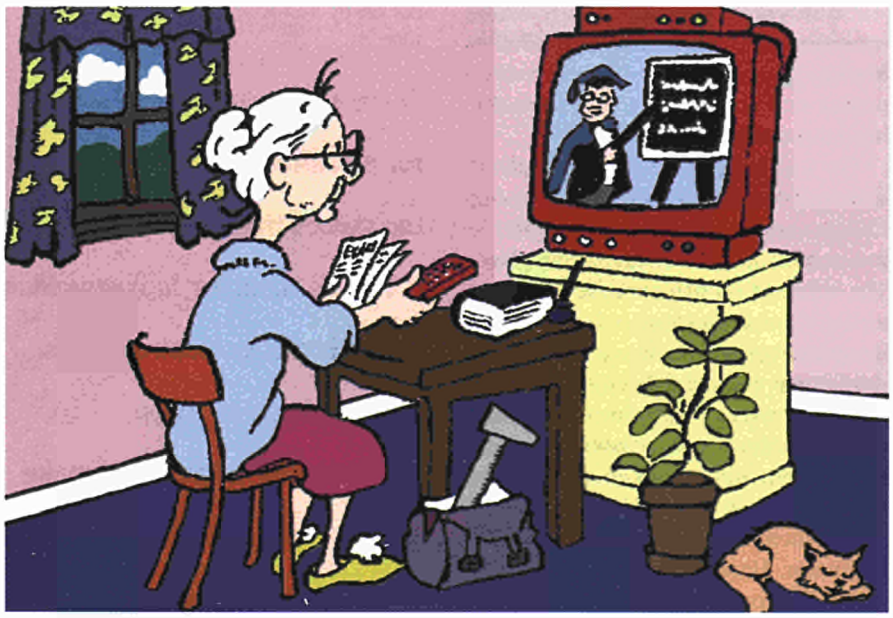
Telecommunications for disabled and elderly people

A market opportunity and a social challenge

TELECOMMUNICATIONS are a crucial component of social and economic life for all citizens, and Europe's disabled and elderly people, making up about 20% of the population, are no exception. Indeed, for many disabled and elderly people telecommunications take on special significance.

Telecommunications applications and services – ranging from the humble voice telephone to advanced multimedia communications – can be vital in enabling independent living in the community, making information and communication possible in ways that match the abilities of the individual, and opening up new opportunities for access, participation and socio-economic integration.

Although collectively a large subscriber grouping, elderly and disabled people have widely varying interests and needs. Their diverse requirements for telecommunications present both market opportunities for the telecommunications industry and social challenges for policy-makers. These issues have been examined by the MART study (TP1113), one of the projects funded under the EU's TIDE programme (see boxes on p.12 & 13).



Distance learning

Meeting demand: a market and a social issue

An optimal mix of market, regulatory and social forces can ensure that the necessary telecommunications services are available, accessible and affordable for elderly and disabled people, and that the opportunities presented by the information society are open to all.

On the market side, the telecommunications industry must develop a better understanding of the elderly and disabled market. This is a large though somewhat differentiated market, comprising not just elderly and disabled people as independent consumers but also health and social services. Creative and flexible approaches to telecoms infrastructure provision, service development and tariff structuring will be necessary to meet all of the needs.

On the regulatory side, the current re-definition of universal service obligations will need to consider these differentiated needs in a detailed way. Meeting the requirements of elderly and disabled people is more than just a question of cheap or subsidised voice telephony.

Social policy will also have a role to play. Implementation of anti-discrimination legislation will place new requirements on telecommunications service providers and information providers to make their services accessible to people with physical disabilities. Financial subsidies under social assistance schemes may also be

Some Applications of Telecommunications for Elderly and Disabled People			
Interpersonal Communication	**Relay, Conversion, Alternative media**	**Remote Activities**	**Care Services and Support**
Voice	Text telephone relay	Information access	Alarms/security
Text	Video telephone relay	Teleshopping	Social services
Video	Text interpretation	Transactions	Telemedicine
Special media	Electronic newspapers and books	Telework Distance learning	Navigation support
	TV (closed) text captions	Entertainment and leisure	
	TV audio description		

necessary in some cases to ensure that important services are affordable.

A co-ordinated approach to all of these aspects, at both EU and national levels, will be necessary if the promise of the information society is to become a reality for elderly and disabled Europeans.

Applications of telecommunications for disabled and elderly people

In addition to all of the applications of interest to the general residential subscriber, there are also a variety of applications which can be of particular interest for elderly and disabled people. These include alternative modes of communication and information presentation, the opportunity to carry out activities from the home and remote access to care and other support services. Some of the more important applications are listed in the Table below. Research and development in many of these areas is currently being promoted under the EU's TIDE programme.

Interpersonal communication

Fixed and mobile voice telephony are likely to remain the core residential applications for most elderly and disabled people. But for some people the nature of their disability precludes using two-way voice communications. People with significant hearing or speech impairments, for example, need text telephony or video telephony for interpersonal communication, and some people with learning and other disabilities may communicate most effectively through symbolic languages. TIDE project IBIDEM (TP1038), developing a videophone to allow lip-reading over the telephone network by hearing-impaired people, is an example of R&D activity in this area.

Relay, conversion and alternative media

To communicate freely with another person or to access information and mass media services, some people with disabilities may need special facilities on occasion. For example, a hearing-impaired person using a text telephone or video phone may require relay (or interpreter) facilities to enable communication with a subscriber who has an ordinary voice telephone; people with visual impairments may need access to newspapers or books in electronic form so that they can be "read" by voice synthesisers; and TV broadcasts can be made more accessible for hearing-impaired or visually impaired people through text captioning of the speech content and audio description of the visual content. Examples of TIDE projects in this area include HARMONY (TP1226), which is promoting the use of accessible structures in on-line documents, and SPLIT (TP1215), which is developing a system for automatic conversion of speech to animated lip movements for transmission over the telephone network.

Remote activities

Sometimes mobility restrictions can make the opportunity to access information and carry out transactions from the home especially important for elderly and disabled people. Information services, teleshopping, transactions (e.g. telebanking) and remote access to entertainment and other leisure pursuits (e.g. video-on-demand) offer new possibilities. Telecommunications also open up new opportunities for employment and education, such as telework and distance learning. Examples of TIDE projects in these areas include AVISE (TP1251) and COMBAT (TP1135), which are promoting the development of telework for people with disabilities, and INSIDE (TP1150), which is developing on-line information services for elderly people.

Remote services and support

Many elderly and disabled people need support from formal or informal care services if they are to live full and independent lives in the community. Telecommunications can play an increasing role in this area, for example, by supporting alarm and other security services based on voice or video connections, remote social services through video telephony, medical monitoring and consultation via data and video links. Mobile telecoms also help people with a visual impairment to navigate when finding their way about on foot.

Examples of TIDE projects in these areas include ASMONC (TP1228) and MOBIC (TP1148), which are developing systems to support orientation and navigation; IMSAS (TP1078) and SCALP (TP1002) which are developing multimedia and mobile alarm systems for elderly people; and TURTLE (TP 1194) which is using teletext to deliver information on public transport services to disabled and elderly people.

Telecommunications requirements

These applications vary considerably in the requirements they place on telecommunications facilities. Different segments of the elderly and disabled market will be interested in different

market will be interested in different mixes of applications, and their demand for telecommunications will vary accordingly.

Public Switched Telephone Network (PSTN)
The fixed PSTN provides a sufficient level of access for many applications. Apart from voice communication, it can support text telephony, access to information and networking services (such as the Internet), and low-to-medium speed data transmission. In the foreseeable future, as image coding and compression techniques improve, it may even support video telephony at an acceptable level of quality. Although the PSTN is almost universally accessible throughout Europe, household penetration is still well below 100% in some countries, tariffs vary widely across the Member States and costs can still be a barrier for some disabled and elderly people (most people with disabilities and many elderly people remain in the lower income group). Line quality, connection to a digital exchange and a touch-tone telephone can be important for some applications and levels of service in these areas vary considerably across Europe.

Mobile Access
This is becoming increasingly popular among residential subscribers in some countries. For elderly and disabled people, cordless telephones around the home can be of great benefit, and cellular networks are becoming important for keeping in touch with carers or contacting emergency help. Analogue cellular networks now cover most of Europe and digital networks are expanding rapidly. However, although tariffs are falling in the face of competition, they are still often set at premium levels which are beyond the means of many disabled and elderly people.

Integrated Services Digital Network (ISDN)
For some elderly and disabled consumers, important applications will require the higher levels of access provided by ISDN. Basic rate ISDN can support reasonable quality videotelephony (e.g. for sign language communication between deaf people), fast and cost-effective downloading of large volumes of text (e.g. electronic books for people with visual impairments) and new opportunities for collaborative working and interactive learning at a distance. Although ISDN access is rapidly becoming universal throughout Europe, it is still generally targeted at the business community, and tariffs are too high for many elderly and disabled people.

Wideband and Broadband
Higher levels of access (i.e. wideband or broadband) are necessary to support video telephony at TV quality and on-line access to high quality multimedia material or video-based entertainment services. Most current developments for the residential consumer are asymmetric (i.e. the video or multimedia is in one direction only) offering video-on-demand or teleshopping services. The arrival of switched public networks providing full two-way (symmetric) broadband access to residential subscribers remains a distant prospect.

Value-added and information services
As well as an appropriate level of connection, value-added network services and information services are also important. New facilities such as automatic text-to-speech and speech-to-text conversion in the network could provide great benefits for people with hearing, speech and visual impairments. Existing services like abbreviated dialling and "Hotline" can support alarm systems and make dialling easier. However, the media used in value-added services and information services must be accessible for people with disabilities. For example, text displays of voice-based announcements and audible caller identification are important for deaf people and blind people, respectively. The potential offered in these areas is still under-utilised and many services remain inaccessible to people with particular sensory disabilities.

Conclusions
Developments in telecommunications are opening up new opportunities for European citizens. R&D activities under the EU's Telematics and TIDE programme are encouraging innovation in technologies and applications which can exploit this potential for the benefit of elderly and disabled people. Appropriate consideration of the needs of these groupings in EU telecommunications and social policy will be necessary if both the market and the social benefits are to be fully realised. ■

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The MART Study

TIDE project MART (TP1113) has carried out a detailed study of the various applications of telecommunications which can benefit elderly and disabled people. The study has analysed the telecommunications requirements of these applications, and the extent to which developments in European telecommunications and in social provisions will facilitate their dissemination and take-up. It has produced recommendations for those who have a role to play in this area. Some of the key elements recommended for EU policy are:

- co-ordination across policy lines, especially telecommunications and social policy
- consideration of the differentiated needs of elderly and disabled people
- detailed provisions for elderly and disabled people in universal service and anti-discrimination legislation and regulations
- promotion of "design for all" approaches and standards to ensure accessibility
- encouragement of affordable prices and support for ability to pay
- dissemination of information and encouragement of innovation in employment, education, and the social and medical services
- monitoring of the social impact of the information society.

MART participants:
Work Research Centre, Ireland (coordinator);
IDATE, France,
empirica, Germany.

Further information:
A summary of the results of the MART Study is published in a series of 6 brochures. These address policy makers, the telecommunications services industry, equipment providers, on-line information providers, user organisations, and social service providers.

The brochures are available from the TIDE Office:
Fax: +32-2-2990248;
e-mail: tide@dg13.cec.be

Mobile support for navigation on foot

TIDE and Telematics

In the European Community today there are some 60 to 80 million disabled or elderly people. Information and communication technologies can make a strong contribution to improving the quality of life of disabled and elderly people. This is the aim of TIDE, the Telematics for the Integration of Disabled and Elderly unit of the **Telematics Applications** programme.

During 1993/1994 TIDE completed 21 pilot phase projects in the areas of general models and tools, manipulation and control, personal communication, safety and daily support, and access to information.

For the call for proposals in April 1993 for the so-called bridge phase, a total of 293 proposals were received. 55 projects and horizontal actions were selected for funding with the 42 Mecu available. These Bridge Phase projects (to be completed by the end of 1997), cover the four action lines of the work plan: access to communications and information technology and support for interpersonal communications; control technologies; restoration and enhancement of functions; and integrated systems technologies.

In addition, a number of horizontal activities intended to increase the impact of the research undertaken have been initiated. One of these horizontal activities is the MART project, (described on previous pages).

After the Bridge call for proposals, TIDE became part of the **Telematics Applications** programme. Telematics is the combination of information and communications technologies. It is within this programme that TIDE has launched a 3rd Call for Proposals, which opened on 15th of September 1995 and closed on 15th January 1996.

The workplan now covers two lines subdivided in five areas:

Line 1: Access to Technology & Services
Area 1
Access to Information and Communications Technologies
Area 2
Integrated systems supporting the activities of independent living, education, work, leisure, mobility and training
Area 3
Information and communication systems for enhancing the efficiency and effectiveness of services supporting independent living.

Line 2: Compensation for Impaired Functions
Area 4
Applications of Manipulation and Control technology
Area 5
Technology supporting restoration and enhancement of function.

If you would like more information about TIDE or the **Telematics Applications** programme, please contact:
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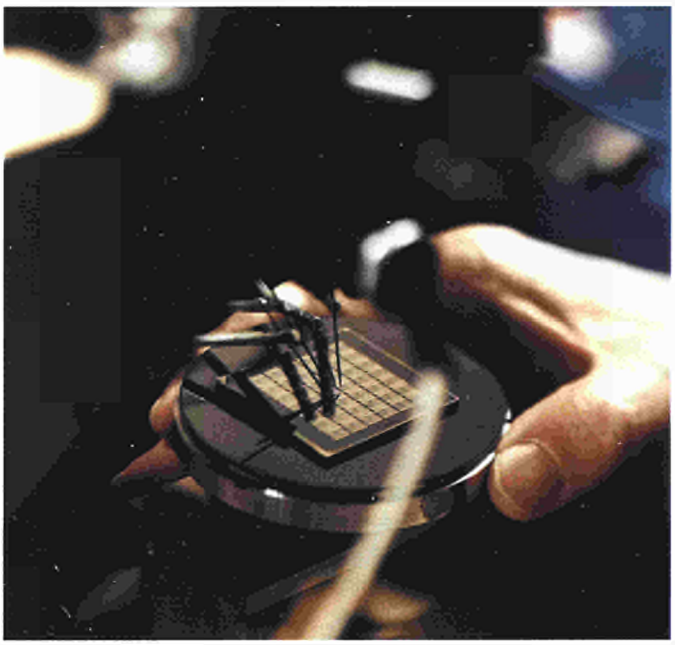
Giant magneto resistance: an ESPRIT project for the home electronics market

LESS THAN TEN YEARS after its discovery, the giant magneto-resistance (GMR) effect will be introduced in read heads in digital magnetic recording consumer products like hard disc systems and tape recorders. This development will enable them to cope with the increasing storage requirements of coming multimedia applications.

The following article has two parts, the first describing the ESPRIT project on GMR, and the second (largely inspired by an European Information Technology Observatory report of 1994) giving an insight into the home electronics market in Europe, where GMR will play an increasing role in the future.



Successful cooperation between industry and research

The magneto-resistance effect

Current digital consumer products like digital tape recorders include advanced thin-film read heads to read the digital information. These are made with a technology similar to semiconductor IC technology, using a sequence of deposition steps and structuring lithography on a micron scale. The sensing element of the read head is a very thin layer of magnetic material sandwiched between two non-magnetic materials. The magnetization direction in this layer is influenced by the pattern of magnetization on the disk or tape close to the sensing element. The variations in the magnetization induces changes in the resistance of this layer, and consequently as well variations in the voltage output as a current is applied. This effect is called the magneto-resistance effect (MR).

The technology to make sensors based on this effect was introduced in the early nineties in commercial read heads for hard disk and for digital tape recording. In the consumer market, Philips introduced this read principle in its Digital Compact Cassette consumer audio system (CD-quality music on tape).

In today's digital products, however, the maximum relative resistance change to variations of magnetic fields in the materials used is only 1-2%. For further progress in bit density in the second half of this decade, sensing materials exhibiting a greater magneto-resistance effect will be essential to enable weaker magnetic signals to be read.

Furthermore, the use of the PC as a multimedia workstation in the second half of this decade will require a drastic increase in the required storage capacity. A higher area bit density in hard disk recording is brought about by decreasing the track width and the bit length of/on/in the recording medium. A consequence of the decrease of bit size is, however, that the magnetic signals in the read heads are weaker. This creates the need for more sensitive magnetic sensors.

The discovery of the GMR effect

In 1988 two European research groups simultaneously discovered a new phenomenon, appropriately called the giant magneto-resistance effect (GMR) since a relative resistance change of more than 100% is possible depending on the magnetic field applied. Professor A. Fert with his collaborators of the University of Paris-Sud in cooperation with the Thomson Research Laboratory in Paris, and Professor P. Grünberg with his researchers at the KFA research institute in Jülich, Germany, discovered this effect in layered thin films (multi layers), which consist of magnetic layers, separated by non magnetic layers.

The thickness of these individual layers is only a few nanometers, some tens of atoms and sometimes even less. In the current magneto-resistive heads, the thickness of a single layer is in the order of a few tens of nanometers, i.e. a ten times thicker. This contributes to a much higher resistance change in the multi-layer system.

The researchers then concentrated on development of material systems in which this effect would occur even under small magnetic fields, making the technology attractive to a wider range of products.

Applying GMR

After the discovery of the GMR effect, many questions especially related to practical applications of the effect were raised. Can materials with even larger resistance changes be found? Would it be technically possible to produce such thin-layer structures reliably enough for commercial use? Can these be applied in sensors? How would magnetic recording systems benefit from these more sensitive read heads? Are other applications possible?

In order to answer such questions, a European consortium was formed in 1992. A European project was the preferred approach to develop this technology further, because it holds the best guarantee that this breakthrough will first and foremost be of benefit to European industry.

Major European industries active in the fields of magnetic storage and field sensors, the discoverers of the GMR effect, and groups which are highly specialised in the preparation, analysis and magnetic properties of artificial materials based on layers with atomic-scale thicknesses are all involved in this project.

Philips, Siemens, Thomson, KFA Jülich Research Institute and the universities of Paris-Sud, Erlangen, Eindhoven, and Louis Pasteur at Strasbourg are collaborating on the project. It is called *Study of Magnetic Multi layers for Magneto Resistive Sensors (SmMmS)*, and was launched by the Long Term Research Unit in DG III-F of the European Commission .

At the international 1994 Intermag/MMM on magnetism in Albuquerque, New Mexico Philips presented the first very promising results on read heads for tape recording based on GMR materials. These new sensor elements were shown to be one order of magnitude more sensitive than comparable single-layer sensors.

At the same conference, IBM presented first results on GMR-based read heads for hard disk recording. Japanese groups are also very active in this field, and the companies Fujitsu, Hitachi and NEC have presented GMR-based read heads at the 1995 Intermag Conference in San Antonio, Texas.

The future

In addition to digital tape and hard disk recording, an important potential field of application of heads based on GMR materials is found in linear digital video recording. The present analogue VHS recording makes use of the so-called helical-scan technology, which is at the moment the leading edge of tape recording in terms of performances. However, it will probably not be able to cope with the huge data rates for high-definition digital-video recording at a reasonable cost and with sufficient reliability.

To make linear digital video recording, an attractive alternative, considerable technological advances are required, including a reduction of track width, an increase of signal-to-noise ratio, and an increase in the number of tracks that can be recorded and read in parallel.

GMR devices can also be used in many other products where magnetic fields are used, such as in cars and in robotics. They can be made lightweight and very small. For example, MR sensors are very attractive in automotive applications for anti-lock brake systems (ABS).

The use of the GMR effect could lead to a further miniaturisation. Its main advantage, the increased sensitivity, may thus be used in different ways: in data and video recording to increase bit densities, and in sensor applications for further miniaturisation. The advantage of the use of the GMR effect in the Digital Compact Cassette, where the recording format (track width, bit length) is standardised, is in the reduced power consumption of the recording head. This is of particular importance for portable, battery-powered equipment.

It is expected that GMR will be introduced in hard disk heads by 1997. The total sales are estimated at 180 million heads per year at a price around $8 per head. Assuming then that GMR will be used in 5% of the heads in 1997, the market of GMR-based heads will be $70 million. The increase in market share, and the increase in the size of the market, could bring the market for GMR based heads in 1998 to $200 million.

The European home electronics market

GMR applications

To illustrate the potential for GMR uptake in electronics, we need to look at the home electronics market. Let us first define this: it encompasses the home in the widest sense, including both home business and consumer use (households activities, education, games, etc.).

Underpinning these new and emerging markets is the basic demographic structure of households in each country.

There are more European households (135 million) and people (365 million) than the 253 million people who occupy just under 97 million US households. In fact, in the five largest countries in Europe (France, Germany (West), Italy, Spain and the UK) which form the focus of this report, there are nearly 300 million people living in more than 100 million households.

However, the US national per capita income of 17,145 ECU is greater than that in the Member States and 70% more than that in Spain where it is only 10,170 ECU. This difference in national wealth, coupled with a much larger homogeneous market where household 'brown' goods and now computer equipment suitable for the home have always been less expensive, has contributed to the greater penetration of appliances, equipment and services in US households.

Whereas 88% of US homes own a VCR and 35% rent at least one video tape per month, the comparable figures for Europe are 64% with VCRs, but only 22% rent with the same frequency. In Italy for example, only 46% of homes have VCRs and less than 5% of these rent "top-ten" movies on a regular basis.

Few fax machines are found in European households. Germany with 1.3 million home faxes has twice as many as any other European country. They are located mainly in home offices or where employers have funded equipment for teleworking.

By far the most interesting electronic device to be found in the households is the PC. Already 35% of US homes have PCs installed and nearly all of them are IBM PC-compatible or Apple computers. By contrast, in Europe where the UK has the largest percentage of homes with computers (22%), only 12% of these are old multifunction machines like those of Atari and Commodore or UK-specific computers such as those made by Sinclair or Acorn. In Italy, 12% of households have IBM and Mac-compatible PCs (but again an extra 5% have only Ataris or Amigas). Germany has a 15% penetration and France has 13%, but with negligible non-business compatible machines and the highest percentage of Apple systems.

The emergence of the interactive home

CD titles are compact discs containing a software application that allows a user to interact with a particular mix of text, graphic, image and audio content that is stored on the CD-ROM. The content could be a game, educational or reference material, a simulation of some real or fantasy environment, musical or visual entertainment or a set of tools for a work-related task.

A suitable multimedia platform is needed to play back the content of CD-ROMs. Many alternative home platforms have been proposed, and a few of these now have a sufficiently large installed base to earn the attention of publishers.

CD titles are important because they will provide the first real consumer market for multimedia technology.

Number of households in 1994 with electronic equipment:				
1994	France	West-Germany	Italy	UK
VCR	15 200 000 (64%)	19 500 000 (65%)	9 400 000 (46%)	18 500 000 (88%)
PC	2 850 000 (13%)	4 500 000 (15%)	2 400 000 (12%)	4 785 000 (22%)
Fax	650 000 (3%)	1 300 000 (4%)	400 000 (2%)	435 000 (2%)

Unlike other proposed multimedia entertainment and reference opportunities, revenue can be earned from CD titles without the need to build a complex network infrastructure linked to committed home subscribers. However, commitment from publishers, authors and distribution channels, is essential if the full potential of the titles market is to be realised.

The one major interactive, digital consumer market to develop to a significant size by the end of the 1990s will be that for CD titles. It will be driven by an explosion in the installed base of CD-ROM drives on home computers and a publishing community awakening to the vast potential of this market. From an installed base of less than a million drives at the end of 1993, to just under three million a year later, this market will grow more than ten-fold over the next four years.

However, titles are expensive to produce, and publishers need to be assured that their title could be sold to a large installed base of platforms with drives able to read a "standard" CD-ROM format. The three contenders for this role are the home PC with CD-ROM drive, and two classes of product that play through the domestic television CD-based derivatives of existing games consoles and new, custom-designed CD consoles.

Over the next decade, our ability to interact with PCs, televisions and other home appliances could cause revolutionary changes in the way we all work, relax, shop, learn, and have fun. The necessary technologies and standards are in place, regulatory attitudes are becoming favourable, and in many countries the installed base of devices and delivery networks is already sufficient to enable the first wave of home interactive applications to be delivered.

- The range of interactive titles available is spreading beyond games to encompass all forms of education, reference and leisure activities.
- On-line services for consumers are becoming accessible and easy to use, allowing new communities of people with shared interests to gather in "cyber space" to develop new ideas and friendships.
- Movies, sports events and a whole range of television programming will soon be available on demand at start times to suit individual users.
- A wide range of home-shopping services is planned, helping home users to learn about products and services, locate sources, browse, compare prices, make purchases and arrange delivery.

These applications will present major new revenue opportunities for IT suppliers at the end of the millennium and beyond. One of the significant elements in IT will be the application of the GMR effect. ■

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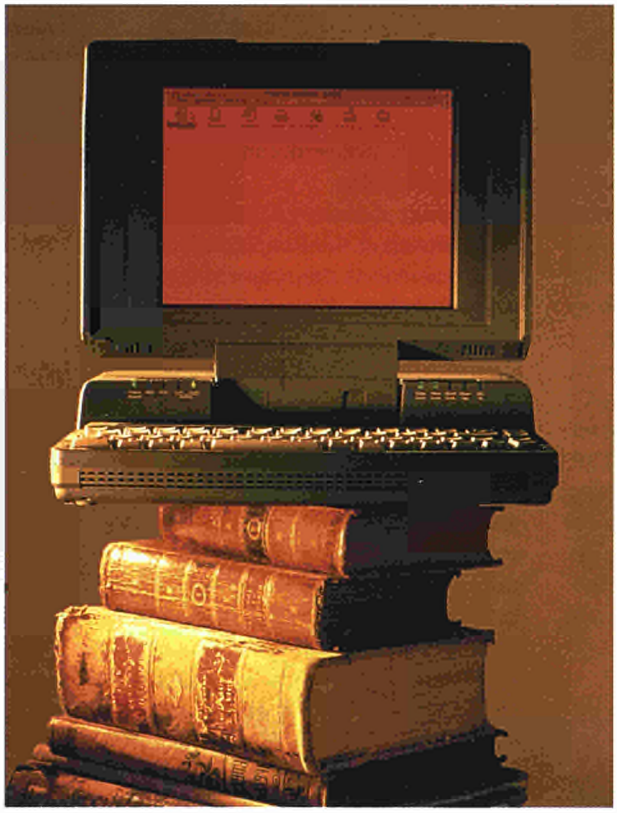
The Frankfurt Book Fair

A showplace for cyberpublishing



FIRST HELD IN 1560, only a few generations after Gutenberg, the Frankfurt Buch Messe is traditionally the most important international book and publishing event. It was relaunched in its present form in 1949, and in 1993 it became the Frankfurt Book and Electronic Publishing Fair, joining the Cannes MILIA and Intermedia in San Francisco as one of the principal annual gatherings of the "new content" electronic and multimedia business.

In 1993 multimedia and electronic publishing occupied only a few stands. In 1995 they were represented by 1229 stands and 5,500 exhibitors, almost three-quarters of the total area of the exhibition, and a living demonstration of how these once diverse businesses have converged. The "Neue & Elektronische Medien" section brought together the publishing giants (Bertelsmann, Pearsons, Hachette, Burda, Warner Books, etc), a substantial representation of the audiovisual and computer industries, and a significant number of SMEs in publishing, multimedia product distribution and electronic services suppliers. According to the organisers the section was the best attended at the Fair and drew most of the 330,000 visitors.

This transformation in two years of a glittering star in the Gutenberg Galaxy into a showplace for cyberpublishing is a direct consequence of the extraordinary vitality of the German market for the new media. The country now dominates European statistics on multimedia equipment, the production of "new content" and the level of use in business and by the general public.

The event also confirms the crucial role of the publishing business in the development of new digital services. More than the television and film industry (indirectly represented as the Kirch Group by their CD Rom and rights selling subsidiaries), and the telecom operators (still prohibited from investing directly in new contents), it is in fact the publishers (publishers, press groups and data bank operators), who have branched out from their traditional specialties, maximised content and now are the prime movers in the business of new digital services.

Two days of interviews covering most of the Neue Medien (New Media) and some of the lectures offered at the Salon served to bring out the following eight developments: the involvement of the major publishing groups; the role of SMEs in multimedia publishing; the localisation of American products as compared with European production; technological innovation; on line commercial services in Europe; the central role of the Internet and the active presence of the Commission.

The major publishing groups: prime movers in multimedia applications in Europe

As one might suppose, it was the major groups which generally dominated the New Media section – publishers (Bertelsmann, Burda and Hachette), press groups (Pearsons, Frankfurter Allgemeine Zeitung and Springer), data bank operators (Dunn and Bradstreet, Knight Ridder and Dow Jones).

The powerfully impressive and diverse presence of Bertelsmann matched its ambitions as the world's third largest communications group (after TW Turner and Disney-ABC). It covered the whole spectrum of new digital services – on-line services (AOL), publishing and distributing CD Roms, managing enriched data bases, electronic magazines, supplying turnkey services, etc. An interesting and relatively recent point is the federative role played by multimedia in a traditionally very decentralised company. Bertelsmann only regrouped its multimedia activities in July 1995 under a managing director and introduced the Bertelsmann multi media logo which dominated the Frankfurt Fair.

The other major publishers such as Burda, Hachette, Pearsons and Springer were testing a variety of new electronic markets and were represented by:

- their CD Rom publishing subsidiaries (such as Navigo, a joint venture between Burda and the Kirch Group's television system, Pro 7).

- their scientific and professional data banks (Springer MultiMedica),
- their participation in on-line services for the general public (Europe on Line) or for selected audiences (Fun on Line, a subsidiary of the publishing house Egmont).

Among the principal players, one should note the modest level of Hachette Multimedia's presence. It was only represented by its German distributor, Bomico. This confirms the French publisher's disengagement from on-line services and its strategic reorientation towards the Internet (providing services for the professional markets and the general public).

SMEs: structural diversity and commercial vitality

An even more conspicuous phenomenon at the Frankfurt Fair than the presence of the major publishers was the plethora of small publishing and multimedia service companies. In the United States most of the CD Rom titles which, with a few exceptions such as *Encarta*, go on to dominate the best-seller list with cult titles such as *Myst*, the *Seventh Guest* and *SimCity* are produced by small companies, start-ups and private labels rather than the commercial software giants. Likewise, in Europe the digital environment currently seems to favour the emergence of a network of energetic SMEs actively developing niche markets, particularly in CD Rom and the provision of services.

The structural and linguistic diversity of Europe, in fact, far from constituting the insurmountable handicap it does in traditional audiovisual production, in a digital environment seems to constitute a decisive advantage in some of the start-ups encountered at Frankfurt.

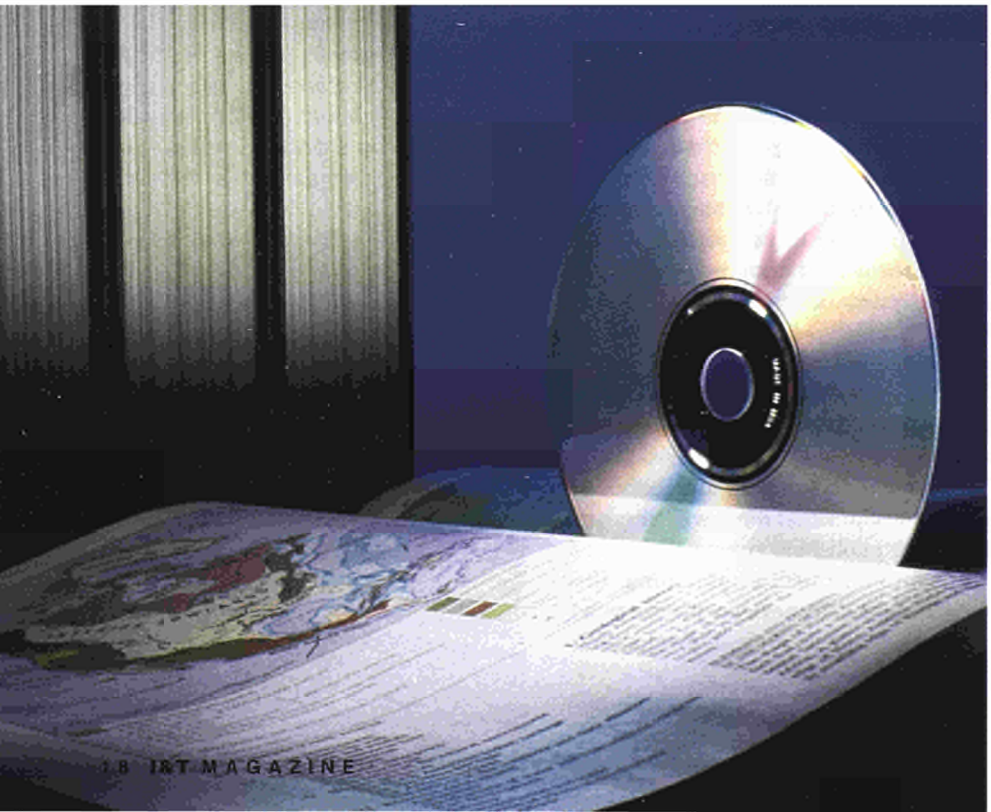
These small CD Rom publishing companies were represented by a few titles in progress or beta testing (even, in the case of a Berlin SME, by a demonstration version of a single title) and claimed to have taken advantage of the Book Fair to look for additional financing, strategic partners and distributors. They are often modest in size (2 to 10 people). Decidedly European in the design of content, their marketing approach and the make-up of their teams these SMEs experiment with original strategies such as:

- the simultaneous up-stream development of versions in several languages. This is more cost-effective than the *a posteriori* localisation of finished products;
- simultaneous up-stream development on several platforms (Mac, PC, CDI), each porting-over adds from about 20 30% to the total budget);
- a targeted approach (with strong identity on a number of titles); or, conversely, a scattershot approach intended to get a foothold in several markets at the same time (from games arcades to the cultural market and including 'edutainment').

SMEs: a web of new European service providers for the digital environment

The numerous SMEs present at Frankfurt as electronic service providers are another indication of the vitality of the multimedia services sector. In fact, the development of the multimedia market and, more recently, the expansion of the commercial and general public applications of the Internet have given rise in Europe to a whole galaxy of small companies which specialise in outsourcing and providing niche services of every kind:

- multimedia guidance and production for businesses which wish to develop their multimedia activities (training, promotional activities, etc.);
- access to the Internet for businesses and private individuals;
- managing commercial activities on the Internet (building and operating Web sites, managing financial transactions: fulfilment; user tracking);



- developing user-friendly author tools for publication on the Web;
- marketing and publicity guidance for new supports (CD Rom embedding, designing publicity campaigns on the on-line services, etc.);
- Cyberpublishing on the Internet (defining and using communities of interest, royalty problems, etc.).

Among these niche services, a number of recently launched companies specialise in software localisation, the adaptation of multimedia products for different language markets. This is more complicated than dubbing or subtitles for the traditional audio visual products. It involves the translation of text files, and in addition it frequently requires reformatting graphics and even the cultural (or pedagogical) adaptation of content. Such SMEs have so far mainly made a living by localising American products, but in recent months they have developed crucial skills in localising European products to economic conditions outside their original language market. All of the companies we encountered (ME&TA, Translingua, etc.) said that they were now diversifying their activities in that direction as exportable products appeared on the European market.

These niche services, scorned by the major operators as a cottage industry and, on the other hand, talked up in the magazine *The Net* as the basis for a service industry which meets a demand not satisfied by the major operators, collectively represent a considerable economic interest.

Given the predictable explosion of such services (Paul Kagan Associates estimate that the market for equipment for the commercial use of the Internet in the United States alone will be $700 million in 1998), the question is whether these SMEs will be able to stand up to the following:

- the inevitable appearance on the scene of the major operators such as Hachette (which is already positioning itself as an Internet service provider) and Bertelsmann (whose subsidiary T1 was offering turnkey solutions for businesses which want to get into electronic publishing),
- the predictable explosion in Europe of commercial on-line services (offering private individuals simplified access to the Internet and one-stop shopping for business users to set up and manage their electronic store fronts),

and above all

- the arrival of the telecom operators, the natural intermediaries for access to commercial and public applications of the Internet.

Localising American products versus European production: towards a new balance?

At the last MILIA American multimedia products completely dominated the scene. At the Frankfurt Fair, in sharp contrast, European content was strongly in evidence with the vitality and power of the distribution of the German multimedia industry well to the fore.

A rapid analysis of the catalogues of CD Roms available on the German market showed that it is, effectively, divided into four equally important segments:

- 25% non – localised American products (original versions);
- 30% American products localised for the German market (much higher than the average for the other European countries). This percentage demonstrates the language resistance of the German public, reinforced by a long tradition of dubbing traditional audiovisual products. In the sector of specifically 'edutainment' products the percentage localised is close to 100%;

25% original German products, and 20% European titles localised for the German market or in the original version.

As compared with other European markets, the strength of the distributors in the field of electronic publishing, as in traditional publishing, is the major asset of off-line multimedia in Germany, and they operate aggressive distribution strategies:

- catalogue sales of CD Roms are general with bundling (packaging several titles together);
- samplers have become common: demonstration CD Roms which offer the option of unlocking the programme on payment by correspondence;
- the advanced migration of distribution circuits from software and computer shops to libraries and supermarkets;
- various remote loading projects for multimedia software via digital television decoders (Premiere, Sega Channel);
- the creation of integrated marketing lines on the model widely followed with edutainment titles in the United States (*Club Kid Soft*, etc). Thus Fun on Line, a subsidiary of the Egmont group, launched at the Frankfurt Fair, includes a monthly cyberculture magazine for children, *Fun on Line*; an on-line service specially designed for children (with supervision of the content, parental control and preset limits on charges); a centre for CD Rom tests done by panels of children and parents; rapid order circuits (impulse purchases) for software by on-line remote loading or de-blocking CD Roms.

As a group, the distributors and producer-distributors we met (Klett/Heureka; Bomico; Burda Interactive; Markt & Technik; Cornelson Software; Ullstein Soft Media) confirmed that, in their opinion, the American products suitable for the German interactive multimedia market will be progressively replaced by European products and particularly by German titles.

Despite the "quality tyranny" of numerous transatlantic titles (*Myst*, *Carmen Sandiego*, *SimCity*, *KidPix*, *Grolier Encyclopedia*), those we spoke to all expressed their determination to increase the proportion of German products, which are preferred by the public, in their catalogues. Cornelson Media, for example, which localises Broderbund and The Learning Company edutainment titles for the German market is planning to double its own production of German titles next year. Ulstein Soft Media, too, which

since its establishment 18 months ago has been mainly occupied in localising popular science titles (*Red Shift*), is actively reorienting its activities towards European titles.

In both cases, these developments are occurring despite the problems inherent in producing multimedia titles in Europe emphasised by those we spoke to – the excessive demands of European copyright holders based on an over-valuation of the electronic publishing market, the surcharge for multiple localisations and the absence of venture capital. The same policy is being followed by the multimedia subsidiaries of the major groups such as Navigo (Burda), BMG Interactive Entertainment (Bertelsmann) and D&K Interactive (Dorling Kindersley). Each of them, at Frankfurt, launched an ambitious catalogue of European titles covering all sectors of multimedia publishing (games, reference works, edutainment, science, medicine, finance, etc).

Lastly, as a sign of the globalisation of markets (and the difficulty of applying geographical criteria in the new digital environment), the Frankfurt Fair demonstrated the growing importance of international co-productions (such as those announced by the Voyager Company, based in both New York and Paris, with a series of European developers), and the creativity of new financial and publishing assemblages (like the remarkable children's CD Rom *The Journey of Thomas Blue Eagle* produced in Singapore, based on a text by a Sioux author, by the Franco-Singaporean CD Rom publishers TG Media/Daichi, premiered at Frankfurt and relocalised in France by Nathan.).

Technological innovations: user-friendliness and empowerment

Unlike Telecoms 95, the Frankfurt Fair, was primarily devoted to content. Nonetheless it offered an opportunity to confirm the impact of technological innovations which are crucial to the democratisation of multimedia production.

Voice recognition. Several competing systems were demonstrated (IBM Voice Type and Dragon Systems Dictate) and confirmed the high performance level of voice recognition technology. Voice recognition has emerged from the laboratory and the realm of science fiction and is now securely anchored in commercial reality, particularly in the production of interactive applications.

Intelligent software. Adobe Systems demonstrated its powerful Acrobat communications/PAO software for the Internet and two new programs, Pagemill and Sitemill, were introduced. They make it possible to create pages and sites on the WWW from traditional PAO software without using HTML language, a confirmation of the growing user-friendliness of author communications tools and their impact on the development of commercial Internet applications.

Commercial on-line services take off in Europe

Officially launched at Frankfurt and commercially available in Germany from 1 November, the AOL/Bertelsmann service marks the start of on-line commercial services in Europe. It also confirms the remarkable progress achieved in the content of on-line services and their accelerated development in the direction of services related to on-line video. AOL Europe consists of a number of areas (AOL-US, AOL Deutschland, AOL-UK, AOL France initially) and is distinguished by its particularly user-friendly interface (more akin to TV or video games than the traditional on-line aesthetic), its visual richness (AOL will be fully available on sites in an ISDN/modem 160,000 baud configuration), its use of European languages and the presence of a rich European content.

Like MS/Net, regarded as its chief competitor, AOL/Europe also offers a unified environment characterised by seamless navigation between the on-line and off-line applications, the various proprietary areas and the Internet.

The central role of the Internet

In addition to on-line services, the Internet dominated the Frankfurt Book and Electronic Publishing Fair, just as it did the Geneva Telecoms 95 Salon in the preceding week.

The Internet was central in discussions of the future of publishing. There was open conflict at Frankfurt. On the one hand, the publishers argued for the "industry's experience in organising information," know-how "without which neither traditional nor electronic publishing could exist." (A particularly vocal representative of the publishers even went so far as to suggest that academics should stick to managing their departments rather than experimenting with publishing on the Internet).

On the other hand, the proponents of cyberpublishing stressed the "revolution" involved in publishing on the Internet. It replaces the traditional mass or niche publishing markets with a new reality of communities of interest. Internet publishing "represents a challenge to both authors and marketing specialists."

In that context, the alliance between EUnet, one of the principal access providers to the Internet in Europe, and Open Book systems, an Internet publisher based in the United States, illustrates the interdependence between network operators (who need content) and content providers (who need access). Open Book Systems and EUnet launched the publication of Nelson Mandela's autobiography at Frankfurt. It was accompanied by a vast body of graphic, sound and textual documents, accessible to and enrichable by users. This is a demonstration of the trend in traditional publishing towards distributive publishing, "From Copyright to Cogniright."

In economic terms, the growing significance of the Internet in European publishing was confirmed in Frankfurt not only by the involvement of the major

publishers in WWW applications (corporate promotion, launching publications, the interface with distributors and bookshops, etc.) but also by the development of a new sector of SMEs. Those operate at the intersection between traditional publishing and distribution and the provision of Internet services (bibliographical searches, book orders, support for the launch of new titles, representing authors, etc.)

The active presence of the Commission

In confirmation of its involvement in both the traditional fields of information and communications and in that of the new media and electronic publishing, the European Commission was represented this year at the Frankfurt Fair by two stands. One was in the International Publishing section and the other in New Media. DGXIII-E also organised a workshop on the topic of "EU Opportunities for Electronic Publishing Support."

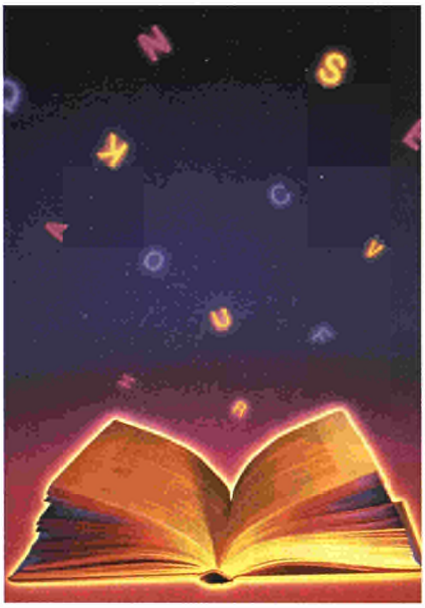
This was led by Franz de Bruïne, Director of DGXIII-E, and provided an opportunity to:

- recall the Commission's long-standing involvement with the field of strategy, beginning with the organisation of DGXIII's first workshop in 1993, the year in which electronic publishing first made its appearance at the Frankfurt Fair;
- present the possibilities for support available to the business under the various programmes of the community and the Information Company, particularly the Info 2000 initiative;
- go over with Brian Blunden, Chief Executive of IEPRC, and Paul Ormerod, Director, Meta-Generics Ltd, the two studies launched by DGXIII on the future of the media and advertising (the Admedia Project) and the impact of technology (the Information Engineering 2001 Project).

Multimedia publishing: an encouraging situation

The Frankfurt Fair confirmed the decisive commitment of the European press and publishers to the multimedia and new digital services sector. They are investing actively in infrastructure and content and building up a powerful, competitive business – in sharp contrast with the film industry which is far more fragmented, unevenly capitalised and largely dependent upon national and European support mechanisms. Its competitive situation compared with the United States is also very much less favourable.

Although, in general, American multimedia products still predominate, particularly in certain segments such as edutainment, the German market, which is by far the most developed in Europe, is already showing signs of a reversal in the trend towards national and European products. As one of those I spoke to pointed out, "the European CD Rom business has only a two-year lag to catch up with New York and Silicon Valley, not thirty years like the European cinema compared with Hollywood."



The Internet: a political and economic challenge to Europe?

Quite apart from the effects of fashion, the Internet constitutes a major social and economic phenomenon in Europe as it does elsewhere. It is a phenomenon which cannot be ignored.

Far from being an "American network" as was suggested by the European Parliament until very recently, the Internet provides a base in Europe for an economic sector which is still small but entirely real, and takes in service providers, software designers, publishers, etc. The sector will grow stronger with the securitisation of electronic transactions and the commercialisation of the Net which is well under way.

The FCC has declared that "the Internet is the key stone of the global information society" (Susan Ness, FCC Commissioner, 7 October 1995). The American administration is systematically highlighting the superiority of the Internet approach in the social and educational fields (Bill Clinton announced an initiative on 21 July 1995 to connect all California schools with the Internet by the end of the year, and every class in the country before the year 2000). American digital information firms are developing technology and testing commercial strategies to take the best advantage of the "global network par excellence." This is not a time when Europe should spare itself the effort of serious thought on the subject. To do so is to risk leaving the political and economic initiative to others.

Most especially, it would be useful to reflect upon the articulation between the Internet phenomenon and the various initiatives launched by the Commission, particularly in the context of trans-European networks and the information society. ■

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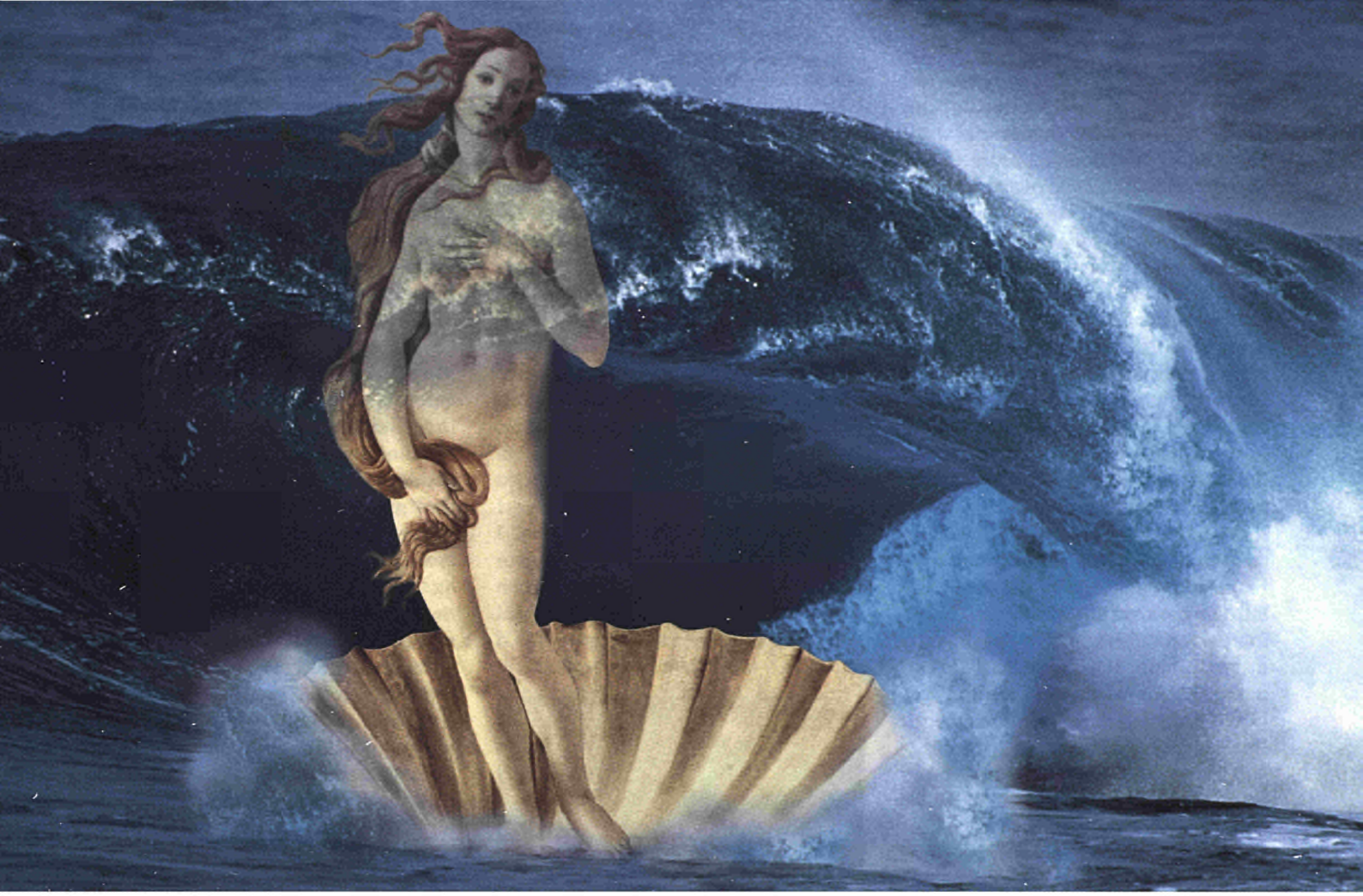

Venus becomes goddess of the seas?

European software makes shipping industry safer

Unexplained losses of bulk cargo carriers and a number of serious accidents on the high seas have been proliferating since 1990 onwards. The combined toll: 34 incidents with 250 deaths, 18 vessels lost and 16 seriously damaged – an unacceptably high human, economic and environmental cost. Something had started to go badly wrong.

In fact, the underlying cause of these 34 marine disasters was **structural weakness in bulk carriers**, according to a Lloyd's Register survey. One hypothesis suggested that the culprit might be the stress inflicted on the structure of the vessels during cargo loading – a critical operation in the top range of vessels, some with a carrying capacity of as much as 400,000 tonnes.

When loading tankers, the distribution of the load within the vessel is another equally serious problem – but of a different nature. Tankers can have up to fifty different cargo tanks, in which from one to twenty or even thirty different types of cargo have to be arranged while meeting all the operational and safety constraints.

Finding a solution to such problems was becoming imperative, and – thanks to software – the Greek company Helintec SA found it. Dr Koumbis, Helintec's managing director, had the expertise to provide a solution: an Automatic Load Optimisation package . . . with the help of Venus.

VENUS and ANKO

Venus[1] was produced as part of the recently finished Esprit project, AFRODITE (Applying Formal methods to Real-size Object-oriented Design in Technical Environments). Venus will be marketed both by the French company Verilog and the Institute of Applied Computer Science (IFAD), in Odense, Denmark. ANKO is an Automatic Optimisation Load Planner software package developed by Helintec using Venus in the AFRODITE project, and has promising prospects under its commercial name of Autoplan.

Precision counts

First of all, ship loading is a safety-critical operation. Human lives, the fragile environment and valuable vessels are at stake. Second, it has major economical implications, and it is not only the value of the ship that counts. Indeed, often the cargo can be more expensive than the vessel. Another factor is the very high cost of structural repairs needed if an inappropriate loading operation were to damage the vessel hull.

ANKO therefore had to be totally reliable and satisfy stringent requirements, and the loading solutions found needed to be completely accurate. In addition, it had to deal with:

- complex engineering computations
- multiple constraints like the maximum shear force, bending moment draught or trim
- IMO (International Maritime Organisation) stability requirements
- different types of load, ie fuel, chemical liquids, etc.

Finally, it had to provide optimised loading plans with an immediate response time while ensuring their accuracy and reliability.

This was the challenge which Dr. Koumbis met successfully with the help of Venus, which supported the specification of ANKO and achieved the very high standards of reliability and accuracy required. In addition, ANKO has already been successfully tested with 70 vessels and 15 customers.

Problems in ship operation

Ship operation, in everyday practice, faces problems and enquiries which have to be handled accurately and within an extremely tight timespace. Such situations most frequently relate to typical questions such as:

- Can vessel A take any specified cargo quantity or quantities, and satisfy, at the same time, a set of applicable operational constraints?
- What is the maximum cargo quantity/quantities vessel A can take given a number of operational constraints?
- What if the ship has to take part of the cargo in port P1 and complete loading in port P2, given, again, a set of operational constraints? What is the maximum cargo it can then load?

To help answer such vital questions, several elements are essential: experience, good knowledge of the vessel and a substantial amount of time. The number of feasible solutions increases exponentially with the number of tanks of the vessel. It also depends on the number of grades that the system is asked to handle, as well as the ratio of the cargo to be carried per grade to the vessel's capacity per group.

The investigation process for the identification of a proposed solution includes a large amount of repetitions, as sometimes trial and error is the only way to find the best way to load, within all the technical contraints and requirements. Among the most typical constraints met in practice are, for example, the draught and trim restrictions in the port of loading or discharge. The decisions taken have an obvious economic significance, as well as an obvious impact on the vessel's safety. Once a vessel's cargo capacity is confirmed, any variations in this can either raise claims from the prospective charterers, or result in unused capacity (dead freight) which can result in loss of income for the owner.

Also important for the operators is the level of stresses to which the vessel structure is subjected. Excessive loads on the vessel will lead to early deterioration of the hull structure, which usually translates into large maintenance and repair costs after several years.

Thus, the rapid investigation of cargo-loading enquiries under operational constraints must combine making the best possible use of the proposed solution, enabling the maximum or specified cargo to be taken and subjecting the vessel structure to minimum stresses. This is inevitably a practical problem for ship operation.

The solution to this includes defining the cargo quantity to be loaded in each particular tank of the vessel. Large vessels (such as VLCCs – Very Large Crude oil Carriers)) may have a carrying capacity of 400,000 metric tonnes and as many as 40 or fifty

different tanks. In this respect, the definition of a loading condition of the vessel, so that it takes a specified (or the maximum) cargo quantity and meets the operational constraints, is a combined minimisation problem. The objective function is based on stress considerations, while fulfilment of International Maritime Organisation stability requirements, as well as the practical limitations of a given trip, also have to be taken into consideration.

Plainly any software dealing with this issue needs to be highly reliable, as not only are substantial economic interests at stake but a group of users for whom complete reliability and trustworthiness would be the most important criteria when considering whether or not to use ANKO.

Automatic load optimisation system

The searching employed in the Load Planning is essentially a generate-and-test algorithm combined with a constraints propagation technique. Explicit and "hidden" engineering criteria are used to guide the search by the use of backtracking where necessary. Once a feasible loading combination has been found, then a classical constraint optimisation technique is used to find a local optimum, ie the best possible solution to a specific localised problem. Comparison of local optima results in a "global" optimum for the given set of constraints. The Load Planning algorithm used has proved to be extremely efficient and impressively stable.

The system is designed to give – within seconds – reliable answers to everyday practical problems of loading tanker operators. It accounts for one or multiple grades of cargo and any number of different vessels.

Vessel segregations (ie the groupings of tanks within a tanker) can be stored permanently and/or deleted, if necessary. After the definition of grades, quantities to be loaded and operational constraints, the system automatically selects from among the different segregations and displays those suitable for the case under consideration.

For each particular trip made by a vessel the user can specify a number of conditions or restrictions, namely:

- the quantity of cargo or quantity per grade, or an instruction to the system to load the maximum possible cargo from one or all grades.
- the bunkers, either as a total or their distribution in the vessel tanks, whichever is available)
- as an option, the maximum allowable ballast quantity to be loaded
- the API (American Petroleum Institute) loading temperature per grade of oil, (the system has built in the tables of the American Society for Testing and Materials and the Institute of Petroleum)
- the need for the compartment(s) to remain empty, or a prohibition on the system altering the loading of compartments
- draught restrictions, if any, and desired trim and trim range
- maximum desirable operational shear force and bending moment for the vessel, as a percentage of the maximum allowable
- water density (which varies according to the presence of chemical or minerals eg oil, or the mix of freshwater with seawater, as in brackish coastal waters)

The system then carries out an exhaustive search of alternative loading scenarios with different cargo segregations (whenever applicable), and gives loading arrangements which can first make the best utilisation of the available capacity per grade of cargo and per vessel trip; second, result in minimal stresses on the ship's hull; and third, fulfil all the given criteria and operational restrictions. All the necessary vessel-related information required for load planning is included in the system.The software system also provides a wide range of utilities to the user.

The development of Venus has been partially funded by the European Commission under the ESPRIT III programme in the area of Information Processing Systems: "Applying Formal methods to Realsize Object-oriented Designs In Technical Environments" (AFRODITE).

Emerging perspectives

The developed load optimisation application is software designed to address real-life situations, provide practical solutions, and increase efficiency in shipping markets, – which represent a particularly important sector for a number of European countries.

Formal methods (VDM++ in this case) and Venus proved to be a suitable platform to ensure consistency in software design and data flow definition, as well as to provide improved control over the software implementation process.

Venus was used for the design and specification of ANKO, showing its applicability in developing real-life industrial applications which are complex and critical from the reliability and safety points of view.

In the future, it is envisaged that more market-critical processes could be automated with the assistance of this leading-edge technology, provided that procedures for its integration in the software production cycle can be established and tested, in order to assess the cost-benefit trade-offs involved. ■

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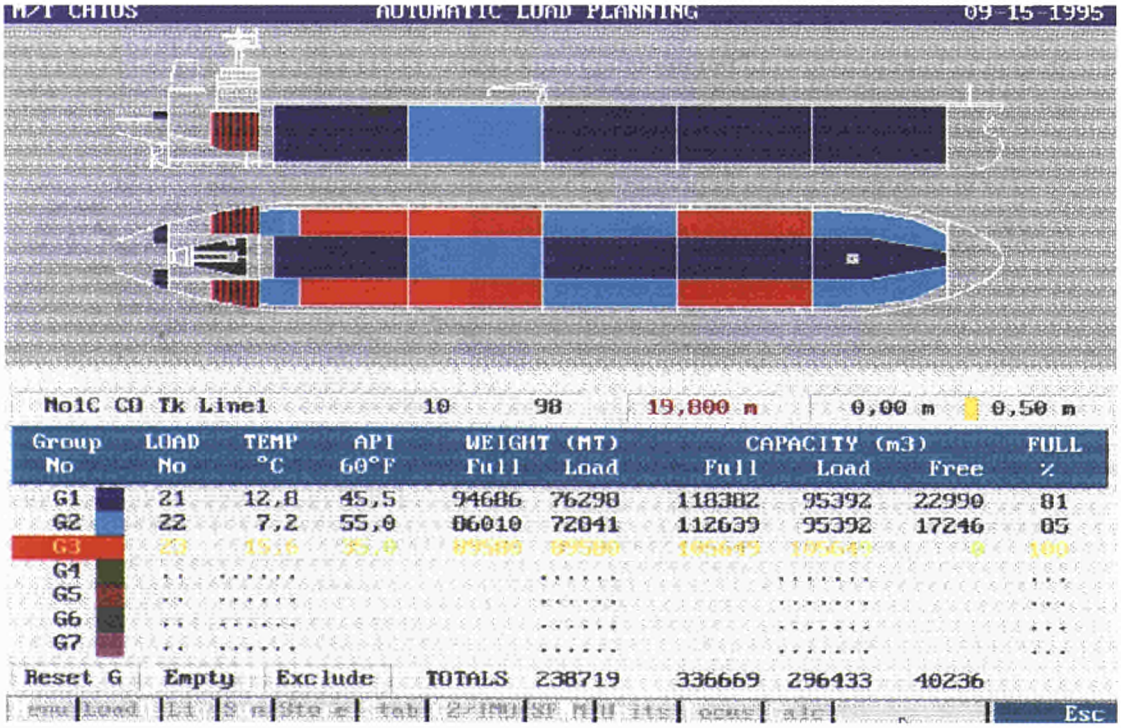
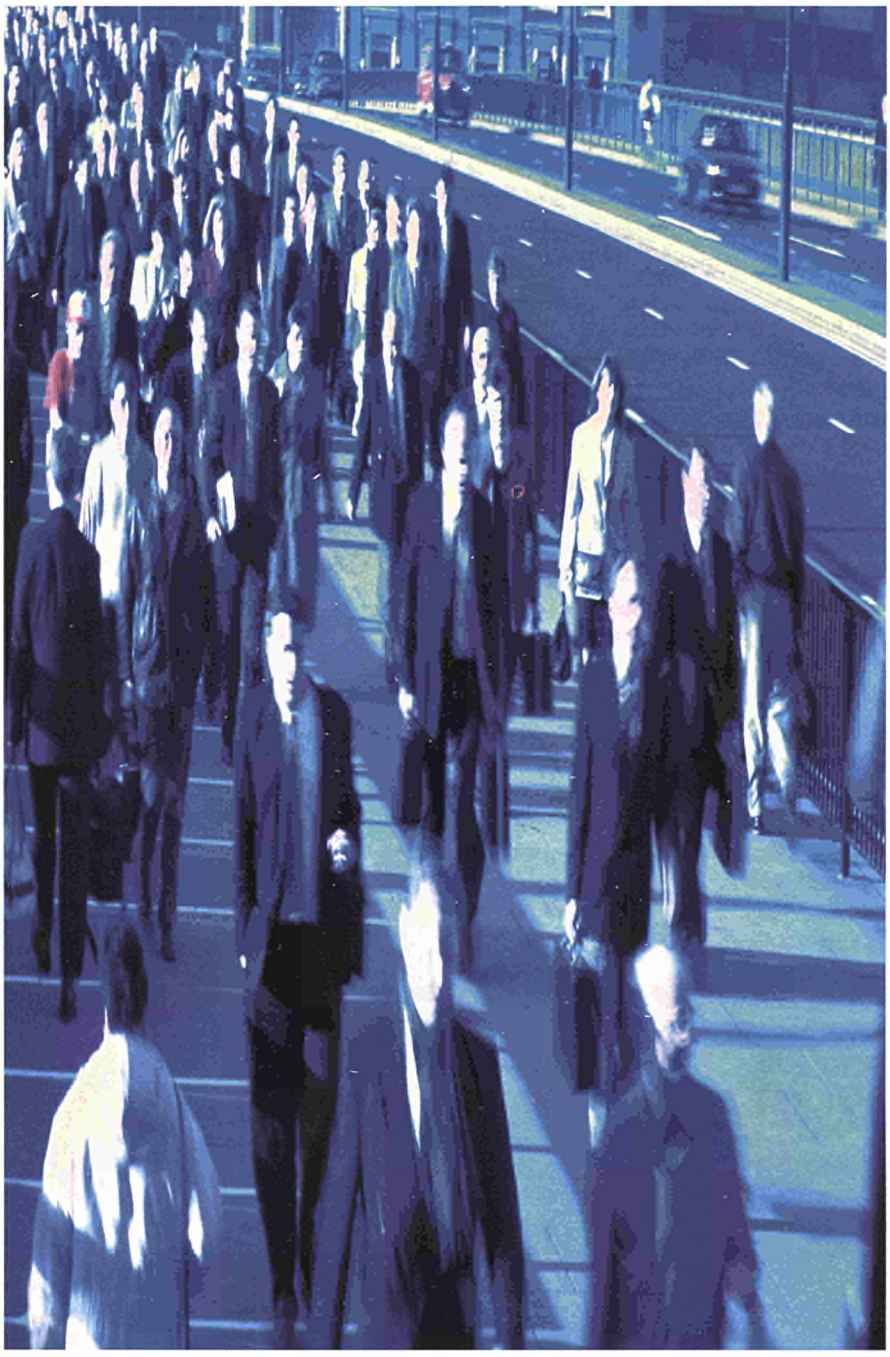
(1) VENUS is based on the combination of a rigorous development environment (the Object Oriented Formal Method VDM++) and the industrial standard OMT (Object Modelling Technique), implemented in LOV/OMT. This is a software environment for software analysis and specification, which included three graphical editors (Object, Function and Behaviour editors), and is a product of VERILOG, France. It offers features such as the graphical specification of Object Oriented Systems, and the generation of fully executable C++.



Re-engineering new patterns of work: a holistic approach



Business Process Re-engineering (BPR), corporate transformation and corporate restructuring are viewed by many senior managers as essential for corporate survival. However, the initiatives that result from them are often dreaded by most of the people who work throughout these same organisations.

Must BPR inevitably be regarded as a threat? How might the 'image' of BPR be improved? More importantly, what needs to be done for people to feel, and become, the beneficiaries rather than the victims of BPR?

The corporate treadmill

Organisations should exist to access, develop, harness and apply the collective capabilities and potential of people in pursuit of such goals as profitably identifying and delivering whatever represents value to customers. In terms of rationale and purpose a particular form of organisation ought to be a means to an end, and yet too often organisations appear to develop a life of their own. Keeping an organisation afloat becomes an end in itself, and one that may demand extraordinary levels of sacrifice and denial as the speed of corporate treadmills inexorably increase.

Management teams across Europe are working long hours to keep alive structures and operations that may no longer have any compelling rationale or distinctive purpose. If they ceased to exist, what would the world actually lose? Often very little would be lost. People would just go around the corner and buy something similar from someone else.

Management evangelism

Into this world of struggling and dying organisations and insecure, sweating people has burst the new management terminology of 'restructuring,' 'delayering,' 'outsourcing' and 're-engineering.' Much hyped and promoted with evangelical fervour, their propagandists use the rhetoric of revolution and promise radical improvements in performance and productivity.

Yet all around us what is happening appears as more of the same. Costs are cut and people seem to be working ever harder rather than more effectively.

Are the new techniques and approaches mere fads, or simply excuses to sell a new generation of consultancy services? Could their application actually enable people to 'work smarter' rather than just harder? Could we use them to create new businesses rather than merely slim down old ones?

While people struggle to keep up with an unending flow of corporate initiatives, there are also various emerging technologies such as EDI, multimedia, virtual reality and inter-active television to consider. How could they enable us to operate more effectively? Do they necessarily favour the large enterprise over the smaller business?

COBRA

To answer these and other questions, the European Commission asked a team of over 20 experts to examine what is happening across Europe with the actual application of BPR, emerging technologies and other means of corporate restructuring. The project was called COBRA – Constraints and Opportunities in Business Restructuring: and Analysis. The results of this year-long project have just been published by Policy Publications as *'The Responsive Organisation: Re-engineering new patterns of work.'*(1)

The COBRA team examined more than 100 examples of European re-engineering projects. *'The Responsive Organisation'* presents a holistic methodology and tools framework that synthesises the experience and lessons for re-engineering practice and new ways of working, along with 21 detailed case studies and various briefings, including notes on 101 specific tools and techniques.

So what did the COBRA team find? Overall, most applications of BPR are concerned with the improvement of existing processes and relatively short term savings of cost and time. They do tend to involve layoffs and 'headcount reductions.' It is little wonder that a growing number of organisations are seeking to avoid the use of the term BPR in view of its negative connotations.

In the main, the perception is that BPR is 'done' to people and they are not sufficiently involved in the process. BPR projects tend to be 'top down' and to be driven by organisational imperatives.

Relatively few BPR projects involve 'green-field' exercises, new ways of working and learning, or result in the development of new strategic capabilities or the creation of new markets or services. Most initiatives concern business and support processes rather than direction setting, management or learning processes. Goals such as improving the quality of working life, 'taking the heat off people' or creating more creative cultures are few and far between.

New models

It need not be this way. For example, the COBRA team found that substantially greater involvement and participation can significantly improve the acceptability of BPR outcomes without necessarily increasing the implementation time. There are also many options for radically improving how we can access, develop, harness and apply the commitment and talents of people:

There are new models of organisation such as 'virtual corporations' or 'network organisations' which could be adopted and which are more flexible and responsive than the relatively bureaucratic forms we have inherited from the past. While they present new management challenges, they may be 'more fun' for those who work within them, and hence more conducive of innovation and learning. They can also enable smaller organisations to successfully compete against those which are much larger.

Rather than stop – as most BPR exercises do – at the boundary of an organisation, they could embrace the whole supply chain. 'Network re-engineering' focused upon the supply chain and with an emphasis upon changing how organisations interact in the marketplace, has enabled radically new services to be introduced without necessarily turning the worlds of existing employees upside down. It can also create new opportunities for small and medium-sized enterprises to cooperate and collaborate.

Of course processes can be re-engineered. This is the 'territory' of BPR, but most re-engineering exercises fail to take account of new ways of working and learning. Processes are changed but generally not how, when, where, and with whom people work and learn – the keys to liberating more of the potential of people. The re-engineering of learning processes rather than of current business processes generally has more of a long- term and strategic impact – when it occurs, – which is surprisingly rarely, given the amount of rhetoric devoted to the learning organisation.

There are many options for radically improving how we can access, develop, harness and apply people's commitment and talents.

Patterns of work and approaches to learning can be, and are generally, changed quite independently of process re-engineering, and the appropriate introduction of a new way of working or learning can have a much more significant impact upon performance than 'improving processes.'

On the whole, new patterns of work such as teleworking are much more favourably regarded than BPR. Often the people within organisations will press for them. They are more likely to be viewed as offering benefits for both an organisation and the people who work for it.

When properly addressed within the context of a BPR exercise, new ways of working can greatly increase the value and acceptability of re-structuring and re-engineering outcomes to both an organisation and its people. The methodology in *'The Responsive*

KEY TO FIGURES

Figure 1:
The COBRA methodology for business process re-engineering runs through six distinct phases, yet it is a process without an end. Once a business process has been re-engineered, its performance must be monitored with a view to improving it even more.
The methodology can be used in one of two ways:
a) as a stand-alone methodology in its own right for BPR projects, especially those which include new patterns of working;
b) as a complementary methodology to be used in conjunction with a proprietary or in-house methodology. In this role, the COBRA methodology is designed to shed new light on the existing one especially by reviewing new patterns of work, including teleworking.

Figure 2:
In a traditional hierarchical business organisation different kinds of processes can be re-engineered. Learning needs to be built into any re-engineering process to ensure that people have the capacity to change into the future.

Figure 3:
Re-engineering can take place at a number of levels – a sub-process, a departmental or cross-functional process, a cluster of processes, a whole organisation, a complete supply chain, a whole market or, exceptionally, an entire community.

Figure 1: The six main steps of the COBRA methodology

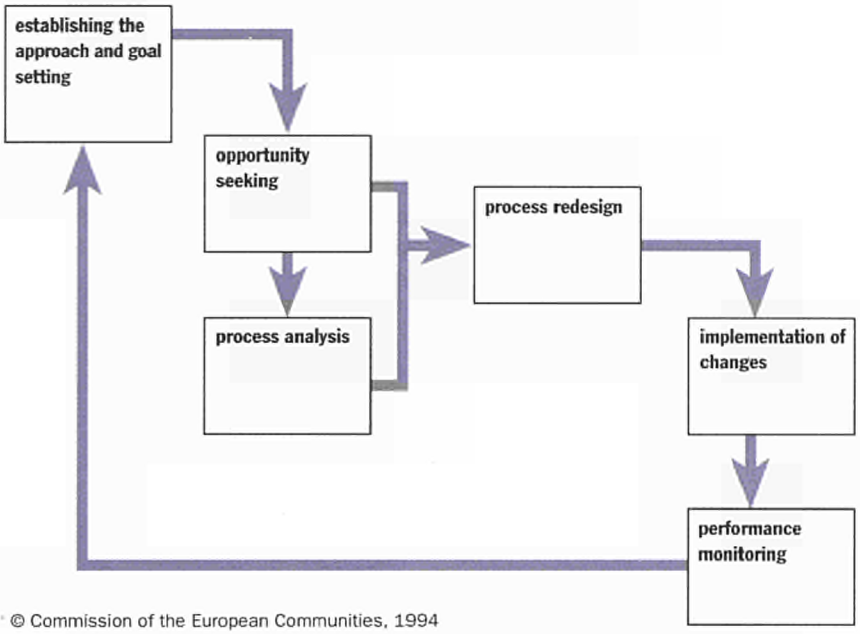
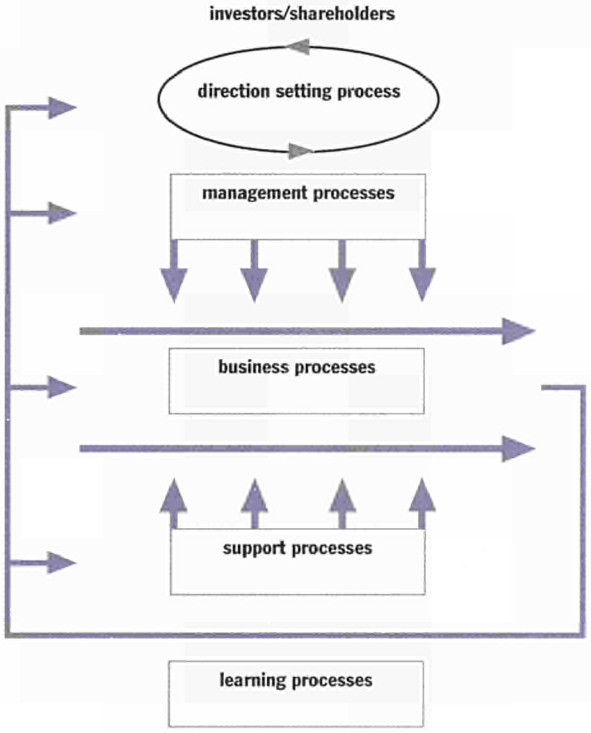


Figure 2: The different kinds of processes in an organisation



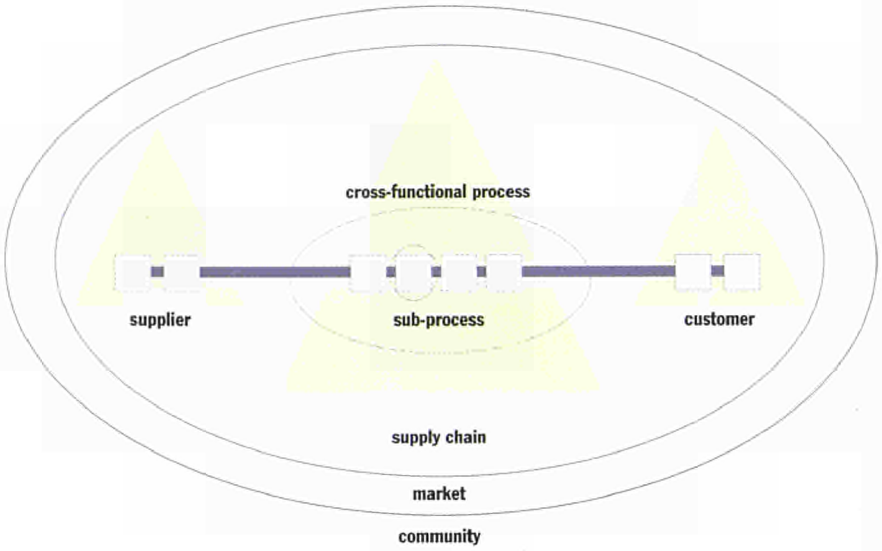
Organisation' report is designed to flag up the key questions relating to new ways of working at each stage of a BPR exercise.

No generation in history has so many options in terms of how, where, when or with whom to work and to learn. For example, people can work as employees or independent contractors, individually or with others, in a fixed or mobile mode, at single or various locations, including at home or neighbourhood offices, on a full or part-time basis, or on a temporary or permanent arrangement. The key to greater involvement and to harnessing more of the commitment and potential of people is to allow them to work and learn in whatever ways suit their needs and preferences, match their natural aptitudes and otherwise allow them to be more effective.

Holistic approaches

More holistic, sensitive and people – focused approaches to BPR and corporate transformation are needed. Organisations are not machines, but organic communities of living people.

Figure 3: The scope of business process re-engineering



The truly flexible organisation does not have standard ways of working or standard approaches to learning. Let us consider the more people-centred approach its managers might be expected to adopt.

People-centred approach

- Its managers begin with a compelling and distinctive vision of what the organisation is trying to achieve, and from which they derive actionable goals and objectives.
- The next step is to identify the roles and responsibilities and the skills and capabilities that are required.
- Suitable people who possess the required qualities are now identified, whether or not they are already employed, and when the desired skills cannot be located inside or outside of the organisation, steps are taken to develop them.
- Having identified the appropriate people, suitable contractual arrangements are concluded and they are then allowed to adopt or create whatever ways of working, develop or employ whatever processes, and use or acquire whatever technologies will allow them to cost effectively achieve their objectives.

The COBRA team found many examples of large organisations in 'commodity product' and other traps that were struggling to survive, while smaller and more flexible organisations, whose people are encouraged and enabled to focus upon what they enjoy doing and do best, innovate and 'make off' with the higher margin opportunities.

With an appropriate 'front end' in place, the virtual or network organisation can appear to have a more appropriate, welcoming and accessible capability than competitors many times as large. The customer or user does not know, and may not care, where a call is diverted to – across an office or between continents and network members – so long as relevant expertise is accessed and a satisfactory response is obtained.

Developments in information and communications technologies are arguably benefiting those smaller organisations that do not feel obliged to use people just because they are employed internally. With few employees of their own, they use emerging technologies to overcome barriers of distance, time, function, organisation, nationality and culture in the search for the most appropriate and relevant experiences and skills.

Defining, agreeing and building appropriate roles, competences and behaviours are the keys to success in organisational transformation. Too often people develop new models of organisations and re-design processes while doing little if anything to enable people to adapt. Structures and flow charts are changed, but not attitudes and behaviours.

On occasion, it may be more productive to put the questions of structure and process flow charts to one side and instead work directly upon roles, competences and behaviours. Frameworks can be put in place to develop them.

According to the COBRA team, if more organisations decided that among the main drivers of BPR should be quality of life and employee satisfaction rather than simple cost-cutting, then teleworking could be a significant feature of more solutions, redesigns and re-engineered organisations. ■

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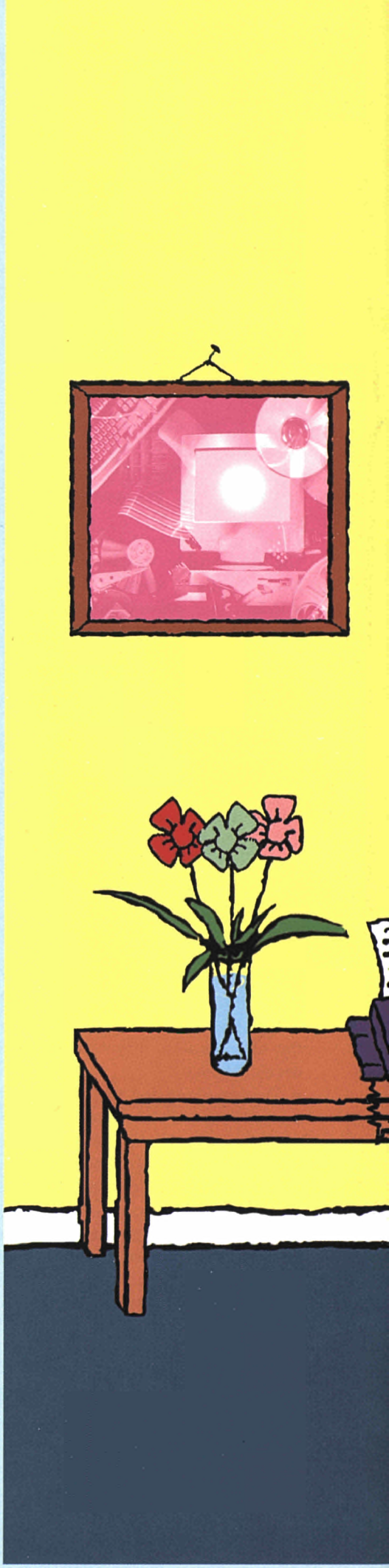

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