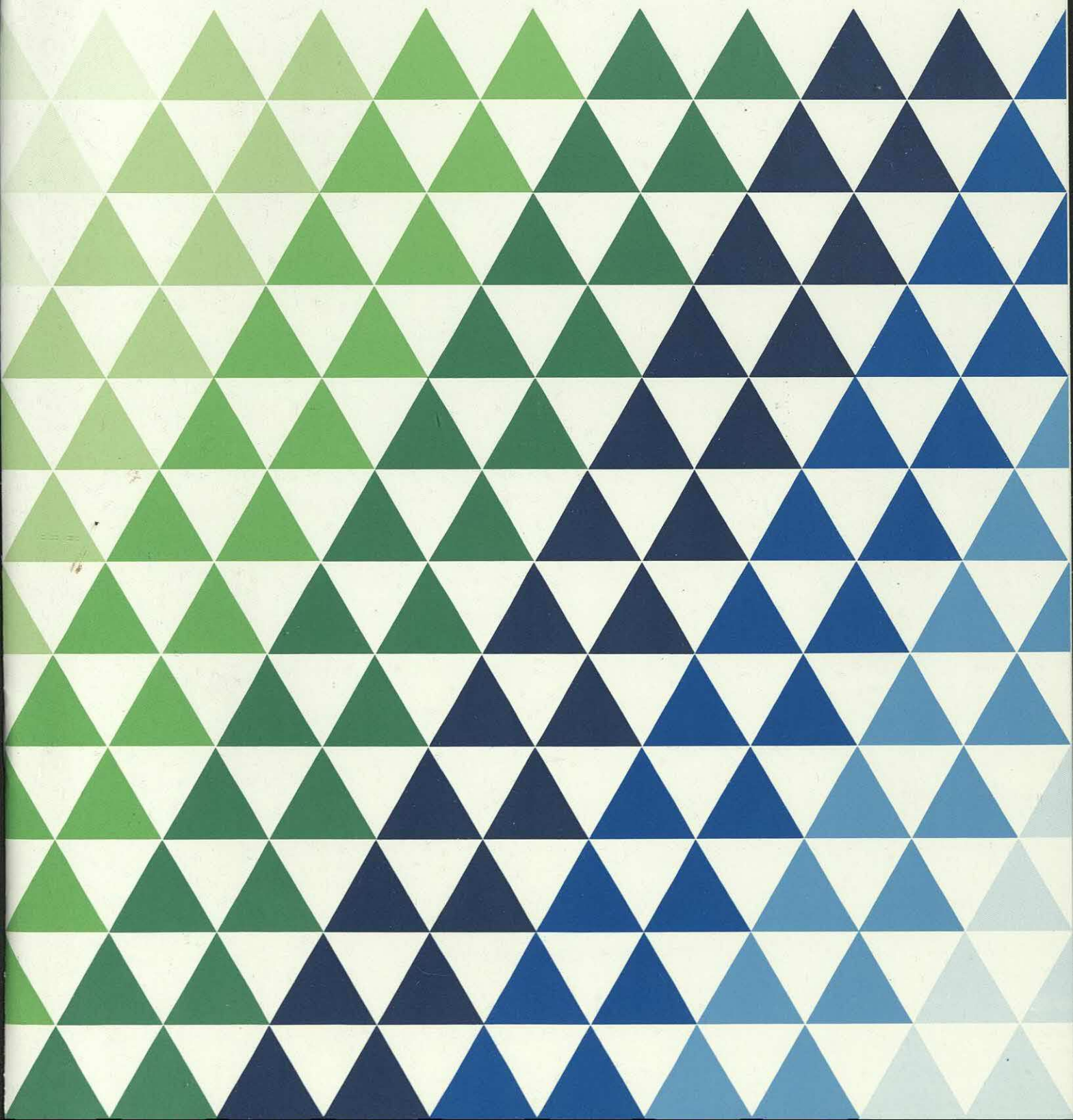
Management Summary

BUTLER COX FOUNDATION

Mobile Communications



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Mobile Communications

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The use of mobile radio technology for voice communications is not new. The technology has been used by the police and the military services since the 1930s and, in various guises, by specialists and enthusiasts ever since. More recently, developments in communications technology and the involvement of third-party service providers have made mobile communications widely available to the business user. (Figure 1 shows some typical mobile telephones; the latest versions of these are now small enough to be carried in a briefcase.) In few cases, however, is their true business potential being fully exploited.

Figure 1 Mobile telephones are now small enough to fit into a briefcase

(Source: Philips Communication Systems Ltd)

Mobile communications can bring substantial benefits to most organisations

Some organisations — for example, those in the fields of transportation and the public utilities — are particularly dependent on the use of mobile communications, and it would be difficult for them to operate effectively without them. The number of organisations to which this applies will continue to increase in the future. However, we believe that there are widespread opportunities for most businesses to use mobile communications to great advantage today. Of course, the greatest benefits will be realised in countries where the services are the most advanced — Australia, North America, Scandinavia, the United Kingdom, and Hong Kong. In countries that are only now becoming active in this field, however, there is an opportunity for organisations to learn from the mistakes of the early users and to plan for the orderly introduction of mobile communications products and services as they become available.

The benefits most commonly quoted relate to applications based on the need to be in constant contact with individual members of staff, or to respond rapidly to business opportunities. Examples include:

- *Responding to an opportunity:* Some companies have been able to secure major contracts because their salesmen were able to contact or respond to a customer at a critical moment.
- *Improving staff productivity:* In many companies, the productivity of sales and service staff has increased, with the introduction of mobile communications. They have made it possible for companies to improve scheduling by reducing travelling time and directing staff to customers' sites where their services are most needed. A vehicle-recovery operation increased productivity by 35 per cent, with the same fleet and the same number of drivers; other companies quote increases of between 20 and 60 per cent in the number of calls made per day by their service engineers.
- *Improving safety/security:* Staff working in potentially hazardous locations can use portable radio terminals to keep in continuous contact or to call for help in the case of an emergency. Vehicles carrying high-value goods, like cigarettes and spirits, or valuable documents, use mobile radio terminals as a matter of course.
- *Maintaining production throughput:* A Canadian car-assembly plant avoids expensive

production stoppages by using a transport operator who can pinpoint the location of his vehicles and make deliveries that are critical to the plant's 'just-in-time' production system.

- *Providing temporary services:* Several banks have managed to maintain services to their customers after disasters have put their conventional telephones out of action.
- *Generating additional revenue:* Operators of railways, airlines, and hire cars have generated additional revenue by providing mobile telephones for use by their customers.
- *Maximising the use of executives' time:* Many highly paid executives find that a mobile telephone is indispensable in maintaining contact with their offices, and enables them to make use of time that would otherwise be wasted in traffic jams and airport terminals.

Products and services are widely available

A wide range of services is already available in most developed countries, and the range is progressively being extended. Pagers can now display, or even 'speak', messages. Trunked mobile radio services, in which users share access to several radio channels instead of being limited to one, are being launched; they offer private mobile radio capabilities with all the convenience of a public service, and at a cost substantially lower than that of cellular radio. Mobile data services are available in several countries — for example, the Mobitex service in Sweden — and vehicle-location services, which enable organisations to track the locations of their vehicles, are now on offer in Australia, the United States, and the United Kingdom. Satellite-based mobile services, air-to-ground telephony, wide-area cordless telephones, and in-car information services will soon be commercially available. Descriptions of all these services are given in Figure 2.

In addition, mobile services are increasingly being packaged and offered in ways that are attractive to the customer. The size of terminals has been progressively reduced so that cellular telephones are now small enough to be carried in a briefcase, and pagers have shrunk to the size of a pen. The quality of mobile voice communications has improved to such an extent that it can approach that of conventional telephony. Advances in technology are making it easier to integrate mobile communications with fixed networks and existing computer systems, and services are far more widely available, both in terms of the number of customers they can support and in terms of geographic coverage.

Digital technology will overcome the limitations of existing cellular services

Existing cellular telephone systems use analogue technology, and provide a limited service in three respects:

- The systems currently available in different countries work to different technical standards. Terminals suitable for use in one country will not usually work in another; in Europe, this limitation has militated against the even greater use of mobile telephony.
- Many of today's cellular telephone services, in Europe and elsewhere, are already reaching maximum capacity. In many countries, and particularly in major cities, the allocations of suitable frequencies are insufficient to meet demand. As a result, public services are becoming very congested, and offer a poor grade of service, or are very highly priced in order to control demand.
- While many highly populated areas are having problems with congested frequencies, some rural areas have no service at all. Expansion of the service to cover a whole country typically takes years.

While analogue systems will therefore still be installed in areas that do not yet have them, they are unlikely to be developed, technically, much further. Manufacturers are now investing in digital technology. The pan-European digital cellular system (known as GSM after the Groupe Spécial 'Mobile' that developed the standards) is scheduled to be launched in 1991. The adoption of common standards will mean that the same digital cellular telephones can be used throughout Europe. Furthermore, the more economical use of bandwidth, which is possible with digital technology, will mean that GSM is likely to provide better-quality service in areas where existing analogue systems are congested. GSM coverage will not, however, be as good as that of analogue systems until the late 1990s, and the two systems are likely to continue to exist side by side for the foreseeable future.

As demand increases, prices are falling

Over the last five years, demand for mobile communications has grown at a remarkable rate. In Western Europe, for example, the number of paging devices has grown from 200,000 in 1983 to more than 1.25 million at the end of 1988. The first

European cellular telephone services were launched in late 1981 and, by the middle of 1988, there were about 1.15 million subscribers, or 0.3 per cent of the European population (see Figure 3 overleaf). The annual growth rates in Scandinavia and the United Kingdom, the longest-established European markets, have been just under 50 per cent. The use of mobile communications services is likely to continue to grow over the next few years at similar rates, assuming that the operators can maintain, or indeed, enhance existing quality.

Figure 2 Mobile communications technologies make a wide range of services possible

Service	Nature of the service
Paging	An alerting service that activates a small, portable terminal (pager) either to emit a tone or to display a telephone number or a short message. Paging messages are transmitted on a single channel, one-way only, and each pager is identified by a code so that it responds only to the messages addressed to it.
Mobile radio	Used by organisations to support their own activities. Typically, users talk only to the operator, not to each other, only one party can transmit at any one time, and all users share the same channel. A more recent development, known as trunked mobile radio, allows users to share access to a number of channels, and they are allocated a free channel when they want to communicate. Both technologies may be privately operated or they may be used to provide a public service offering similar facilities.
Cellular telephony	A mobile telephone service using a number of low-power transmitters (base stations), each of which provides service within a small, well-defined area, or cell. Cellular systems can cater for more users than traditional mobile telephone systems because the same frequencies can be re-used in non-adjacent cells.
Wide-area cordless telephony	Public base units sited at locations such as railway stations and airports enable users to operate their own handsets, similar to those used with domestic cordless telephones, within 150 metres of one of these base units. Only outgoing calls are possible.
Mobile data communications	Mobile services that support data communications. In some cases, they transmit data only; in others, they support voice as well.
Vehicle location	A service that enables the user, at base, to pinpoint the location of a vehicle. In most cases, these services also provide limited data communication between the vehicle and base.
Satellite-based mobile services	Also known as land mobile satellite services (as opposed to satellite services for ships and aircraft). Planned services include paging, vehicle location, and messaging.
Air-to-ground telephony	An in-flight telephone service for airline passengers.
In-car information services	A service that provides traffic information, and in some cases, advice on routes, to drivers.

Our research indicates that many of the organisations that are not yet using mobile communications are holding back because they perceive the costs to be unacceptably high. Indeed, the investment required to install and run mobile communications systems can be high, but it can often be justified in view of the benefits that can be gained. Furthermore, the prices of many types of mobile equipment have fallen considerably as a result of progress in integrated circuit technology, growing equipment production volumes, and greater competition. Reductions in the prices of cellular telephones in several countries over the last few years are a case in point (see Figure 4 on page 5). It should, however, be borne in mind that equipment costs are only one element of the cost of introducing mobile communications. Usage costs (air time) represent a significant proportion of total costs.

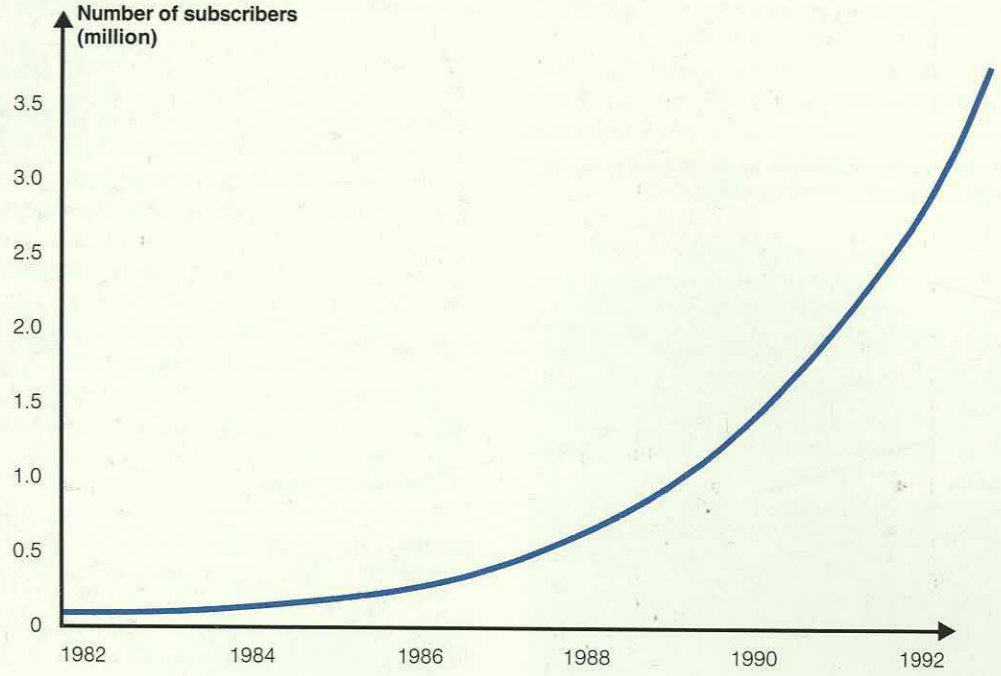
Thus, although many organisations currently perceive price to be the main barrier to using mobile communications, we believe that the substantial benefits to be gained, coupled with falling prices, will mean that many more organisations will begin to use mobile products and services. They will, however, need to plan for the introduction of these new technologies if they are to realise their true potential.

Mobile communications must be coordinated and managed

The growth rates quoted above represent a substantial increase in the importance of mobile communications. There is little evidence to suggest, however, that they are receiving much management attention in most organisations. Responsibility has been devolved to the individual departments most directly concerned, coordinated purchasing has been limited, and the use of mobile services has developed independently of the use of other information technology. As usage increases, the costs of such mismanagement will become significant.

Organisations that fail to manage mobile communications effectively will risk incurring significant penalties. Above all, an uncoordinated approach will lead to inefficient operations and a failure to capitalise on the business opportunities that could be exploited. Furthermore, it will mean that unnecessary costs are incurred and that opportunities to develop the business in the future will be jeopardised because it will be difficult to integrate mobile communications with other systems.

Figure 3 Spectacular growth in the number of subscribers to cellular telephone systems in Europe is expected to continue



(Source: *European Mobile Communications Report* and Dataquest)

We believe that it is increasingly important that mobile communications be seen in a broader perspective. It is no longer appropriate to treat them in an ad hoc way; they should be planned for and managed in the same way as other areas of IT, and coordinated with them. This implies a need for organisations to broaden the scope of their IT strategy to take full account of telecommunications in general, and of mobile communications in particular.

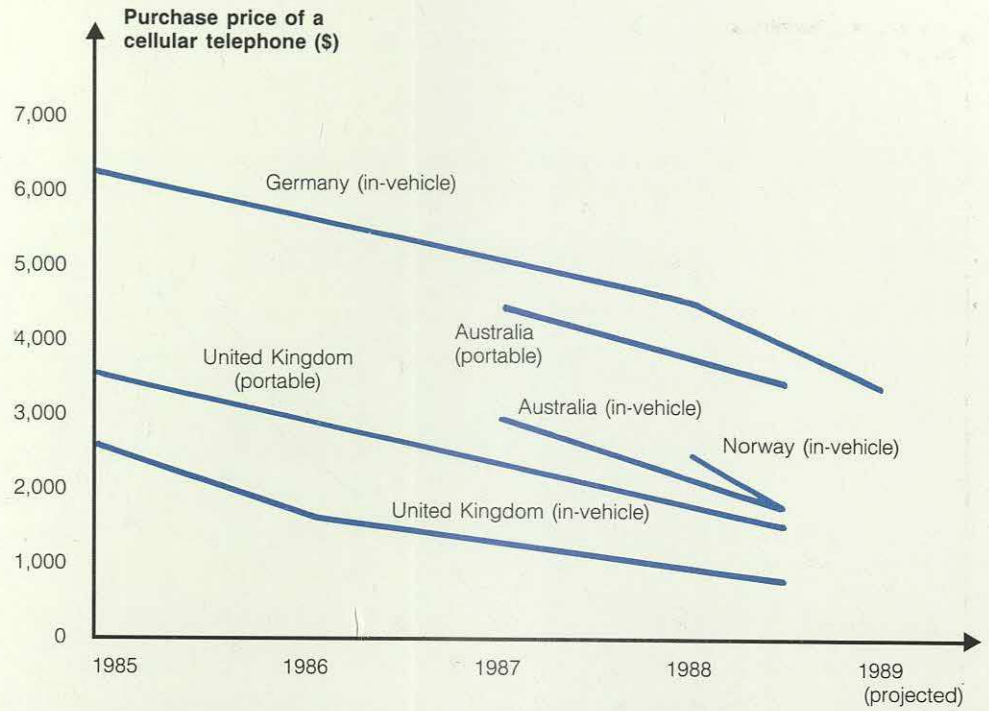
The systems department should take responsibility for mobile communications strategy

Because of the growing need to integrate mobile communications with fixed networks and existing systems, and because mobile communications are likely to account for more than 10 per cent of spending on telecommunications in most organisations in the next few years, we believe that systems departments have an important role to play in ensuring that they receive the attention they deserve. Where the systems department is already responsible for telecommunications, it should take full responsibility for mobile communications too. Where telecommunications is managed separately, the systems department should ensure that the telecommunications function is aware of the importance of mobile communications, and of the need to include them in its range of responsibilities.

In countries where adequate mobile services and products already exist, systems directors must ensure that their organisations can make sensible choices among the wide range of services and products now available, and that mobile communications applications are developed and managed within an overall framework, or strategy. Such a strategy should be based on a clear idea of the type of mobile communications environment that will be required by the organisation in, say, five years' time. This, in turn, will be based on the business's requirements for mobile systems and services. In defining these, the systems department will need to play a bigger role than for other types of applications, because of the general lack of awareness, both about the products and services available, and about the benefits to be gained from them. Once the requirements of the business have been defined, individual applications can be implemented in a way that is consistent with the environment that the organisation is seeking to create. Advice on these aspects of coordinating and managing mobile communications is given in the main report.

In order to implement the strategy, systems directors will need to ensure that telecommunications

Figure 4 Prices of cellular telephones are falling



The relative prices indicated above should be treated with caution. The cost of living, and indeed, the cost of conventional telecommunications in general, also vary markedly from country to country.

managers are aware of mobile communications technologies and are in a position to take responsibility for them, that the necessary skills are available and coordinated in their departments, and that appropriate user support and administrative procedures exist.

In some countries, services are not available, either because of the national regulations governing mobile communications, or because of the inadequate frequency allocations made available by the national regulatory body. Where the consequences of this to the business are significant, the systems director should alert the board to the problem. The board should be encouraged to lobby the relevant political institutions or to bring pressure to bear on the PTT or other service suppliers to improve the situation. In most countries, associations of mobile radio users and suppliers exist to pursue such campaigns on behalf of their members.

The management of mobile communications thus places further responsibilities on systems departments and creates a new challenge for them. They must take up this challenge if their organisations are not to be left behind in the drive for competitive advantage.

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The Foundation publishes six Research Reports each year together with a series of special Position Papers. The programme of activities includes a wide range of meetings that provide Foundation members with a regular opportunity to exchange experiences and views with their counterparts in other large organisations.

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