

New Telecommunications Services



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Management Summary
Report 78, December 1990

Butler Cox plc

LONDON
AMSTERDAM MUNICH PARIS

Published by Butler Cox plc
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Photoset and printed in Great Britain by Flexiprint Ltd., Lancing, Sussex.

Foundation Report 78, 'New Telecommunications Services', was published in December 1990. Its aim is to provide systems directors with information on the new telecommunications services that will be available in the period 1990 to 1995, and to provide them with advice on how to exploit the new services as they emerge. This document summarises the main management messages arising from our research. The full report is available only to members of the Butler Cox Foundation.

Telecommunications services are undergoing a fundamental revolution. Deregulation is eroding the PTTs' traditional role as the monopoly suppliers of services, and forcing them to operate in a more competitive environment. Market liberalisation has allowed new players to enter the telecommunications-services market. Suppliers are shifting the emphasis of provision from basic to value-added services. New technology is being widely deployed, and is enabling new types of services to be offered to users. Some of the more important changes that are taking place are:

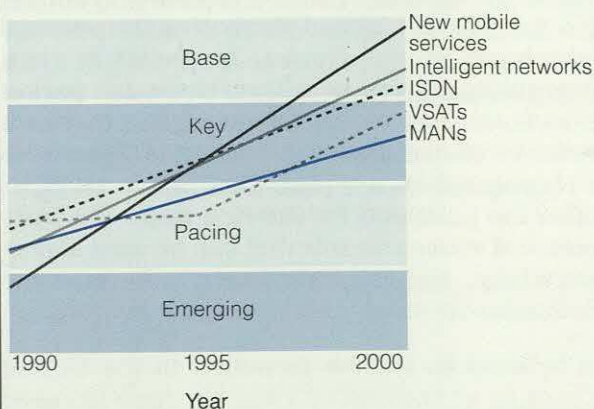
- A move from wired to mobile communications, which will change the emphasis from accessing locations (desks, rooms, buildings) to accessing individuals.
- The growing availability of public services that can be used instead of private network facilities.
- The increased use of satellites as an alternative to terrestrial communications.
- The conflict between market forces, and tariffs and regulation.
- The tensions within the PTTs as they face both competition from new service providers and the conflicting priorities of big business and residential subscribers.
- The widespread availability of digital communications, providing a wider range of higher-capacity transmission services that will eliminate many of the constraints to doing business over long distances.

The changing environment will bring opportunities for businesses to reduce costs, increase flexibility, and use telecommunications in new ways to gain advantage in the marketplace.

Of the many new telecommunications services now becoming available, we have selected the five most significant for detailed consideration in this report — new mobile services, intelligent network services, integrated services digital network (ISDN), metropolitan area networks (MANs), and new satellite services using small antennae and known as VSATs. Some of these services are already available, principally in countries with a fairly liberalised telecommunications environment; others are still at an early stage of development. All of them will, however, have a significant impact on corporate communications in the next five years.

Figure 1 shows how these five services will progress through the four stages of technology evolution during the 1990s. By about 1996, all of them, with the exception of satellite services, will have reached the key technology stage,

Figure 1 Mobile services and intelligent networks will show the fastest growth



Base technology is in widespread use in organisations. It is an essential business tool.

Key technology is proven, and market leaders use it to gain competitive advantage.

Pacing technology is used for pilot systems.

Emerging technology is still at the laboratory stage, although there may be a few prototype uses.

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which means that the technology will be proven and that market leaders will be using the services to gain a competitive advantage. Outside the United States, the growth of satellite services will be slow until the regulatory constraints are eased. Once that happens, the use of these services in Europe and elsewhere will grow rapidly.

Mobile communications services

There have been three significant developments in the two years since we last reported on mobile communications. These are digital mobile telephony services designed for personal use, mobile data networks, and land-mobile satellite services.

Digital mobile telephony services

A confusing array of digital mobile telephony services will become available during the early 1990s. They will largely supersede the existing range of analogue systems, including the existing cellular radio services. Personal communications networks (PCNs) and the pan-European digital cellular network (known as GSM) are the most significant of these services. PCNs are aimed at individuals but are not designed for use in vehicles (although PCN handsets will work in a stationary or slow-moving vehicle in urban areas). GSM has been designed for communications with vehicles anywhere in Europe.

The PCN concept is a new initiative from the UK government, aimed at creating the personal telephone of the future. Its belief is that, eventually, everyone will carry a small pocket telephone, just as, today, everyone carries a wristwatch and a pocket calculator (Figure 2 is a photograph of a typical PCN handset). PCNs offer the prospect, for the first time, of a truly personal communicator that can be used almost anywhere, and they are likely to become the dominant form of mobile communications.

PCN services will be launched in the United Kingdom at the end of 1992 by three licensed consortia and will cover about 40 per cent of the population. Although tariffs have not yet been published, we expect that, in the long term, the services will cost less than those for cellular telephony and be competitive with both existing and future wired public telephone services. By the late 1990s, PCNs will therefore

Figure 2 With the advent of PCN services, the general public will be able to own inexpensive, pocket-sized, portable telephones that can be used anywhere



provide a real alternative to the (wired) direct exchange line for individual subscribers.

Mobile data services

New mobile communications services aimed specifically at data communications will be developed over the next few years. Using these new networks will be cheaper than using voice-oriented mobile networks for data transmission. We expect that there will be several service providers in the marketplace, each concentrating on a particular sector or group of sectors.

In line with its policy of promoting a competitive telecommunications environment, the UK government is in the process of granting licences to four organisations to establish and operate public mobile data communications services.

Land-mobile satellite services

Land-mobile satellite services are being established on a regional and global basis by several organisations. In Europe, for example, five such services are planned, and a worldwide service (known as Iridium), based on multiple low-orbit satellites, has also recently been

proposed by Motorola. While current services provide mainly data transmission and position-fixing facilities, future services will also include mobile telephony.

Many road-haulage companies are already gaining significant benefits from using land-mobile satellite communications. In the future, similar advantages will be gained by a wide range of businesses, and communications managers will increasingly need to take account of mobile communications, both voice and data, in their corporate networking plans.

Intelligent network services

PTTs and other providers are beginning to offer services that either cannot be provided by private networks, or at best, can be provided only with difficulty and at a high cost. These services offer four main advantages:

- They enable many of the operational aspects of in-house telecommunications to be subcontracted to a third party.
- They offer new facilities to enable organisations to improve their responsiveness to their customers and the general public.
- They enable staff at small branches to have similar telecommunications facilities to those at larger sites.
- They promise cost reductions plus the ability to change telecommunications facilities quickly.

These services are known as intelligent network services because they are based on computers and databases that are added to the public network infrastructure. They include variable routing of calls, variable billing arrangements, and provision of information about the caller to the called party. More important for businesses, the PTTs will be able to use their intelligent network infrastructure to provide centrex services and virtual private networks. The provision of these types of services will mean that even large organisations will have less need for private networks.

A centrex service provides similar features and functions to an in-house PABX but with the main switching equipment generally located within the local PTT telephone exchange. The advantages are that the management of the in-house telephone service is subcontracted to the PTT and it is easy and quick to expand or reduce the size of the facilities. Centrex services have

been available for many years in North America and are becoming available in Australia and the United Kingdom.

A virtual private network (VPN) provides a business with many of the features associated with a private voice network without requiring the use of private circuits. Experience in the United States, where VPNs are common, has shown that they can also bring particular benefits to organisations that have many small branches and insufficient voice traffic to justify a private network. VPNs are often less expensive than private networks because transmission capacity is provided on an as-required basis, and can be shared between customers.

The call rerouting facilities available with intelligent networks can be combined with freephone numbers to enable businesses to provide a more flexible telephone service for their customers and the general public. Other types of intelligent network services can provide new ways of doing business. In the United States, for instance, 900 numbers are used to provide information services where the revenue is shared between the service provider and the PTT. Examples are listed in Figure 3.

Integrated services digital network

Much of the telecommunications infrastructure owned and operated by the PTTs has been converted from analogue to digital technology during the last 30 years. The exception is the connection between subscribers' premises and the local telephone exchange. Integrated services digital network (ISDN) is the means by which the PTTs will provide digital channels

Figure 3 In the United States, 900 numbers provide access to information services

- Callers to a California 900 service can obtain a facsimile showing the current status of Los Angeles traffic jams.
- Lotus 1-2-3 spreadsheet users can call a 900 number to obtain expert assistance in solving problems. Calls are charged at \$2 per minute.
- One service provider sells TRW Business Credit Reports via a 900 call that costs \$28.
- A tele-lawyer 900 service provides legal advice over the telephone at a charge of \$3 per minute.

In each case, the telephone company bills the total cost of the call, including the service elements, and passes on an agreed amount to the service provider.

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to subscribers' premises. Each ISDN connection will provide at least two digital channels, which can be used simultaneously — for example, for a telephone conversation on one channel and for transmitting a facsimile, or data between computer systems, on the other.

There will be two varieties of the initial narrowband ISDN — basic access will provide two digital channels and a signalling channel; primary access will provide 30 (23 in North America) channels and a signalling channel. Broadband ISDN, which will evolve from metropolitan area networks, will not start to appear until the late 1990s.

The digital nature of ISDN will result in better voice quality and short call-set-up times, and will facilitate switched data communications at transmission rates higher than can be achieved over analogue links. It will also enable new facilities to be provided, such as calling-line identification, automatic redialling, and direct dial-in to individual extensions.

In the short to medium term, the tariffs for ISDN will make it appear expensive compared with conventional telephony and telecommunications services, and many organisations will not be prepared to pay a premium for the standard facilities associated with end-to-end digital working. In the immediate future, therefore, the take-up of ISDN will depend on the additional features and other benefits that ISDN applications can provide. This means that the initial focus will be on using basic-access ISDN for specialised niche applications. (The main report contains examples of successful pioneering ISDN applications.)

Later, as primary-access ISDN becomes widely available, and as ISDN tariffs are reduced in comparison with tariffs for existing telecommunications services, other types of applications will begin to have general appeal. By the mid-1990s, there will be four main categories of new ISDN applications:

- Interconnections between PABXs and the public network.
- Connections of small branches to head offices.
- Provision of back-up and overflow capacity for digital leased circuits.
- Customer service and telemarketing applications.

Figure 4 gives our best estimate of the availability of a commercial ISDN service in most

Figure 4 By 1991, most advanced countries will have implemented initial commercial ISDN services



of the countries where there are Foundation members. Although the projected growth rates in the number of ISDN subscribers may be impressive, ISDN connections will constitute only a small proportion of business lines by 1995, and a tiny fraction of total lines in any of the countries implementing it. To achieve the full benefits of ISDN, all business and residential lines will need to be connected via ISDN, and this requires the whole of the telecommunications infrastructure to be digitised. Most developed countries will be able to offer full digital access to all subscribers by about the turn of the century.

Given the long lead times of all telecommunications investments, we believe that Foundation members should now plan to use ISDN services. We recommend that they identify potential ISDN applications and test these with suitable pilot projects. Such projects will prepare the ground for making a business case for eventually adopting ISDN. In some countries, financial assistance may be available

for setting up pilot ISDN applications. We also advise members to participate in any user forums and groups that may be established to support ISDN implementation in their country.

Metropolitan area networks

At present, information can be transmitted within a site much more quickly than it can economically be transmitted between sites. This means that remote users of computer systems receive a much worse service than local users, unless very expensive high-speed private lines are installed. Metropolitan area networks (MANs) will provide dial-up high-speed services between sites, thus giving companies more flexibility in the location of staff and new opportunities to communicate more effectively with trading partners, suppliers, and customers.

MANs will initially be designed to cover areas equivalent to major cities but they will be interconnected to provide national and international coverage. They will offer high-speed services (up to 75 times faster than narrowband ISDN) for the transmission of data, voice, and video. Areas initially served by MANs are likely to be those selected for special infrastructure development in order to attract new industries and employment.

The Institute of Electrical and Electronics Engineers (IEEE) has recently agreed a standard for MANs. It is not surprising that the first country to implement a public MAN service based on this standard will probably be Australia, where the underlying technology (described in the main report) was invented. Rapid progress is also being made in Europe and North America; many PTTs have announced their intention to carry out trials of MANs in 1990 and 1991.

In deciding to install and promote MANs, the PTTs are faced with the difficulty of not harming the commercial prospects for narrowband ISDN, which is only now being introduced. Considerable investment will also be required. Given the immaturity of the technology, the PTTs will want to write off the capital costs in as short a time as possible. These two factors suggest that the PTTs will take a cautious approach when setting tariffs for MAN services. Our view is that, where there is no competition, the tariffs set will not encourage a rapid take-up of MAN services.

For some time, MANs are likely to exist as 'islands' of concentrated demand, with limited interconnection between the islands. This will not, however, meet the needs of multi-site organisations, which are often scattered around the country. The lack of universal geographical coverage will be a serious obstacle to the widespread adoption of MAN services.

In the longer term, we believe that public MANs will play a significant role in corporate wide-area networks. Using MANs in this way can be seen as part of the overall trend in business towards delegating specialised tasks to third-party service providers. There will inevitably be less need for specialist in-house staff as these services are implemented, and Foundation members will need to take this into account in their long-term planning. In the meantime, we recommend that Foundation members consider participating in one of the MAN trials.

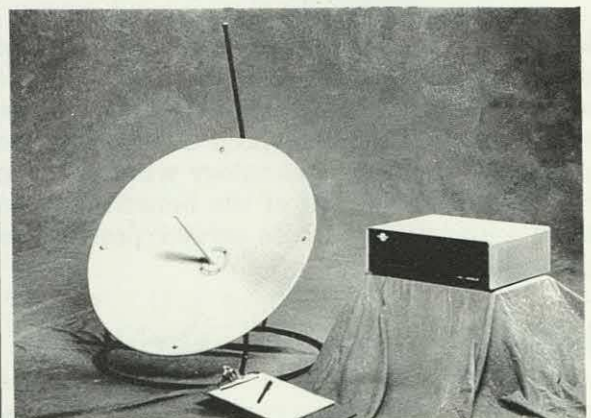
VSAT satellite services

Inexpensive satellite communications using small dishes offer two main business benefits:

- The ability to transmit video and data to multiple locations simultaneously.
- The ability quickly to establish reliable communications with remote locations that are served inadequately by terrestrial links.

These services are known as VSAT services. (VSAT stands for 'very small aperture terminal', which is telecommunications jargon for a small satellite dish — Figure 5 is a photograph of a

Figure 5 A VSAT consists of a small antenna connected by standard coaxial cable to a small indoor digital receiver/controller



(Source: Contel ASC)

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VSAT.) Outside the United States, restrictive practices by PTTs have thwarted the growth of VSAT services, and these remain the greatest obstacle to their use. Because the PTTs derive such large revenues from international services, they are anxious to ensure that VSAT services are not used to bypass the terrestrial network, and the use of VSATs in Europe is therefore highly regulated.

Pressure is, however, mounting from users in Europe who complain that they are being denied the benefits already available to North American businesses. The European Commission is already pressing for reform, and has recently published a VSAT supplement to its 1984 Green Paper on Telecommunications. Full two-way use of VSATs should be commonplace by the late 1990s.

There is a wide range of potential VSAT applications, but they fall into three broad categories:

- One-way information-distribution applications. These applications are used to broadcast video, audio, or data from a central point to a large number of locations. Business television, business audio, financial-information services, news-agency services, and electronic publishing are typical applications.
- Interactive applications. These are two-way point-to-point transactional services for standard teleprocessing or telecontrol applications, and possibly voice telephony.
- Data-collection applications. These are specialised applications, where VSATs are polled to collect data. This category of VSAT application is typically used for remote sensing in meteorology, pipe-line monitoring, and similar fields.

In view of the current regulatory problems, a great deal of tenacity is required to implement a VSAT network. Those organisations that have embarked on pilot VSAT projects usually have a 'champion' of the technology who is able to convince management of the benefits and to work with an appropriate service provider to implement a system.

Impact of the new services

The impact on large businesses of such significant changes in telecommunications services will be enormous:

- The ability to communicate with customers, suppliers, and trading partners at high speed over public dial-up services will create new product and marketing opportunities.
- The ability economically to provide staff in remote locations with similar services to those in central locations will create new scope for organisational flexibility. At the same time, satellite communications can provide direct broadcast communications to multiple sites, enabling managers to communicate directly with the field.
- The ability of the communications system to route calls to the most appropriate location depending on time of day or location of the caller will provide ways of improving customer service.
- Mobile voice and data communications will increase both efficiency and responsiveness to customers.

While the PTTs are keen to introduce new services that will make this possible (and to obtain the additional revenues that they will generate), they will also want to protect the massive investments in the existing public network infrastructure. Some of the new services can be used to bypass the existing infrastructure, and the risk is that the initial tariffs will be set at discouragingly high levels. At the same time, the PTTs will increasingly be subjected to competition as more countries move to a less regulated and more liberalised telecommunications environment.

The implication for corporate telecommunications managers is that they will continually have to re-assess the services on offer and decide when it is appropriate to replace private facilities by public services. Greater use of public services will start with voice services, followed by data services. The rate of progress will depend partly on how fast the new services are implemented in each country and partly on the confidence that customers have in their PTT's ability to deliver a reliable and responsive service. The availability of competitive services will also be an important factor because businesses will be more prepared to use third-party services if there is an alternative source of supply. Take-up of the new services will be highly dependent on the tariffs set by the PTTs.

The trend towards greater use of public services will have an impact on the skills required to manage the in-house telecommunications

function. There will be less emphasis on network operation and more emphasis on applications and on managing the third-party suppliers. In effect, the telecommunications

manager will become a communications broker, matching corporate applications requirements to the telecommunications services available from a variety of sources.

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The Butler Cox Foundation is a service for senior managers responsible for information management in major enterprises. It provides insight and guidance to help them to manage information systems and technology more effectively for the benefit of their organisations.

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