INFORMATION TECHNOLOGY AND CASH

The Impact of Electronic Payment and Cash Management Systems

Butler Cox

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THE BUTLER COX REPORT SERIES

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Rising costs and payment volumes and increasing competition have encouraged organisations such as banks and retailers to look to information technology to cut the costs of handling payments, improve service levels and deliver new cash management services. Electronic payment and cash management services present opportunities to all potential players — banks, retailers of goods and services, hardware suppliers and network services providers.

This report reviews the opportunities offered by the new electronic payment and cash management services. Retailers will be put under pressure by the banks to adopt electronic funds transfer systems at the point of sale (EFTPOS), but could harness it to cut costs or even diversify into financial services themselves. Indeed, an increasing number of organisations involved in retailing are now moving into the banking services arena, thus effectively competing with established banking and credit card services.

Corporations can also take advantage of new cash management services and systems to optimise cash utilisation and reduce borrowing and transaction costs, and small companies and private investors can use on-line 'home banking' services to manage their financial affairs more efficiently. This report describes and discusses the impact of these new systems.

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INTRODUCTION

Cash is the life-blood of companies. How companies make and receive payments and manage the cash they hold has a major impact on their functioning, and even on their survival. Developments in information technology (IT) provide new means for organisations and individuals to make payments and manage their cash more effectively. In the application of IT to cash management, new markets arise for traditional cash handlers — the banks. But organisations other than banks are also attracted to these markets. Hence we see competition emerging.

Scope of the report

In this report we describe the new funds transfer and cash management services and technologies and identify their implications for businesses. We review the practical experiences of users and suppliers, and we assess the current status and future of the market. The geographic scope of the report is Europe but major developments elsewhere in the world are reported and evaluated.

For whom is this report intended? First, we believe the Financial Director, Treasurer or Controller of every substantial enterprise should study it. The Management Services Director (or equivalent) should also study it. Senior management in the retail trade should read it. Marketing managers in financial institutions and IT suppliers should also read it, for it maps with as much precision as possible a crucial and dynamic area of development.

Structure of the report

The report comprises eight chapters. In Chapter 1 we identify changes in the financial and payments environment, the new electronic payment and cash management services that are becoming available, and the key issues that they raise for corporate users and IT suppliers. In Chapters 2 to 7 we review the services and systems which we believe are likely to have the greatest impact on businesses: electronic funds transfer at the point of sale (EFTPOS); corporate payment and cash management services; and remote banking services for individual customers and small businesses.

EFTPOS services are covered in Chapters 2, 3, 4 and 5. We describe the technologies and the current status of EFTPOS in Europe and elsewhere, and we present eleven case histories to illustrate how users and suppliers have implemented EFTPOS services. Close study of these cases will, we believe, lead to important lessons for the future. We review the supplier market. We also present the results of our extensive survey of major UK retailers' views on EFTPOS, their requirements and implementation plans. Patterns of market development form the basis for our forecasts of EFTPOS terminal markets.

Chapter 6 deals with on-line corporate payment and cash management services. We review corporate cash management products and services, their benefits for users and the practical aspects of their implementation.

On-line banking services for the home and small business and the opportunities they provide as a payment mechanism for suppliers of products and services are described in Chapter 7.

In Chapter 8 we review the implications of the new electronic payment and cash management services for users, suppliers, and customers at large.

Research methodology

Butler Cox has been monitoring developments in information technology (IT) since 1977 and has wide-ranging consultancy experience in the banking, retailing and large corporate sectors, working for both users and suppliers of IT products and services. In addition, we have undertaken an extensive programme of research to support the preparation of this report, including:

— A postal questionnaire survey of nearly 400 of the largest retail organisations in the UK. We received 117 responses, and of these 102 were usable for our analysis.

— Face-to-face and telephone interviews with 40 suppliers of electronic payment and cash management products and services in Western Europe.

—Case histories of 23 users and suppliers of electronic payment and cash management systems and services in Europe, the Pacific Basin and the United States.

—Interviews with key industry observers.

—Extensive desk research on electronic funds transfer services and systems throughout the world.

The above programme of research constitutes one of the most intensive of its kind ever conducted by Butler Cox.

It taps a huge reservoir of accumulated experience in the provision and use of electronic systems for payment and cash management. The research findings have also been correlated with numerous other market studies carried out by Butler Cox in recent years.

CHAPTER 1

THE CHANGING FINANCIAL AND PAYMENTS ENVIRONMENT

It is no exaggeration to say that the management of money is in a state of revolutionary change. There are four main forces driving this change, forces which we describe in the succeeding pages. They are: changes in costs; deregulation of markets; increased competition in financial services; and changing demands on the part of customers. Alone, each of these forces would be powerful. Together they are irresistible. We do not regard IT as a force for change in itself, but as an enabling mechanism by which the other forces operate.

These forces are revolutionising the banks' approach to the market, the financial services available and the types of organisations providing them.

Technology is providing companies with new options for making and receiving payments and managing their cash assets and is also revealing a dramatic new requirement for technical and management skills. In the City of London today, for example, we have heard of astronomic salaries being paid for money market skills, as the institutions prepare for deregulation. The whole financial environment is changing, reordering priorities and introducing new opportunities for increasing revenues or cutting costs. These changes raise a number of key issues for corporate users of money transmission services and information technology suppliers which we discuss in this chapter.

FORCES OF CHANGE IN THE BANKING WORLD

We examine below the impact of four major forces of change — cost, deregulation, competition and customer demand — on the banking world.

The cost of traditional payments services

One leading bank official told Butler Cox that traditional banking is 'hopelessly uneconomic'. What did he mean?

Banks are under severe pressure from the high and rising costs of providing traditional cash and paper-based money transmission services. These costs arise in a number of areas:

— *Staff costs.* Traditional banking and payment services are labour-intensive and are therefore affected by rising staff and office costs. Despite automation, many bank records are still handwritten.

— *Branch networks.* The extensive branch networks needed to provide traditional banking services to retail customers represent a large fixed cost, and the effectiveness of the retail networks must be maintained by renovating or re-siting branches.

— *Volume of paper-based payments.* In particular, the volume of cheque and credit card transactions is rising fast in many countries, with a consequent increase in handling costs. The increases in volume of cheque and credit card transaction for various European countries are shown in Figures 1.1 and 1.2, respectively. In many countries bank charges do not cover the costs of handling cheques for retail customers. In France and Belgium, for example, no charge is usually made for cheque handling, and in the UK, customers who keep a minimum credit balance in their current accounts receive free banking service.

Figure 1.1 Increases in volumes of cheque transactions in various European countries

Country	*Volume of cheques issued by deposit-taking institutions (millions)*		*Percentage change*
	1978	*1983*	
Belgium	88	99	13
France[1]	1,709	3,030	77
Germany	500	600	20
Italy[2]	612	582	– 5
Netherlands	100	120	20
Sweden	125	120	– 4
UK	2,200	2,494	13

Notes:
1. Figures relate to volume of instruments exchanged in official inter-bank circuits, not volume of transactions carried out.
2. Data for 31 banks accounting for 70% of total balance sheet assets of banking system.

Source: 'Payment systems in eleven developed countries', Bank for International Settlements, 1985.

Figure 1.2 Increases in volumes of credit card transactions in various European countries

Country	Volume of credit card payments (millions) 1978	1983	Percentage change
France	26	102	290
Germany	insignificant	7	—
Italy	0.9	4	340
Sweden	15	40	170
UK	100	313	210

Source: 'Payment systems in eleven developed countries', Bank for International Settlements, 1985.

Figure 1.3 Comparative costs for banks of various methods of payment in the UK and France

Method of payment	Index number/cost of cheque = 100 UK (undated)	France (1978)
Cheques	100	100
Giro transfers	233	—
Automated transfers		
Standing orders	55-186	17-33
Direct debit	45-105	21-53
Direct deposit	45	—
Cash		
Deposit	114	—
Withdrawal at counter	182	—
Withdrawal at ATM	114-185	—

Source: Revell, JRS, 'Banking and electronic fund transfer', OECD, 1983.

In the face of such rising costs, and burdened with a cost structure not easily dismantled, banks are literally driven by economic necessity towards electronic payments services which enable them to avoid some of these major cost elements. The comparative costs are difficult to establish, but automation appears to offer some savings, as shown in Figure 1.3. In addition, average costs per transaction of electronic funds transfer (EFT) systems are expected to fall as the volume of EFT increases. By contrast, the costs of traditional systems increase with increasing volumes.

Deregulation

Who are the banks' main competitors? In the past, the answer was simple — other banks. Today retailers, financial institutions other than banks and even the PTTs are also competing to control cash.

Legislative changes under way are affecting the structure of conventional banking. In a number of countries, restrictive legislation governing the provision of banking services is being relaxed, offering opportunities for organisations other than banks to enter this market. For example, in the UK, acceptance of the report of the Child Committee, set up by the Committee of London Clearing Bankers to review the ownership, membership and control of the money transmission system, opens up the market for the provision of clearing services. Up to now only ten English banks have been allowed to clear payments in England and Wales, and similar arrangements prevail in Scotland and Northern Ireland. However, from the beginning of 1986 any organisation able to deliver a sufficient volume of traffic and to meet a number of technical and financial criteria will be granted settlement facilities by the Bank of England. In addition, new legislation enabling building societies to offer a wider range of banking services is planned for late 1986 or early 1987.

In Australia, rules restricting the number of licensed banks to five national banks and an additional bank in each state were reviewed late in 1984, and as a result 16 new licenses have been issued and more are anticipated.

In the US, a continuing programme to deregulate the banking environment has, for example, allowed thrift institutions (savings banks) to offer commercial loans.

The effect of these changes and of similar changes in other countries has been a sharp increase in competition to provide money transmission and other banking services.

Competition and sector convergence

Deregulation is just one of the factors which has made competition in banking markets more acute. Established banks are facing increasing competition from a number of sources in the provision of retail and wholesale banking services, including:

— Foreign banks.

— Credit card companies.

— Other financial institutions, eg building societies, brokers and insurance companies.

— Retailers, who are increasingly moving into the financial services area, in order to exploit their control over massive liquidity.

— Government savings schemes and post office services.

— Large corporations meeting many of their own financial needs.

Deregulation encourages integration. In London a series of mergers and acquisitions has taken place between banks, stockbrokers and jobbers, to create institutions with an integrated range of services in readiness for the deregulated market which will operate from "Big Bang Day", as the press have termed it. In the past thirty years, world centres of

wealth and production have moved around the globe at dizzying speed. In the 1960s the OPEC countries, for instance, were poor. Europe and the USA were the manufacturing centres for world markets. Japan was on the rise, but Taiwan and Korea were nowhere. The rise and fall of industrial powers and wealthy countries today is like a speeded-up old film. These rapid changes in industrial trade and national wealth have obliged American and European banks to follow their customers overseas as well as bringing Asian banks to the Western financial centres. Technology is helping to overcome barriers of distance, regulation and costs of entry into foreign markets. Retail banking service markets are becoming more competitive. In particular, financial institutions which were previously content with sectors of the market complementary to those of the banks are now competing with the banks. Governments are increasingly entering the retail savings market to finance their chronic deficits. Brokers and insurance companies are seeking to offer other financial services in order to secure their customer base. The retail customer is becoming increasingly sophisticated in his requirements for financial services (as is the wholesale customer), although at the same time he or she tends to require the convenience of 'one-stop shopping'. Technology is playing a role in many of these developments. We have already mentioned its role in helping banks compete in foreign markets. But the providers of the technology, and in particular computer services companies and telecommunications network services suppliers, are beginning to emerge as significant competitors in their own right.

The potential of IT suppliers in the financial marketplace was amply demonstrated in Britain in 1984, when IBM and British Telecom proposed to set up a joint venture codenamed Jove. Jove was to be a nationwide value added network service (VAN). Critics of the scheme argued that Jove would create not only a quasi-monopolistic operator in the VANS market, but also a single dominant controller in the distribution of financial services and information. The Secretary of State for Industry declined to grant the necessary licence for Jove.

The impact of data processing on banking has been considerable. Indeed a bank handling manually the volume of transactions commonplace today would be unthinkable. The consequences for competition are only one aspect, albeit one of the most important. The use of data processing in banks now dates back 30 years. Initially, it was used primarily to automate back-office activities, particularly bookkeeping and customer account administration. More recently, front-office activities at the branches have begun to be automated, with the capture of transaction data to support counter staff. The widespread installation of data processing and telecommunications systems in banks and other financial organisations has had a number of major effects:

- It has enabled banks to offer new types of product, for example 'sweep' accounts which automatically move funds out of a current account into an account bearing a higher rate of interest. Some of the products are more complex than would previously have been practicable, for example asset management accounts which combine a range of banking and brokerage products in a single package. Products based on modular components are also feasible.
- It has reduced the costs of some labour-intensive activities but, at the same time, it has resulted in more impersonal banking services.
- It has enabled the remote provision of services without a branch network.

These effects of data processing have combined to encourage other organisations to provide payment and other banking services:

- More complex products enable organisations other than banks to reconcile their provision of banking services with legislation, for example by packaging payment services with a unit trust product.
- Organisations specialising in the delivery of other kinds of financial services can now offer a broader range of products, including banking services.
- The advent of new technologies and new services based on them has enabled organisations other than banks to offer financial services that do not require the expensive branch network on which banks rely.

Customer demand

Not least among the forces for change acting on the banking world are changes in customer demand. We have already mentioned the retail customer's requirement for one-stop shopping. But corporate customers are also becoming more sophisticated, and their requirements are changing in response to changes in their environment. Changes in the environment and requirements of corporate customers form an important thread in our discussion of the new electronic funds transfer services in this report.

NEW DEVELOPMENTS IN BANK SERVICES

Changes in the banking world are not merely of academic interest to businesses outside the banking sector. They have very real effects on other organisations, whether in the form of new types of banking services, new tariffs or tariff structures for services, or changes in the banking relationship.

New services are being developed and launched, many in electronic form, and among the most important of these are electronic funds transfer and cash management services.

Companies will not be able to ignore some of these services. The decisions about whether to implement them and, if they are to be implemented, whether to lead or to follow others can have a considerable impact on business. Electronic funds transfer at the point of sale (EFTPOS) for retailers is one example. As it is introduced, some existing services may be withdrawn or the basis of charging for them changed, causing difficulties for those who see no benefit in joining the new services.

Electronic funds transfer and cash management services

For convenience, electronic funds transfer services may be categorised under three headings:

—Bank networks. Networks have been and are being developed for handling money transfers and a range of other messages between banks, both within and between countries.

—Payment services. In addition to interbank payments, there are services to handle large volumes of payment instructions input by banks and corporate customers , and to clear high-value payments rapidly. A somewhat different type of service, electronic funds transfer at the point of sale (EFTPOS), allows payments made by private individuals to retailers to be handled electronically. Services exist to cater for specialised payment instruments, for example bills of exchange. Finally, customers can withdraw cash from cash dispensers (CDs) or automated teller machines (ATMs).

—Cash management services. Whether the customer who is offered such services is the largest multinational corporation or an individual managing the family budget, the basic principles are the same. The services provide electronic means of managing cash more efficiently, in particular up-to-date information about balances in one or more accounts, statements of recent activity in an account and funds transfer services to enable money to be moved between accounts. Payment facilities may be provided. Some services also offer analysis or modelling capabilities to support decision making.

These services may be described in terms of the kinds of facilities they make available to different types of customer: banks, other financial institutions, retailers, large and small businesses, and private individuals. The services of each type for each kind of customer are shown in Figure 1.4. Services for large companies and retailers and home banking services are described in more detail in subsequent chapters, and will be described here only briefly; interbank services, services for financial organisations other than banks and services for private customers are covered in more detail.

Services for banks

New electronic services for banks are of two main types, payment clearing services and bank networks.

Clearing-houses

Traditionally, the clearing-house for banks was a central exchange where banks brought cheques paid in to claim cash from their originators' banks. Instead of each transaction being settled separately, net settlements between banks could be calculated. The modern clearing-house receives payment instructions, debit or credit, from banks or other large organisations, distributes them to their recipient banks, and arranges net settlements between banks.

In some countries, clearing is done electronically. A number of European countries, notably the UK, Sweden, the Netherlands, Denmark and Belgium, have automated clearing-houses (ACHs), which accept magnetic tapes of payment instructions and sort them onto other tapes for distribution to banks. Some of these ACHs are now beginning to accept inputs on-line. Full electronic clearing, in which payment instructions are input and distributed on-line, is now available in the US (The Clearing House Interbank Payments System, or CHIPS) and the UK

Figure 1.4 Electronic funds transfer services for different types of customer

End-user	*Services*
Banks	Interbank networks (eg SWIFT, BankWire) Automated clearing-houses (eg BACS) Electronic clearing-houses (eg CHAPS, CHIPS) ATM/EFTPOS networks
Other finance sector organisations	Automated clearing-houses Electronic clearing-houses ATM/EFTPOS networks
Retailers	EFTPOS ATMs at retail premises
Large/medium companies	Automated clearing-houses Electronic clearing-houses Cash management
Small businesses	'Home banking' Cash management
Private individuals	EFTPOS ATMs Home banking Home shopping

(Clearing House Automated Payments System, or CHAPS), giving same-day settlement for high-value payments. Switching systems for distributing point-of-sale (POS) or automated teller machine (ATM) transactions between banks also perform a clearing function. Clearing-house services such as BACS in the UK are now also available to the banks' corporate customers. (These are described in more detail in Chapter 6 and Appendix 2.)

Bank networks

Bank networks provide a secure medium for a wide variety of messages for exchanges between large numbers of banks. Instructions for funds transfer constitute a significant element of the traffic, but the networks also carry account statements, foreign exchange deal confirmations, and query and administrative messages. BankWire and FedWire in the US are major examples of such networks, and the Society for World Interbank Financial Telecommunications (SWIFT) provides an international bank network.

SWIFT is a cooperative society, headquartered in Brussels, formed by banks to provide an international interbank message transfer service. By the end of 1984 it served 1,656 banks in 51 countries, and carried 130 million messages — some 25% more than the previous year. Only banks are allowed to access the service directly, but they may retail SWIFT services to their customers.

SWIFT operates four computer centres around the world that are connected by leased telecommunications circuits. Banks access the centres from standalone terminals or through interface devices located on their own premises via regional processing centres serving a country or other regional division. Figure 1.5 shows the regional architecture of the SWIFT network.

Because of the huge volume and rapid growth of SWIFT traffic, the PTTs levy a volume-based charge rather than the customary fixed rental for leased lines.

SWIFT offers a variety of messaging and transaction services, including:

—Customer funds transfers.

—Bank transfers.

—Credit/debit advices.

—Statements.

—Foreign exchange and money market confirmations.

—Collections.

—Documentary credits.

—Interbank securities trading.

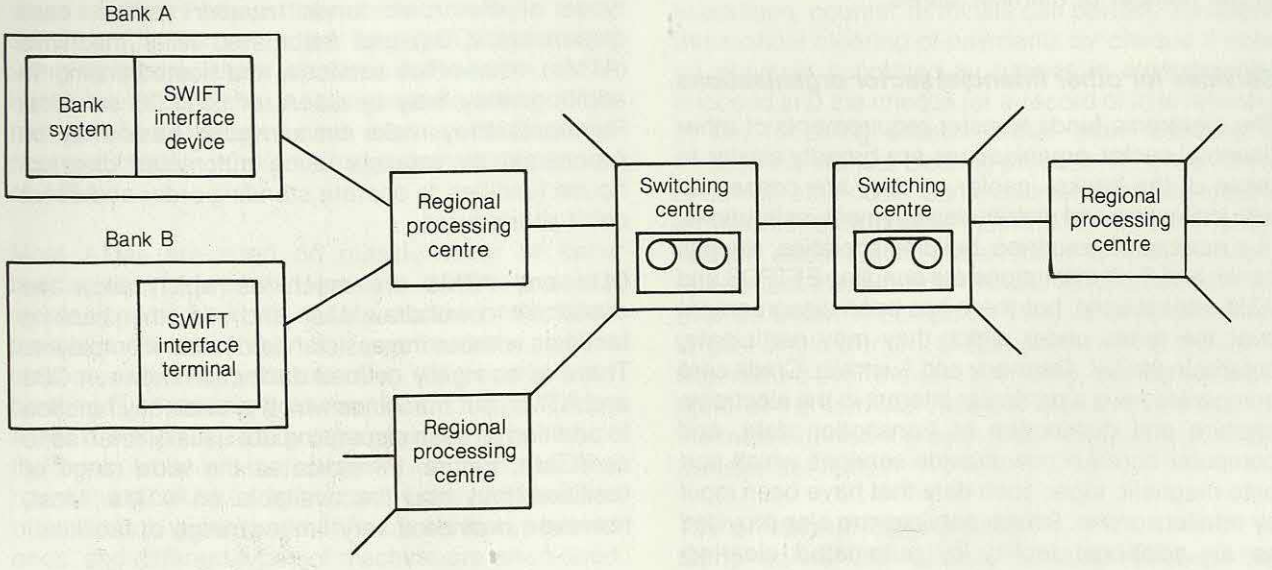
—Balance reporting.

—Payment systems.

It defines standard message formats for each type of service and transaction.

Two grades of service are offered, 'normal' and 'priority'. In addition to membership charges, SWIFT charges 18 Belgian francs (BF) (about 34 cents) per normal message up to 325 characters irrespective of distance, and 36 BF (about 68 cents) for priority

Figure 1.5 The SWIFT network



messages. The current average message charge is 21 BF (about 40 cents). Member banks set their own charges for the services they sell on to customers.

The main benefits of SWIFT that banks can pass on to their customers are fast and accurate transmission of messages and execution of transactions, and low cost compared with other telecommunications media. To international treasury managers, who need to quickly ascertain their balances around the world and reliably adjust them by funds transfers, these facilities could be particularly useful. The bankers of the world frequently complain about the costs of SWIFT, but many of them have used it as a valuable tool for securing profitable business.

From the viewpoint of a party to a transaction, the speed of settlement is, of course, more interesting to the creditor than to the debtor. What is of interest to all bank customers, however, is the reliability of an electronic payment system. Corporate treasurers can do their jobs effectively only if they know that settlements will be completed on schedule, without pieces of paper being delayed in the mail or mislaid in an office.

The current SWIFT system is reaching the limits of its capacity and a replacement network service (SWIFT2) is due to be introduced from 1986. SWIFT2 will be a distributed system capable of faster message delivery, greater traffic-carrying capacity and modular expansion. It will have additional and improved capabilities, for example better message retrieval services, and is designed to enable transmission costs to be reduced. The growth of message traffic is expected to arise through further automation of back-office procedures by existing members, rather than through a significant increase in the number of member banks.

Services for other financial sector organisations

The electronic funds transfer requirements of other financial sector organisations are broadly similar to those of the banks, insofar as they are concerned with collecting and distributing payment instructions. In a number of countries, building societies, savings banks and thrift institutions are handling EFTPOS and ATM transactions, but there has been disagreement over the terms under which they may participate, notably in the UK, Germany and Australia. Credit card companies have a particular interest in the electronic capture and distribution of transaction data, and computer bureaux now provide services which sort onto magnetic tapes such data that have been input by retailers online. Similar services are also provided as an additional facility by automated clearing-houses.

Services for retailers

Retailers and their customers are the potential users of electronic funds transfer at the point of sale (EFTPOS) services. These are services which enable the customer to pay the retailer for goods or services using a plastic card which is inserted in or wiped through a terminal at the point of sale. Data identifying the customer and specifying the value of the payments are forwarded electronically to the customer's and retailer's banks for settlement. (EFTPOS services are described in detail in Chapters 2 to 5.)

Services for large corporations

Large corporations are increasingly using the automated clearing-house services for bulk payments, and in the UK they are beginning to input payment instructions online to BACS (the UK automated clearing-house) or, for high-value payments, to CHAPS. Larger corporations are also prime users of cash management services. (These services are described in more detail in Chapter 6.)

Services for small businesses

Small businesses have only recently been taken seriously as a potentially profitable market for on-line financial services. There is now mounting evidence that they are more enthusiastic customers for simple cash management ('home banking') services than are private individuals. Some small businesses, particularly solicitors, accountants and brokers, regularly make high-value payments, and in the UK they are beginning to use CHAPS. (Cash management services for small businesses and individuals are discussed in Chapters 6 and 7.)

Services for individual customers

Individual customers may benefit from four main types of electronic funds transfer service: cash dispensers (CDs) and automated teller machines (ATMs), front-office services, and home banking. In addition, they may be users of EFTPOS services. Payments they make on a regular basis may be processed by retailers using automated clearing-house facilities to operate standing order and direct debit prodedures.

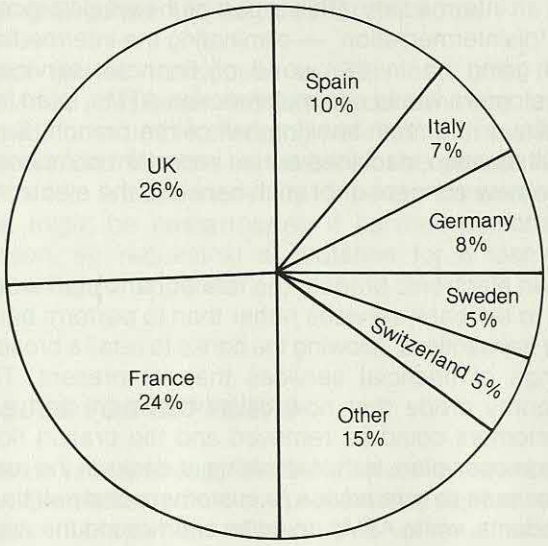
CDs and ATMs are machines which allow the customer to withdraw cash and use other banking facilities without the assistance of a bank employee. There is no rigidly defined distinction between CDs and ATMs, but machines which provide any function in addition to cash dispensing are usually referred to as ATMs. Figure 1.6 indicates the wide range of facilities that may be available on ATMs. Most, however, provide a very limited range of facilities.

ATM numbers have grown steadily since they were

Figure 1.6 Facilities available on ATMs

Cash withdrawal from current or credit card accounts
Deposit of cash, cheques and other payment documents
Funds transfers between accounts
Bill paying
Creating, amending and cancelling standing orders
Requests for overdrafts and loans
Balance enquiry
Ordering or display of statements of account
Cheque-book requests
Requesting appointments to see the bank manager
Request for financial information, eg interest rates and exchange rates
Request for information about bank services.

Figure 1.7 Proportions of European installed base of CDs and ATMs by country



first introduced in Europe some 10-15 years ago, to a total of some 25,000 by early 1985. But different countries have adopted ATMs to differing degrees. Figure 1.7 shows the approximate proportion of CDs and ATMs in different European countries.

Increasingly, banks are cooperating by sharing ATM networks or allowing their networks to interwork with those of other banks. They see convenience to the customer as more important in marketing terms than a proprietary network.

There is some doubt whether ATMs have helped banks to tackle the problem of cost control in retail banking. The economics of ATMs have shown some interesting and unexpected quirks. Customers drawing cash from a human teller tend to draw a higher amount than from an ATM. No definitive research has been conducted to determine why this is so. Possibly ATMs are so quick and easy to use that customers are willing to draw cash two or three times as often. Perhaps they dislike drawing a small sum from a human teller because they dislike seeming impoverished. Whatever the reasons, some banks have found that ATMs generate many more transactions for the same cash volume, creating extra cost and reducing the advantage gained by the use of ATMs.

Most ATMs are sited on outside walls of bank buildings or inside banks. However, there is a rapidly increasing number of ATMs located off bank premises, for example in supermarkets, petrol stations, and railway stations. Also, the trend to lobby banking is spreading from the US to Europe. Lobby ATMs are sited in a lobby separated from the rest of the bank, to which the customer can gain access round the clock by using his card. Lobby ATMs often offer a much wider range of functions than external ones, and different types of machine are often used to support different functions. Lobby ATMs are one aspect of the development of the electronic branch and reflect new thinking about the delivery of branch, or front-office, services.

The first step in the automation of front office services (ie the range of services provided in bank branches for retail customers) has been the provision of counter terminals. These terminals are operated by the counter clerks to access bank computer systems to capture transaction data at the counter, so that account information can be provided on demand and payment and funds transfer instructions handled electronically. They can speed up and improve customer service considerably, increasing the productivity of the counter clerk.

In addition, counter terminals can partially eliminate the manual clearing of payments by cheque if data on cheques submitted by payees is electronically encoded and the cheque (or a record of it) is retained in the receiving branch rather than returning it through the manual clearing process. This, too, helps to contain staff costs. Some counter terminals require a customer's card to be inserted for account identification, accentuating the similarity to ATM services. Investment in counter terminals, estimated to run at over $3 billion in Europe by 1990, is likely to be the largest single element of European bank automation expenditure over the next five years, and the development of the terminal network will represent one of the most significant growth areas for electronic funds transfer services.

The electronic bank branch

Many banks are already thinking beyond the introduction of counter terminals and are trying to

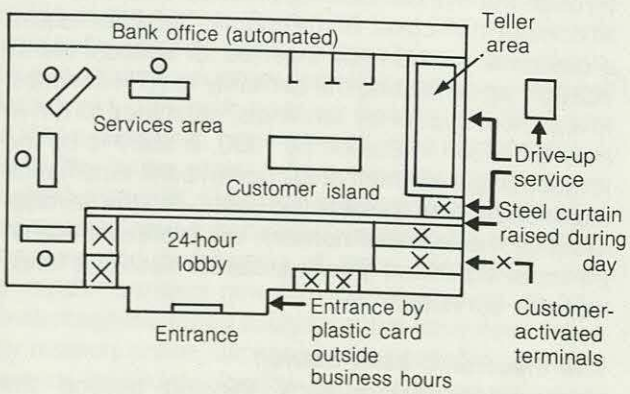
develop means to encourage customers to carry out most of their banking transactions themselves by using terminals without a member of the bank staff as an intermediary. (This is part of the whole process of 'disintermediation' — eliminating the intermediary — going on in the world of financial services.) Customers would use multifunction ATMs, sited in a lobby or the main banking hall of the branch. Such multifunction machines are an important component of a new concept of branch banking, the electronic branch.

In an electronic branch, the role of bank staff would be to sell bank services rather than to perform banking transactions, allowing the banks to retail a broader range of financial services than at present. The security divide that now exists between staff and customers could be removed and the branch floor made open-plan, with staff sitting at desks in the main floor area to give advice to customers and sell bank products, while ATMs could be sited round the walls to provide transaction services. The sales staff would be provided with workstation terminals to demonstrate, for example, interest rate and loan repayment calculations, but they would handle no cash. One possible plan for an automated branch is shown in Figure 1.8. Although self-service and lobby banks are becoming familiar, the full electronic branch concept has reached the trial stage at only a few locations.

Charging for services

Banks have traditionally relied for a large proportion of their revenues on the interest they could earn on funds deposited above that paid out to account holders and on float (money available to the bank as a result of funds available between the dates when the payer is debited and the payee is credited). Their prime marketing objective was, therefore, to secure customers' deposits, and additional services, for example cash management services, were provided as a means to this end.

Figure 1.8 Layout of an automated branch



Both corporate and private customers are increasingly sophisticated and less willing to leave deposits in accounts bearing little or no interest. Where payments are made by electronic funds transfer, for example to and from large companies using bulk payment services, float can no longer be justified on the basis of the time taken by the clearing process. The decline in the importance of the banking relationship and the availability of remote services are encouraging customers to take individual bank products and to 'shop around' for the most suitable combination of services. As a consequence, most banks are assessing and reviewing their sources of revenue and their marketing strategies. In particular, there is a trend towards charging separately for different services and, as far as possible, bringing charges into line with the actual costs of providing the services.

Banking relationships

Changes in the way banks charge for their services are one symptom of the changes in the relationship between banks and their customers. Banks are moving towards selling and charging for individual services rather than offering a complete service package and towards delivering services remotely. This move towards self-help banking inevitably leads to a more impersonal approach. However, their customers may also prefer to shop around for financial services, and may find that some of their needs can be met not just by the traditional providers of banking services but by newcomers such as foreign banks or computer service bureaux.

ISSUES FOR USERS

The developments in electronic payment and cash management systems pose many questions for users. Three questions are of paramount importance:

— How do the four major forces for change — cost pressure, deregulation, competition and new customer demands — influence the individual enterprise?

— Dealing with assets under its own control, can the enterprise use advanced payment and cash management techniques to extract every benefit from its liquid resources?

— Looking outwards, can the enterprise use advanced cash management as a tool for securing business and achieving competitive advantage?

Of the new electronic funds transfer services we have described, two are likely to have a major impact on businesses in general: EFTPOS and corporate cash management services. A third service, remote banking, will have a more limited impact in the short to medium term.

EFTPOS will be of importance as a source of cost reductions and new business opportunities not just for retailers, but for any organisation or individual who regularly accepts payments from private customers at fixed locations. It is of relevance also to professionals, for example dentists and solicitors, and to local authorities collecting local taxes and operating parking meters, and even churches will find it relevant.

EFTPOS can improve the efficiency of current customer payment methods in a number of ways. Transaction times can be faster than for cheque and credit card transactions, speeding customers' passage through the checkout or the petrol station. Costs associated with cash, credit and cheque handling can be reduced, fraud made more difficult, and float, the delay before a payment is credited to the retailer's account, minimised.

EFTPOS can offer retailers an advantage in the marketplace over their competitors directly, as an alternative method of payment which they can offer to customers, or indirectly by allowing unmanned operation in certain circumstances (eg for petrol stations) and therefore longer opening hours. It may also enable retailers to offer an in-house credit card by reducing the costs associated with the provision of the service, and the in-store connection to a bank network may broaden the opportunities for the retailer to provide other financial services.

Corporate cash management services enable corporate treasury departments to manage cash and foreign currency assets more effectively, minimising interest payments, bank charges and costs associated with currency dealings, and maximising income from cash assets.

Cash management services increase the precision of the information available to a corporate treasurer about the state of his bank accounts, allowing him to minimise float and short-term borrowing and maximise interest from short-term investment. They also facilitate the execution of funds transfer instructions. Cash management systems provide the treasurer with better tools to analyse his cash and foreign exchange position and also reduce the burden of routine and clerical tasks associated with cash and foreign exchange management.

Cash management services and systems, by providing more scope for cash management than traditional procedures, may enable businesses to treat their cash assets as a major source of income rather than merely consigning them for safekeeping.

Home banking services for private individuals and small businesses offer a mechanism to support simple cash management for such users. This facility opens up a potential new distribution channel for selling banking services to private customers. It is also likely to be of particular significance to suppliers selling IT goods and services for the home.

Other related transaction services can offer the individual customer increased convenience and speed, for example shopping from home or making reservations. Remote services can also provide him or her with relative anonymity for certain transactions that might be embarrassing if handled person to person, eg requesting a quotation for a loan or searching for a partner.

ISSUES FOR SUPPLIERS

A wide variety of suppliers are involved in the market for information technology products for payment and cash management. Banks and other financial institutions, computer bureaux and telecommunications service suppliers, packaged software and terminal product suppliers, all have major roles to play.

The markets for electronic funds transfer terminal equipment differ considerably in degree of development. At one end of the scale, the markets for automated teller machines and counter terminals are relatively mature, whereas at the other end, the EFTPOS terminal market is just beginning to emerge in most countries. Successful strategies for approaching these markets will vary accordingly; the EFTPOS terminal market in particular will display all the uncertainties characteristic of an emergent market, and the suppliers who can best judge what consensus will develop out of the current broad spread of customer requirements are likely to be among the most successful.

Banks and financial institutions face a number of key decisions over the delivery of electronic services. Among them are how to link their technology and marketing strategies, whether to develop their own services, buy in ready-made systems or subcontract the operation of the service entirely, and what partnerships to establish in order to develop and exploit services. They are torn between a desire to use packaged software, thus avoiding the costs and risks of internal development, and the fear of being just average in a fiercely competitive market.

Electronic payment and cash management services represent a major opportunity for telecommunications network and service suppliers. They, too, must decide on the extent to which they wish to offer the services themselves or whether they will develop, install or operate them with or on behalf of others. The considerable volumes of traffic which these services

might contribute have major implications for network design and dimensioning, and the financial stakes are high.

Overall, the market for payment and cash management products and services is still undeveloped. However, its potential is enormous and it provides attractive opportunities for a wide variety of suppliers.

SUMMARY

We have reviewed the forces that are changing the financial and payments environment and their effect on different types of organisation, and we have outlined the new systems that will fuel further changes in the way cash is handled and regarded. These systems and their potential impact form the subject of the next chapters.

CHAPTER 2

EFTPOS: WHAT IS NEEDED FOR SUCCESS?

A customer drives into a petrol station in Manchester, England. He pays by credit card. The forecourt attendant inserts the card in a point-of-sale terminal which records the details of the transaction, prints a voucher for the customer to sign, and sends the details of the day's transactions to a computer bureau overnight, for forwarding to the credit card companies.

A woman shops at a supermarket in Florida, USA. At the checkout the assistant totals the value of her purchases and wipes her cash-dispenser card through a terminal while she enters her Personal Identification Number (the 'PIN') on a keypad. The terminal immediately communicates with a central computer at her bank to check if she has enough money in her account and, if so, debits the appropriate amount.

A man buys a small trinket at a jewellers in Caen, France. He inserts a microprocessor-carrying card (a 'smart card') into a terminal which subtracts the cost of the item from the credit allowance recorded in the memory of the card and records the details for later transmission to the bank.

These are just three examples of electronic funds transfer at the point of sale (EFTPOS), the electronic capture of payment or credit instructions. EFTPOS relies on the use of electronic media, instead of cash or paper-based media such as cheques and credit card slips, to effect payments at any place where transactions are completed between a customer and a personal representative of a selling organisation, or an unmanned piece of equipment belonging to it. Shops are obvious examples of places where people meet a representative of a selling organisation to purchase goods or services, but the dentist's surgery, a mobile ice-cream van and even the customer's doorstep when the encyclopaedia salesman calls, are all points of sale at which transactions are completed face-to-face. Payments can also be made at unmanned vending machines, parking meters and public telephone kiosks.

As a new means of payment, EFTPOS has enormous potential. But for this potential to become reality, many issues need to be resolved. In particular:

— *What benefits may be achieved?* The benefits need to be clearly recognisable by the three main parties involved in an EFTPOS transaction — the banks or other financial institutions, the retailers and the customers.

— *Who should pay for the service?* This is perhaps the most pressing and controversial issue delaying the wider acceptance of EFTPOS, and it is of course intimately tied to the question of who benefits most.

— *Who should provide the service?* Banks are concerned that they should not lose a potentially very important part of the payment handling business. But other financial organisations and even retailers themselves may — and some already do — provide the service or some of its elements.

— *What standards should be adopted?* All the parties involved in EFTPOS acknowledge the need for standards but their priorities and requirements differ, leading to delays while attempts are made to reach agreement.

— *What security aspects are important?* To be successful, EFTPOS requires not only new security measures but compatibility between the security requirements of different systems.

We address these issues in this chapter, after first providing an introductory description of the different types of EFTPOS. (A fuller description of EFTPOS technologies is contained in Appendix 1.)

TYPES OF EFTPOS

EFTPOS implementations differ in three basic ways: the types of payment transactions they support, whether the terminal at the point of sale interacts with a bank computer on-line (ie while the transaction is being completed), and the type of card technology used.

Payment transactions

EFTPOS transactions may be of two kinds, credit and debit.

Credit transactions. Credit transactions by customers are, strictly speaking, not payments but promises of

payments. When a customer completes a credit card transaction, he confirms an agreement between three parties: himself, the retailer and the organisation operating the credit service (this may be operated by a credit or charge card company or as an in-house service, by the retailer himself). The retailer receives payment for the transaction from the card company, and the customer makes no payment until he settles his account with the card company.

However, credit card transactions are an alternative to true payment and, in electronic form, use similar technology. They are therefore included within our definition of funds transfer.

Debit transactions. Debit transactions involve subtracting the amount due from the customer's account and crediting it to the seller's account. A variant of the debit transaction is the 'prepaid' transaction: the customer pays a specified amount (either by cash or by subtracting it from his account) which is then encoded electronically on a card or in some other form. Subsequently, the value of each payment he makes using the card is subtracted from the total value encoded in the card until it is exhausted.

EFTPOS systems can cater for either debit or credit transactions, or both. 'Credit EFTPOS' refers to credit transactions using EFT at the point of sale, 'debit EFTPOS' to debit transactions.

Types of communication

Completing a payment may require two types of communication with the bank

- —Authorising the transaction, to verify the purchaser's identity and to check that the value of the transaction does not exceed authorised funds. This type of communication is not always used in electronic funds transfer.
- —Communicating the details of the transaction to enable the payment to be effected. By definition, this type of communication is required for electronic funds transfer.

Either or both of these types of communication may occur on-line, ie in real time over a communications link while the transaction is being completed. Either may also be completed at some other more convenient time, ie not necessarily involving on-line communication. Where the communication is not on-line, authorisation may simply involve a customer's credit card number being checked against a list of stolen or lost cards (the 'hot list') previously transmitted by the banks, stored in the terminal and updated periodically. Authorisation may also be by signature alone, ie without reference to the bank at all. For data capture the specific details of the transaction can be collected and stored in the terminal during the day and communicated in batch overnight, together with other similar transactions.

Types of card technology

An important prerequisite for the success of EFTPOS is a base of card holders who are able to use the service. Three main types of card technology are contenders for EFTPOS applications: magnetic stripe cards, smart cards and hybrid smart/stripe cards.

Most current EFTPOS systems work with plastic magnetic stripe cards such as those used for credit cards and automated teller machines (ATMs). The use of these cards has the advantage of making the service accessible to the large base of existing card holders without the need to market and distribute new cards.

Smart cards are plastic cards which have an electronic microcircuit embedded in the thickness of the card. The intelligence built into the card makes it far more secure against fraudulent use than a magnetic stripe card. Unlike magnetic cards, smart cards do not require a communications link with banks to be set up for verification of the PIN, which avoids the risk of fraudulent interference with data transmitted over that link. They are also designed to be more secure against tampering with the PIN code. However, smart cards have only recently been developed, they are still relatively expensive, the range of applications in which they have proven themselves is still limited, and the number of current smart card holders is very small and restricted to only a few countries, particularly France.

Hybrid cards, incorporating both smart card and magnetic stripe card characteristics, would be useful in allowing a smooth transition from magnetic stripe to smart card technology, allowing existing ATMs and EFTPOS terminals to continue in use. Such hybrid cards are currently being introduced in France and tested in other countries.

WHAT BENEFITS MAY BE ACHIEVED WITH EFTPOS?

One of the arguments frequently made against the introduction of EFTPOS is that, after all, cash and cheques have proved satisfactory payment mechanisms for hundreds of years. Also, the credit card system has only recently been introduced for consumer credit transactions and may not yet have been fully exploited. What benefits might electronic funds transfer have, which outweigh the unavoidable cost and inconvenience of its introduction? Why should its use be preferable to conventional payment methods? The answer will be different for each of the

three parties involved in EFTPOS — the banks and credit card companies, retailers and the consumer.

For banks and credit card companies

The potential benefits of EFTPOS to banks and credit card companies are perhaps the most immediate, particularly those related to reducing costs, or at least containing them. Banks are contending with the costs of handling ever-growing volumes of cheques. To illustrate the magnitude of this trend, Figure 1.1 on page 1 shows the recent percentage increase in bank cheque volume in several European countries. In most European countries bank charges do not cover the costs of cheque handling. For example, in Belgium and France cheque handling is provided as a free service. In the UK the banks recover only about 20% of the cost of handling cheques for private customers, and the average cost to the banks of processing cheques is about 75 pence (just under $1) per cheque. With volumes processed running at 2,500 million cheques per annum in the UK alone, the scale of the problem becomes apparent. EFTPOS is not expected to reduce the volume of cheques significantly, but it could at least contain the growth, especially as most cheques are generated through the retail trade, and EFTPOS is essentially a system designed for retailers. However, the cost per EFTPOS transaction is currently still high, and only once usage of EFTPOS achieves appreciable volumes can costs drop to more attractive levels.

Credit card companies are facing even more acute problems in terms of the growth in volume of paper slips (or vouchers) which record transactions. In the UK, for example, the volume of credit card transactions is growing at about 20% per annum, with most of this growth accounted for by the retail sector. Again, EFTPOS can substantially reduce the costs of transaction data capture and processing, but only once mass usage is achieved.

Another significant problem for banks and credit card companies which EFTPOS could help reduce is cheque and credit card fraud. Reportedly, fraud costs UK banks alone some $65 million a year. EFTPOS can contribute significantly to reducing these costs: automatic checking of card numbers on-line or against lists stored locally makes detection of illicit card use easier and faster; on-line verification of bank account status prevents overdrawing without permission; and the use of personal identification numbers makes impersonation more difficult.

While perhaps not critical to a cost/benefit assessment, EFTPOS might also bring the banks other valuable benefits, for example

— Cash handling and its associated costs could be reduced. EFTPOS is likely to have a less immediate impact on cash payment than on cheque and credit card transactions. However, substantial use of EFTPOS might permit banks to make savings on cash handling costs in their branches.

— Valuable information to guide the marketing and selling of financial services could be provided. The electronic capture of transaction details opens up possibilities for sophisticated analysis of spending patterns to assist banks in the development of new products and the targeting of sales.

For retailers

Retailers, as the intermediate party in the payment process between the banks and the customer, must be able to see clear benefits from EFTPOS if they are to adopt it. In principle EFTPOS might deliver a wide range of benefits to them. Those listed in Figure 2.1 are among the most significant. Some of these benefits will increase the retailer's competitive edge, providing him with a means to increase sales and improve marketing. Others are related to improved efficiency and lower costs. And finally, there are benefits in terms of improvements to the payment mechanism itself. The benefits are, however, less clearcut than those for banks, and will vary between retail sectors and also from one country to another, depending on specific circumstances.

Thus, faster payment can help supermarkets move customers through their checkouts more quickly and assist petrol stations in speeding up the throughput of motorists. But faster throughput is less likely to be of value to a retailer selling high-value items in small

Figure 2.1 Potential benefits of EFTPOS to the retailer

Sales and marketing benefits
- Attractiveness to customers
- Increased sales per customer
- Unmanned operation, allowing longer opening hours
- Opportunities opened up to offer financial services
- Opportunities to develop new marketing tools

Improved operational efficiency
- Faster transaction times per customer
- Reduced error rates
- Integration of payment with other point-of-sale functions
- Easier reconciliation with bank statements
- Bookkeeping facilitated
- More up-to-date cash management information
- A single system for all credit cards

Advantages as a payment mechanism
- Risk of cash handling reduced
- Costs of cheque and cash handling reduced
- Reduced cheque and credit card fraud
- Cheque and credit card payments credited to retailer's account more quickly
- Reduced fees to credit card companies
- Credit card slip handling eliminated
- Credit authorisation telephone calls eliminated
- Elimination of rounding down of payment amount in favour of customer

numbers, such as would be the case for most jewellers, for instance. The jeweller may, however, be far more worried about cheque fraud than the typical grocer, whose transactions are almost all below the limit secured in many countries by a cheque guarantee card. EFTPOS may bring few benefits at all to some types of retail outlet, such as tobacconists and newsagents, where almost all transactions are cash and of low value.

The benefits that are potentially achievable with EFTPOS also depend to a large extent on customers' existing payment habits and, in particular, on the proportion of payments made by cheque and credit card. These vary substantially from one country to another (see Figure 2.2).

Although these figures need to be treated with some caution in this context because volumes of cash payments are notoriously difficult to estimate and because they include a high proportion of nonretail payments (for which EFTPOS is not normally appropriate), they do give an indication of the relative importance of cashless payments in different countries and of the different types of cashless retail payments that are used.

Payment norms can also vary considerably between different industry sectors. For example, in the UK, grocers tend not to accept credit cards, but clothes shops do. Even for particular sectors, payment methods will vary from one country to another. Thus, in Belgium, most fuel retailers accept cheques but not credit cards; in the US they accept credit cards but not cheques; in the UK they now accept both.

In addition to general retail sector characteristics and payment norms, specific local factors influence the benefits EFTPOS may bring. Thus, in US supermarkets there is often a second attendant at each checkout to pack the groceries for the customer. Therefore, faster checkout speeds are generally easier to attain than, say, in the UK, where customers tend to pack their purchases themselves. A second example is the custom in Norway of rounding downwards the amount paid by the motorist for a fuel purchase. If EFTPOS eliminated this practice, it could bring substantial benefits to retailers.

Figure 2.2 Proportion of total payments (by volume) accounted for by cash, bank cheques and credit cards in several countries

Country	*Cash*	*Bank cheques*	*Credit cards*
France	82%	11%	0.4%
West Germany	87%	0.15%	0.02%
Sweden	77%	4.6%	1.5%
UK	94%	3.8%	0.5%
USA	69%	25%	1.8%

Note: Other cashless payments make up the balance to 100%.

Adapted from: Bank for International Settlements, 'Payment systems in eleven developed countries', 1985.

Perhaps the most significant of the readily quantifiable potential benefits to retailers are those that could stem from reductions in bank charges for cash and cheque handling, and from transaction fees payable to credit card companies. They will not, however, accrue automatically to the retailers but will need to be obtained in negotiations with the banks.

Where current bank charges most closely reflect costs and the market for banking services most closely corresponds to a free market (as is the case in the US), retailers are already negotiating charges that reflect the reductions in bank costs for processing payments that are achieved by using EFTPOS. But banks in other countries, which have in the past covered their costs from interest earned on sums deposited, rather than by levying charges on services provided, may see the new EFTPOS services as an opportunity to introduce cost-related charges.

A further quantifiable benefit is reduction in float, cash due to a retailer as a result of a payment but unavailable to him whilst a cheque is being cleared or a paper credit card slip processed. With EFTPOS the retailer receives the funds due to him several days earlier than otherwise.

In retail outlets that rely on unmanned operation (eg telephone booths, parking meters, etc), EFTPOS can bring substantial benefits by reducing security risks and by increasing the convenience for customers, who would no longer need to carry precise coinage.

The marketing advantages of EFTPOS are potentially greater than those related to direct cost savings, but they are less quantifiable and more risky. The convenience of the additional payment alternative can give the retailer an advantage over his competitors, at least as long as EFTPOS use is not widespread. Once it is widely accepted, the advantage could disappear, although it may continue, as has been achieved by some retailers with electronic point-of-sale (EPOS) systems. In particular, if customers switch their custom to a specific retailer because he offers EFTPOS, they are likely, all other things being equal, to continue buying from that retailer, even once other retailers follow suit. It is likely, too, that, once widespread, EFTPOS will become a necessary 'hygiene factor' whose absence would alienate customers, as has happened with credit cards in some sectors.

The extent to which retailers perceive the potential benefits of EFTPOS to be important to their business

is crucial to the success of the service, and we have provided only a summary here. The benefits, as anticipated and achieved in practice by retailers, are more fully discussed in the next chapter, 'The Retailer's Perspective'.

For the customer

The development of EFTPOS is predicated on the assumption that customers will accept and even welcome it. Customers are notoriously unpredictable in terms of their acceptance of new technology, but there are a number of potential advantages for the customer:

- More convenience compared with writing cheques or making a cash withdrawal.
- Less waiting at checkouts.
- The ability to make guaranteed payments above cheque-card limits.
- Avoiding the need to carry coins of specific denominations, eg for buses, telephones and vending machines.
- Lower bank charges (assuming that banks pass on cost reductions, at least partly, to customers).

These benefits are likely to prove attractive to some customers, but for others they will not outweigh the disadvantages of having to remember a personal identification number and contend with the unfamiliar technology of the terminal. In addition, allowance will need to be made for the current practice in many countries of allowing credit card customers to defer payment without penalty for several weeks. Unless EFTPOS systems are devised that allow a continuation of this practice, customer resistance will be extremely difficult to overcome. Similarly, debit EFTPOS systems should allow for the same period between issue date and clearing as is usual for cheques (typically 2-3 days) to gain full customer acceptance.

Customer acceptance may also vary depending on whether credit or debit EFTPOS is used. Debit EFTPOS offers the customer an alternative but unfamiliar payment mechanism. By contrast, credit EFTPOS is used simply to automate familiar credit card transactions.

WHO SHOULD PAY FOR THE SERVICE?

The problem which, more than any other, has delayed the implementation of EFTPOS is the question of who pays: should it be the banks, the retailers, or the customer, or should costs be split in some way between different parties? EFTPOS requires substantial investment in bank systems, retail terminals and communications between them, and the issue will need to be resolved before investment is committed.

In most cases, it is the banks who perceive the most immediate benefits from EFTPOS, principally because it should lead to reduced costs of processing payments. However, their reluctance to meet the full costs and their desire in some cases to introduce new charges or to charge more for EFTPOS than for current means of payment reflect more than just normal commercial motivation to maximise return on investment. In many countries bank charges for processing cheques are well below the actual costs incurred, and in some, such as France and Belgium, no charge is made at all. The banks' incentive to reduce payment processing cost is coupled, therefore, with the desire to bring costs and charges more in line. As a consequence, banks wish to introduce charges for EFTPOS (as they have done, for example in Belgium, and as they propose to do in France). These charges are of course resisted by retailers, where they have the negotiating power to do so effectively.

Competition between banks and between other EFTPOS services might, in theory, allow the market to resolve the charging question, but the nature of the service, which has many of the characteristics of a public utility, preclude this. Furthermore, the fixed costs of providing the service are high. These factors have already forced banks in many countries (such as in Germany, the UK, and the USA) to share ATM networks. The concentration of retailers requiring EFTPOS services is greater than that needed for ATMs. In addition, retailers are unlikely to tolerate multiple EFTPOS system terminals at their checkouts. The pressures on banks for sharing or at least interworking EFTPOS networks are therefore very strong.

In a number of countries, notably in the UK, Germany and Denmark, the arguments for coordinating the provision of EFTPOS services have been recognised, and plans for national services drawn up. In France, negotiations on the charging structure and levels for EFTPOS services are being conducted at national level. In both France and the UK, this coordinated national approach has, however, encouraged intransigence from retailers over the proposed charges, which threatens to delay the planned introduction of the service. Retailers are worried, perhaps not surprisingly, about dealing with a banking cartel in effective sole control of EFTPOS.

In the US, where some ATM networks serve large numbers of banks, the principles of reciprocal charging for ATM usage and network charges have been well worked out. In some cases these principles have been extended to cover the charging for EFTPOS transactions, too. Since network and bank

ownership are divorced in the US and the principles were originally developed to cover interbank dealings, the question of tariffs for EFTPOS services has been separated from that of paying for other aspects of the banks' payment processing service.

'Unbundling', the separation of a service into its components for the purposes of tariffing and compliance with regulations governing fair competition, is a familiar concept in the US environment. In the longer term, it is likely to be seen as a desirable goal in European EFT services, too, for the following reasons:

— It represents a logical approach to resolving tariffing problems.

— It can help to ensure fair competition.

— It establishes the principles by which retailers may provide varying levels of service (eg by merely providing EFTPOS terminals, or by also handling the networking and switching for all their branches).

However, this approach requires a reasonable initial alignment between costs and charges. In many European countries, this alignment does not now exist for banks' payment processing services. Although European banks are beginning to shift the basis of the tariffs for some of their services towards a closer relationship with costs, accomplishing such changes for their retail banking services is likely to be an extremely slow process.

WHO SHOULD PROVIDE THE EFTPOS SERVICE?

The question of who should provide debit EFTPOS services has aroused considerable controversy in a number of countries, notably Australia, Belgium, the UK and the United States. The question has a number of facets, including:

— Should financial institutions other than banks, such as building societies, participate in national EFTPOS services?

— Should retailers operate debit EFTPOS services?

— Should EFT be integrated with point of sale (POS) systems?

There is, however, less controversy over the provision of credit EFTPOS, than over debit EFTPOS.

Tied to the issue of who should provide the service are specific issues that need to be addressed by EFTPOS services provided on a national basis and services provided in competition.

Issues for debit EFTPOS

The controversy over debit EFTPOS has arisen because EFT permits the retail payment clearing process to be unbundled, so that the different components of the service may be undertaken by different organisations. Cheque clearing, acceptance of the cheque by the payee's bank, its return to the bank of its originator, authorisation of payment and subsequent settlement between banks are traditionally a monopoly of the banks. With EFT the different payment handling elements may be separated, enabling some of them to be undertaken off bank premises, and making it potentially attractive for non-bank organisations to provide them. Four separate elements make up a debit EFTPOS service, as indicated in Figure 2.3.

Figure 2.3 Elements of a debit EFTPOS service

— Capture of transaction data.

— Networking, ie the infrastructure for transmitting and switching EFTPOS communications.

— Account management and authorisation of transactions, ie taking deposits and holding them in debit accounts, or operating credit accounts, which can be accessed and authorised for EFT transactions.

— A settlement mechanism, allowing funds to be transferred between the financial institutions concerned, usually the customer's and retailer's banks.

In practice, responsibility for providing the different elements can be divided in a number of ways. Figure 2.4 illustrates possible combinations in various EFTPOS schemes around the world. At one extreme Bancontact in Belgium, for example, insists on providing the complete EFT system, and even manufacturing parts of it. At the other extreme, in Norway, the banks consider it the responsibilty of the retailer to deliver payment instructions to the bank, whether electronically or on paper. In the case of EFTPOS this requires a communication link to IDA, the banks' data processing centre. In the US there are examples of both banks and retailers being responsible for data capture for a bank network (eg the Iowa Transfer System).

Should non-bank financial institutions participate in national EFTPOS services?

The commercial banks are understandably reluctant to relinquish elements of the payments handling process. In particular, two specific areas of concern are evident:

— They wish to retain control over payment clearing.

— They wish to retain control of activities which impact their financial risks.

On the other hand, the commercial opportunities of EFT are attracting other types of organisation to payment handling services. In addition, fair trading regulations in a number of countries and related regulation in domains such as telecommunications may prevent banks from retaining their monopoly over all aspects of debit EFTPOS.

Competition from building societies and similar deposit-taking institutions is likely to be particularly serious for the banks, because the ability of these organisations to take deposits and manage accounts would enable them to offer a complete payment handling service in competition with the banks. The participation of building societies in EFTPOS services is a particularly pressing issue in the UK and Australia. In Australia the banks point out that the building societies would not be competing with them on equal terms, since they are not subject to the same regulations governing ratios, and in principle the risk of a building society not being able to honour a guarantee of payment is therefore greater. In the UK, the building societies have, to date, been excluded from direct participation in the inter-bank clearing process, but following the implementation of the recommendations of the Child Committee* they will in principle have access to the clearing process under the auspices of the newly instituted Association for Payment Clearing Services.

* The Child Committee was set up by the Committee of London Clearing Bankers to make recomendations on the future of the payment clearing system. It reported in December 1984, recommending a broadening of the range of financial institutions allowed to participate in the clearing process.

Should retailers operate debit EFTPOS services?
Where retailers offer debit EFTPOS services,they do not in most cases offer a complete payment handling service competing with that of the banks. For example, Publix, a supermarket chain in Florida, is capturing and networking ATM and EFTPOS transaction data, but does not operate deposit accounts. However, it is now able to charge banks for services for which banks previously charged Publix. In Belgium, GB-Inno-BM, a large retail conglomerate, is capturing and collecting transaction data within its retail stores, and in some cases concentrating it at its head office computer system, but the networking and other functions are performed by the banks. GIB does, however, compete with the banks in the provision of financial services; their in-house card gives customers the option of drawing on a credit account with GIB or of having their bank accounts debited by means of a conventional direct debit. Carrefour in France come nearest to providing a complete payments service for purchases made in their hypermarkets. They provide a card for use as a debit or credit card in their EFTPOS system, and both the debit and credit options draw on accounts held with the store.

Should EFT be integrated with POS systems?
A particular area of controversy between banks and retailers is responsibility for data capture for EFTPOS

Figure 2.4 Responsibilities undertaken by debit EFTPOS system operators

EFTPOS operator	*Country*	*Responsibilities undertaken by operator*			*Settlement mechanism*
		Data capture	*Networking*	*Account management*	
Anglia Building Society	UK	Yes	Yes	Customer's account but not necessarily retailer's	Where the retailer does not have an Anglia account, through Anglia's bank
Bancontact	Belgium	Yes	Yes	Member banks	Between banks
Carrefour	France	Yes	Yes	Yes	For accounts held with Carrefour only
GB – Inno – BM	Belgium	Yes	No	No	Between customer's and retailer's bank
IDA	Norway	Retailer	Networking: Norwegian PTT, Switching: IDA	Member banks	Between banks
Iowa Transfer System	USA	Member banks or retailer	Yes	Member banks	Between banks
Publix	USA	Yes	Yes	No	Between customer's and retailer's bank
Westpac/Commonwealth Banks	Australia	Yes	Yes	Yes	Between banks

services. Aspects of this issue are whether banks or retailers should provide in-store EFT terminals, and, in paticular, whether EFT should be integrated with POS (point-of-sale) systems.

Some bank EFTPOS operators insist on providing the terminals in order to be able to ensure the security of the system. For example, it has been the policy of Bancontact, one of the two EFT networks in Belgium, to provide all the equipment in the EFTPOS communications chain, and to insist on physical separation between EFT and all other retail systems. Not only do they supply the pinpad (a secure keypad at which customers can enter their personal identification number), they manufacture it as well in order to retain control.

Retailers, on the other hand, tend to prefer the convenience of integrated EFT/POS terminals to eliminate dual keying of transaction values, to facilitate reconciliation and to avoid duplication of wiring and equipment. Various levels of integration are possible. At the extreme, both POS and EFT functions may be performed by a single terminal, and both types of communications carried on the same network. The exchange of transaction data can also be achieved, however, if the two functions are supported by separate terminals, store processors and wiring, but there is a connection at terminal or store processor level. This arrangement can satisfy the banks' requirements for physical separation and dedicated equipment for secure communications, but at the cost of some duplication of wiring and store processors.

Issues for credit EFTPOS

Far less controversy surrounds the provision of credit EFTPOS services, for two main reasons:

—Where authorisation is by signature, security requirements are less stringent because the need to prevent unauthorised interception of the customer's PIN does not arise.

—A wide variety of organisations already operate credit schemes and issue credit cards. For example, many retailers already operate in-house credit card schemes.

Credit EFTPOS schemes are already operated by retailers as well as by banks, their subsidiaries and related organisations, and transaction data may also be processed by third parties, as in the case in the Cresta Teletran service in the UK (Cresta is a small computer services company offering a credit authorisation and EFTPOS service in conjunction with British Telecom).

National EFTPOS schemes and competing services

Few individual banks develop their own EFTPOS networks beyond the trial stage. For a full commercial service, the arguments for cooperation outlined in the previous section are too persuasive. Indeed, few banks have the penetration, even in particular regions, to offer a viable service by themselves.

In some countries, the banks are putting their weight behind a national scheme; in others they are joining large competing consortia. In almost all cases, the company operating the service is jointly owned by a number of banks. Most handle the crucial payment clearing aspect, but they vary on whether they also provide the networking and the retailers' EFT terminals. National EFTPOS schemes and competing network consortia must address somewhat different sets of issues.

For national EFTPOS schemes, the main policy issues that need to be resolved are:

—Financial arrangements between banks and retailers for equipment provision and service utilisation.

—Technical standards, especially for communication.

—Service security and contingency arrangements.

—Options for the customer interface.

In addition, the aim of national EFTPOS schemes is usually that the financial arrangements should not discriminate between different retail sectors or against other specific groups such as smaller retailers. Technical standards need to be established to maximise compatibility with existing equipment and to permit fair competition between EFTPOS terminal suppliers. Most important perhaps, is the ability to cater for all cards, including in-house cards.

By contrast, where networks are in competition, procuring terminals from a single supplier and using proprietary communications protocols may be the most cost-effective approach to providing an attractive service to the retailer. Exclusivity to a card or set of cards rather than multi-card operation will probably be a requirement specified by competing networks. Also, rather than standardisation, aspects of the service such as security features will be the basis for differentiating competitive products, and the selection of retailers to whom the service is marketed will be governed by commercial considerations rather than ones of equity.

The amalgamation of competing networks or interworking agreements which give such networks a de facto monopoly may have some side-effects, since the arrangements will inevitably reflect the priorities of a competitive environment. In particular, some equipment suppliers without early access to the service may find themselves subsequently excluded from terminal provision, either explicitly or through the use of proprietary protocols.

WHAT STANDARDS SHOULD BE ADOPTED?

Most new technologies suffer initially from lack of, and disagreement over, standards, and EFTPOS is no exception. Indeed, technical standards have been a major topic of discussion in the negotiations on setting up EFTPOS services, especially where the provision of the service is being coordinated on a national basis. All parties involved, whether suppliers, retailers or network providers, have an interest in establishing standards, but their priorities and requirements differ:

Suppliers want:

—To access as large a market as possible with the smallest number of different products. Dominant suppliers, however, may prefer to adhere to their proprietary standards as a means of preventing existing users of their equipment from buying new equipment from other suppliers.

Retailers want:

—A single terminal at the point of sale to handle all cards.

—To minimise the cost of communications interfaces, in the terminal or in-store EFT processor.

—To be able to purchase POS equipment compatible with future EFT systems.

Network providers want:

—A single network solution for all cards and card issuers.

—To be able to interwork with other networks as required (for national or international service).

National standards for EFT systems have been established in Australia and Norway but elsewhere they are still under discussion, although several announcements are imminent. Thus, by early 1986 the specifications for the French Carte Bancaire system should have been announced. Even in France, however, the bank system will need to work side by side with proprietary systems installed by retailers. Especially where the latter are designed to handle in-house credit cards only, it may be some time before they adopt the same standards. A need for international standards has been expressed by many, and multinational equipment suppliers in particular strongly favour their development. However, except in the area of card standardisation discussed below, little progress has yet been made. So far, compatibility and interworking problems have been solved by a combination of proprietary solutions and technological fixes.

Standards are being sought in a number of areas:

—Cards.

—Communications protocols and message formats.

—Security.

—EFT terminal interfaces with electronic cash registers (ECRs) and pinpads.

—EFT terminal layouts and message displays.

—Network gateways.

In terms of cards, ISO standards have been established governing the positioning and function of data tracks on magnetic stripe cards, but banks differ in the nature and format of the data they encode. Discussions are currently being conducted in ISO (the International Standards Organisation) on the standardisation of smart cards.

A wide range of protocols has been considered for EFT terminal-host communications. Compatibility with EPOS (electronic point-of-sale) protocols and broader applicability outside EFTPOS will be important considerations in the final choice.

There have also been calls for standardising EFT terminal layouts and customer message displays. Although there is some merit in standardising the customer interface, good design is generally perceived to be more important in avoiding customer problems than standardisation.

WHAT SECURITY ASPECTS ARE IMPORTANT?

Security is a major concern to all participants in EFTPOS, and adequate levels of security are essential for the service to be viable.

Two aspects of security need to be distinguished in the design of EFTPOS systems, physical security and logical security. Physical security means ensuring that important system components (eg pinpads) are proof against mechanical interference. Logical or electrical security means that transaction or PIN information cannot be obtained from the system in usable form by intercepting communications or by tapping into equipment circuitry.

Compatibility of security requirements between card issuers is one of the most crucial factors for success of EFTPOS among retailers, since it will determine whether the retailer can service all cards with a single terminal at the checkout. This will require at least the co-location within a pinpad of the security logic serving a number of card issuers, and hence agreement on the physical security of the pinpad.

In the longer term, with perhaps many hundreds of

card issuers, the maintenance of physical separation between the security logic circuitry within the pinpad is unlikely to be practicable. Therefore, agreement on standards of security permitting some sharing of logic circuitry will be necessary. The level of security required and the techniques appropriate for attaining it are currently the subject of disagreement and competition between equipment suppliers and between network providers. As a consequence, the achievement of standards in this domain will be difficult and is likely to be a protracted process.

SUMMARY

Many obstacles need to be overcome before EFTPOS will be introduced and used successfully on a wide scale. The sheer number of parties involved, their different backgrounds and their often conflicting priorities are a major handicap for short term success. However, despite the inevitable setbacks that will be experienced initially, the promise of substantial long-term benefits that can be achieved will either encourage the different parties to seek agreement or, alternatively, will lead to market forces alone governing the development and success of EFTPOS, albeit in a fragmentary fashion. The former course of events is perhaps the more desirable, the latter the more likely.

CHAPTER 3

EFTPOS: THE RETAILER'S PERSPECTIVE

"We will introduce EFTPOS only if it increases our profits. This probably means reduced costs, as it is hard to see how revenues will increase as a result of its implementation. We will not be trail blazers!"

This statement, by a large UK retailer, epitomises the current view of the many retailers who have given us their views on EFTPOS. They encompass a multitude of feelings: doubt and uncertainty, an emphasis on achieving cost savings, a hazy view of the marketing advantages of EFTPOS and an unwillingness to pioneer.

Without the acceptance of retailers, EFTPOS cannot succeed, and their views, requirements and plans are thus of fundamental importance. We have therefore conducted a major survey of UK retailers, designed to shed light on retailers' views on EFTPOS. We describe and analyse the results in this chapter and we discuss the extent to which EFTPOS has so far delivered the benefits retailers anticipate. We also examine criteria by which retailers can judge whether and when EFTPOS is likely to deliver the benefits they expect.

OUR SURVEY RESULTS

The survey questionnaire was sent to nearly 400 of the largest UK retail organisations. Of these, 102 returned usable replies in time for our analysis. The survey and replies covered all major retail sectors, as shown in Figure 3.1.

The questionnaire asked retailers:

—What benefits they expected EFTPOS to bring to their business.

—What concerns they had about EFTPOS, when they expected to begin installing EFTPOS equipment, and the factors that would determine the timing.

—Whether they would prefer to integrate EFTPOS with existing point-of-sale equipment or buy new equipment.

—Whose EFTPOS network they would be most likely to use.

—What financial services they already provide.

We also asked retailers in the survey for various details of their operations, including main line of business, number of sites and payment points operated and methods of payment used by customers. Figures 3.2 to 3.4 (overleaf) provide the profile of our respondents in terms of these factors. These factors enabled us to determine the extent to which retailers differ in their priorities for EFTPOS and in their plans for installing it, and to identify the factors underlying these differences.

Benefits

In general, retailers appeared to see the benefits of EFTPOS as stemming from cost reductions and

Figure 3.1 Sectors covered in questionnaire survey of retailers' views on EFTPOS

Food retailing:	Grocers Cash & carry Hypermarkets/supermarkets
Cooperative societies	
Department stores	
Non-food multiples:	Variety chain stores DIY (Do-it-yourself) Hardware/china/glass Electricals/TV/rentals/records Furniture/carpets Chemists Car accessories Car rentals Bookshops/cards/stationery Toys and sports goods Travel agents Jewellers Off-licences (Wines and spirits) Confectioners, tobacconists and newsagents Footwear Clothing
Fuel retailing	
Utilities	
Hotels and restaurants	
Mail order	

increased efficiency in payment handling rather than from increased sales and marketing opportunities (see Figure 3.5). Almost 60% of retailers expected EFTPOS to reduce the costs of handling cheques and cash, and almost 50% expected EFTPOS to reduce the risks of cash handling, enable cheque and credit card payments to be credited to their accounts more quickly and reduce transaction times per customer.

Figure 3.2 Number of sites from which retailers sell goods and services

Number of sites	*Percentage of retailers responding to survey*
1-5	2
6-10	3
11-20	5
21-50	18
51-100	26
101-200	20
201-500	15
501-1,000	5
1,000+	6

Note: Sites include all types of retail outlet including such sites as ticket offices, petrol stations and hotels.

Figure 3.3 Number of payment points at retailers' premises

Number of payment points	*Percentage of retailers*
1-5	1
6-10	0
11-20	3
21-50	9
51-100	12
101-200	23
201-500	15
501-1,000	20
1,000+	17

Notes: The number of retail payment points refers to all such points at all sites operated by the retailer.

Payment points include all individual cash registers, supermarket checkouts, box office windows and receptionist positions.

Forty-five per cent expected reduced payments to credit card companies. The last was one of several costs and inefficiencies mentioned that are related to credit card handling which EFTPOS is expected to reduce. Over 30% of retailers in our survey expected EFTPOS to permit the introduction of a single system for all credit cards, to eliminate credit card slip handling and credit-authorisation telephone calls, and to reduce cheque and credit card fraud.

By contrast, very few retailers expected EFTPOS to bring sales or marketing benefits. This emphasis on cost reduction rather than revenue increase is likely to cause retailers to take a very hardnosed approach to EFTPOS service and equipment costs. Perhaps surprisingly, very few retailers in our survey plan to use EFTPOS as a vehicle for moving in on financial services markets.

The only widely expected benefit not directly concerned with the payment process is faster transaction times per customer. Integration of payment with other point-of-sale functions and more up-to-date cash management information are also sought by about 30% of retailers. This market segment is unlikely to find rigid separation of EFT services from other POS functions a satisfactory solution.

The benefits anticipated do, however, vary from one retail sector to another (see Figure 3.6 on page 24), reflecting the different characteristics of the sectors and the payment habits of their customers. Successful EFTPOS equipment and service suppliers will need to take full account of these differences in requirements.

Concerns

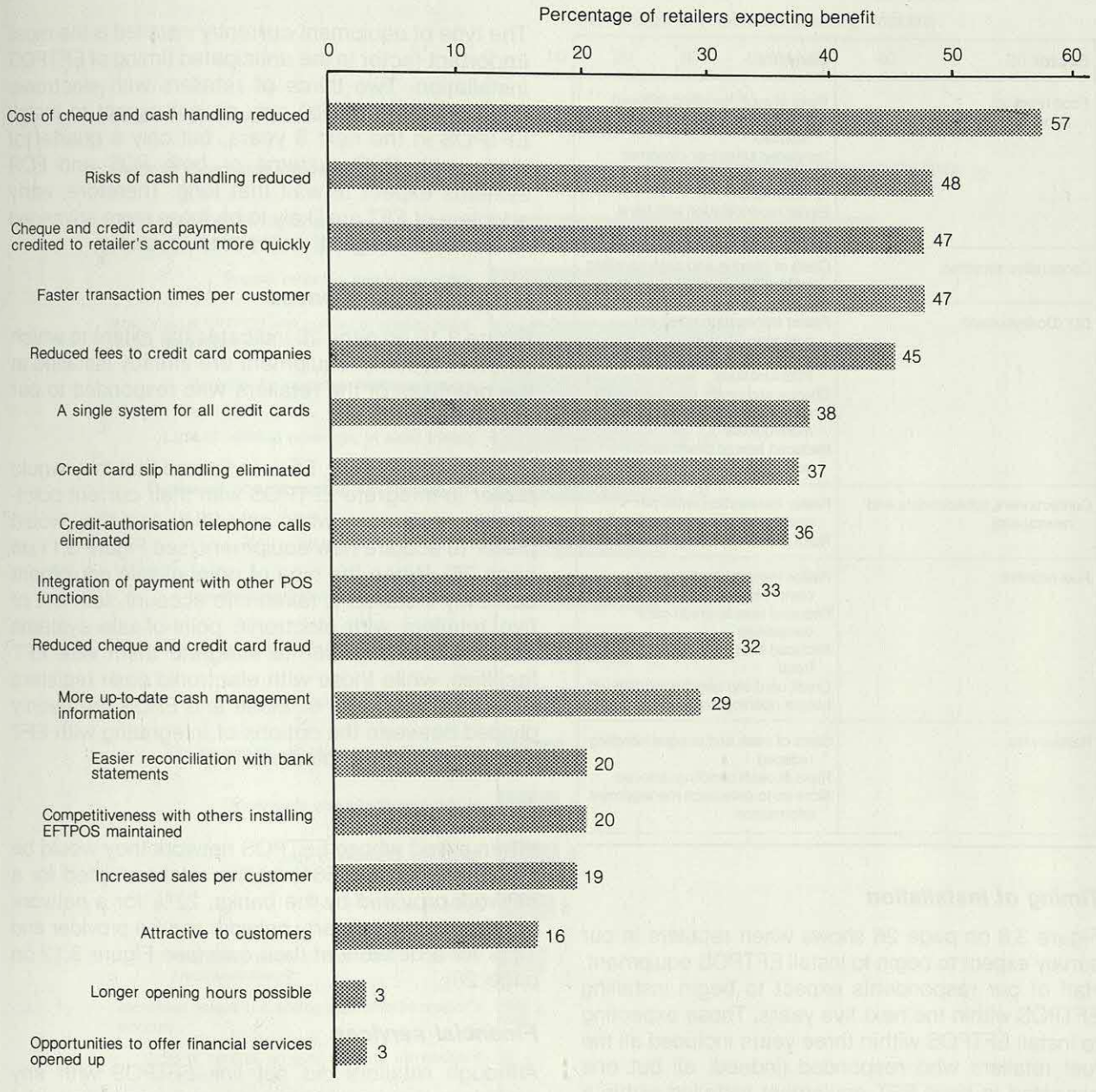
Two concerns about EFTPOS were expressed by the vast majority of retailers responding to the survey (see Figure 3.7 on page 25) — equipment costs and customer acceptance. More than half the respondents were uncertain about the banks' plans for their EFTPOS service and for other methods of payment.

Figure 3.4 Most common methods of payment used by retailers' customers

Payment method	*Rank order of frequency of use*	*Comments*
Cash	1.3	The most important payment method for all sectors except car rental, mail order and hotels
Cheque	2.3	Important for all, except car rental and hotels. Most important for mail order
Third-party credit card	3.1	Most important for car rental and hotels
In-house credit card	3.6	Important for department stores and DIY stores
Credit account	3.7	Important for utilities
Direct debit	4.1	Important for electricals and TV rentals

Note: Other payments methods used to a lesser extent include standing orders, vouchers and payment stamps issued by utilities.

Figure 3.5 Benefits expected from EFTPOS by retailers



Thirty per cent or more were concerned about system reliability and vulnerability, the integration of EFTPOS with point-of-sale equipment, the possibility that EFTPOS could embarrass customers if they are refused authorisation to pay by card at the checkout, and a possible lack of national coverage, at least in the early years of service.

These results imply that banks will need to undertake a major marketing and public relations exercise, aimed at both customers and retailers, if they are to promote EFTPOS successfully. If there is any justification for retailers' fears about plans for EFTPOS and competing methods of payment (such as an increase in the cost of cheque handling, or the integration of EFT with point-of-sale systems, or limited geographical coverage) which would limit the benefits for retailers with a nationwide presence, the level of concern expressed should encourage the banks to review their strategies.

Surprisingly few retailers see a lack of defined technical standards for EFTPOS as a problem. They apparently expect proprietary solutions and technical remedies for incompatibility to provide satisfactory solutions for equipment interworking and to cope with multicard and multi-card-issuer environments.

Figure 3.6 Benefits most frequently cited by retailers in different sectors

Sector	*Benefits*
Food retailing: Supermarkets and hypermarkets	Risks of cash handling reduced Costs of cheque and cash handling reduced Increased sales per customer More up-to-date cash management information Easier reconciliation with bank statements
Cooperative societies	Costs of cheque and cash handling reduced
DIY (Do-it-yourself)	Faster transaction times per customer Integration of payment with other POS functions Cheque and credit card payments credited to retailer's account more quickly Reduced fees to credit card companies
Confectioners, tobacconists and newsagents	Faster transaction times per customer Risks of cash handling reduced
Fuel retailers	Faster transaction times per customer Reduced fees to credit card companies Reduced cheque and credit card fraud Credit card slip handling eliminated Longer opening hours
Restaurants	Costs of cash and cheque handling reduced Risks of cash handling reduced More up-to-date cash management information

Timing of installation

Figure 3.8 on page 26 shows when retailers in our survey expect to begin to install EFTPOS equipment. Half of our respondents expect to begin installing EFTPOS within the next five years. Those expecting to install EFTPOS within three years included all the fuel retailers who responded (indeed, all but one expected to have EFT equipment installed within a year), but otherwise responses were scattered across a wide range of sectors. Within the range of organisations surveyed, the expected date of first installation did not appear to depend on the size of the retailer (as defined by the number of sites or payment points).

The factors which will determine when retailers install EFTPOS, according to our survey, are shown on page 26 in Figure 3.9. Customer acceptance is rated ahead even of the availability of the banks' EFTPOS service. Equipment costs, implementation of other retail systems and the implementation of EFTPOS by competitors are all considered important. Many retailers obviously see EFTPOS as one element in a broader retail systems strategy, and many will be reluctant to go ahead until others in their sector have blazed the trail.

The type of equipment currently installed is the most important factor in the anticipated timing of EFTPOS installation. Two thirds of retailers with electronic cash registers (ECRs) only do not expect to install EFTPOS in the next 5 years, but only a quarter of those with POS systems or both POS and ECR systems expect to wait that long. Therefore, early adopters of EFT are likely to be those more advanced in terms of usage of other retail systems.

Equipment preferences

Figure 3.10 on page 26 indicates the extent to which different types of equipment are already installed at the premises of the retailers who responded to our survey.

In terms of EFTPOS, 55% indicated that they would prefer to integrate EFTPOS with their current point-of-sale equipment, while only 28% said they would prefer to acquire new equipment (see Figure 3.11 on page 26). When the type of point-of-sale equipment currently installed is taken into account, four out of five retailers with electronic point-of-sale systems installed would prefer to integrate them with EFT facilities, while those with electronic cash registers (ECRs) or a mixture of ECRs and EPOS are evenly divided between the options of integrating with EFT and buying new equipment.

Network provision

When asked whose EFTPOS network they would be most likely to use, 56% of the retailers opted for a network provided by the banks, 22% for a network provided by a third-party network service provider and 14% for a network of their own (see Figure 3.12 on page 26).

Financial services

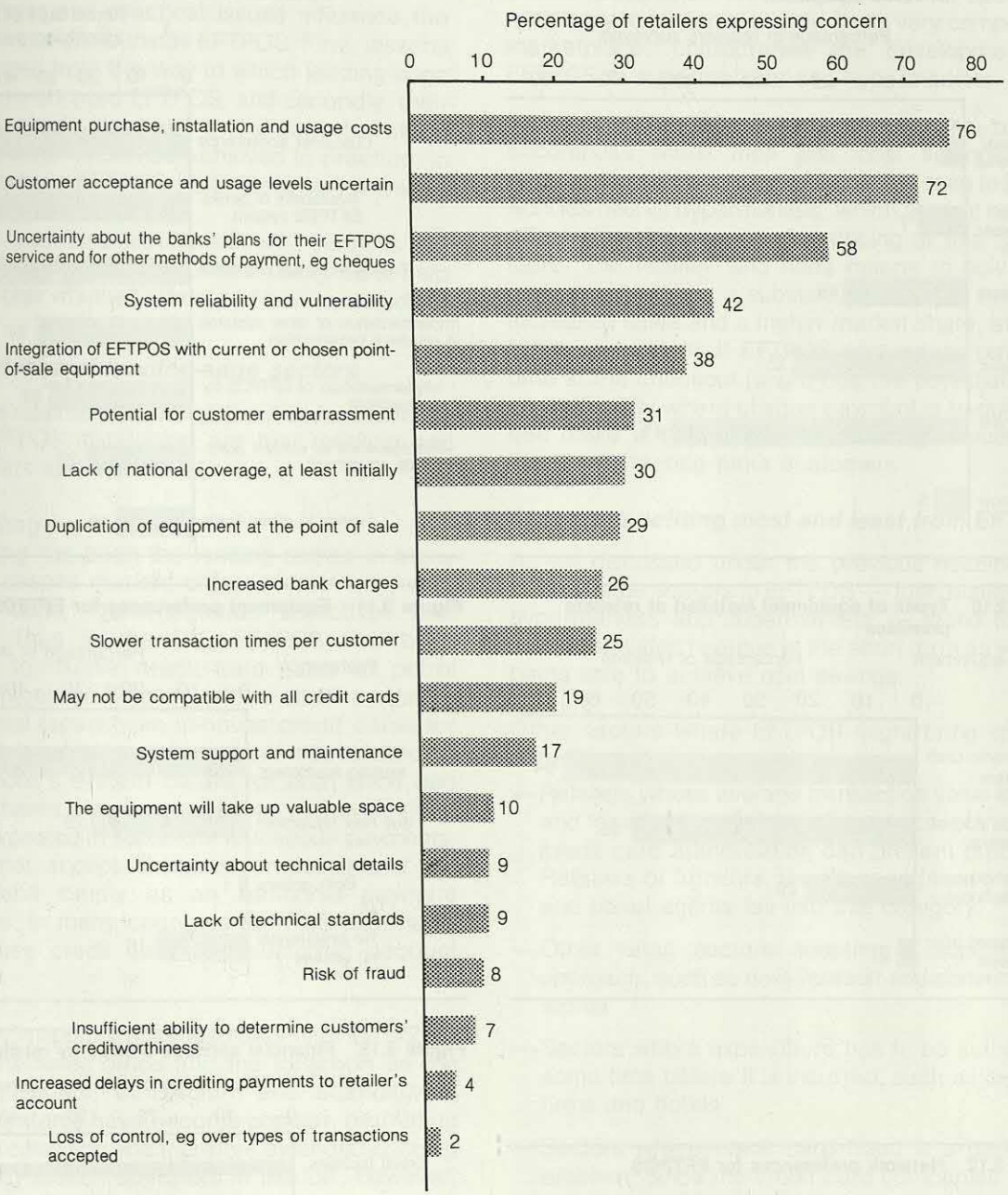
Although retailers did not link EFTPOS with any ambitions they might have as providers of financial services, the survey provided evidence of the extent to which retailers already offer such services and the range of services offered (see Figure 3.13 on page 26). Large retailers are already well established in this market, rather than being on the point of entering it. Credit facilities and in-house credit cards, used by 46% and 37% of retailers, respectively, were the most popular services.

Lessons of the survey

In conclusion, a number of key messages have emerged from the survey:

— Retailers see EFTPOS as a way of reducing costs rather than generating additional revenue and are likely to judge investment decisions accordingly.

Figure 3.7 Retailers' concerns about EFTPOS



—Retailers see EFTPOS in the context of their broader retail systems strategies. Their views on integrating EFTPOS with other retail systems and the timing of its introduction are influenced by this perspective.

—The level of an organisation's sophistication in retail automation is likely to be one of the most important factors determining the timing of EFTPOS installation.

—The banks face a critical task in the marketing of EFTPOS to retailers and their customers. It would be difficult to overestimate the importance of promotion, product definition, pricing and launch planning in determining the success of EFTPOS schemes.

—The survey also provides much evidence of attitudes to EFTPOS which will need to be changed if the service is to take off. In particular, the emphasis on using EFTPOS as a means to save costs rather than to achieve a competitive advantage is likely to lead to considerable caution among many retailers.

Figure 3.8 When retailers expect to begin installing EFTPOS equipment

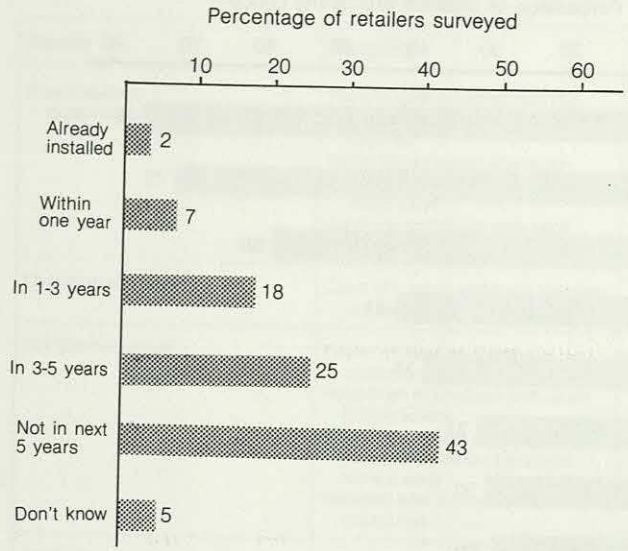


Figure 3.9 Key factors determining when retailers will install EFTPOS

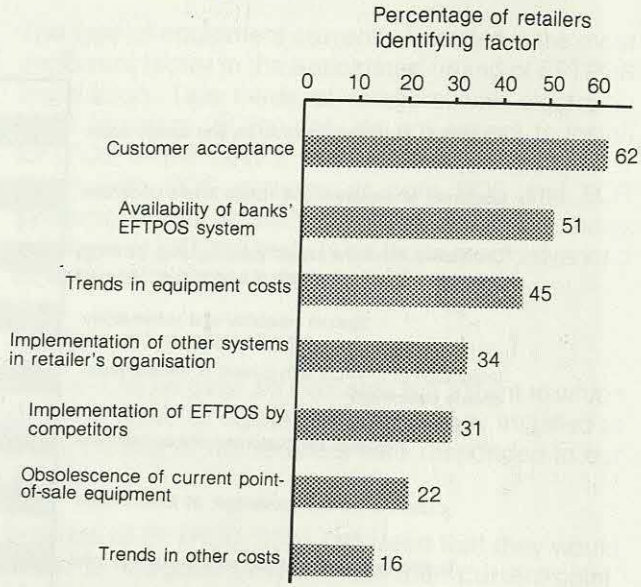


Figure 3.10 Types of equipment installed at retailers' premises

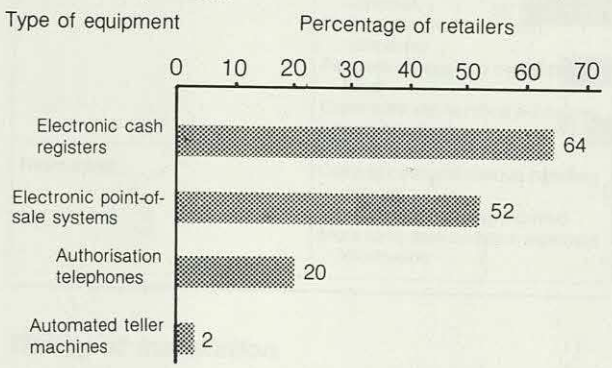


Figure 3.11 Equipment preferences for EFTPOS

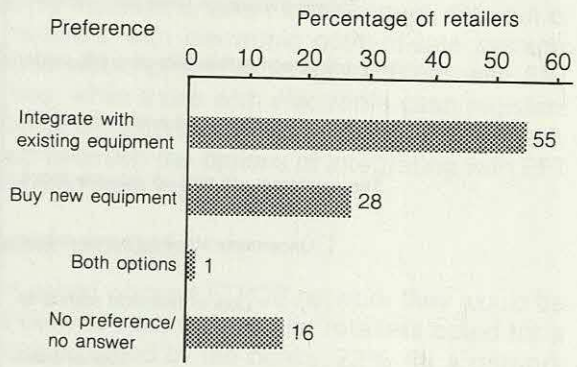


Figure 3.12 Network preferences for EFTPOS

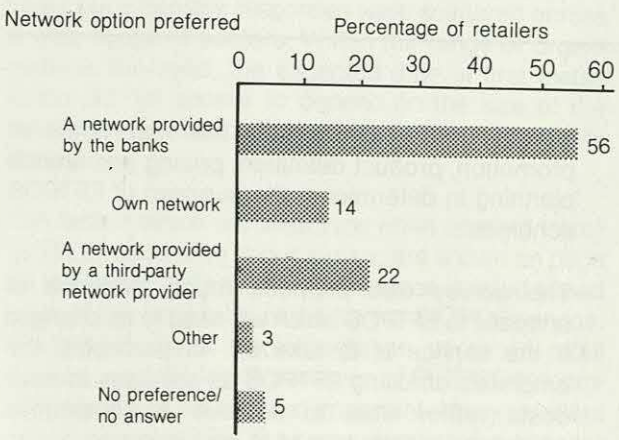
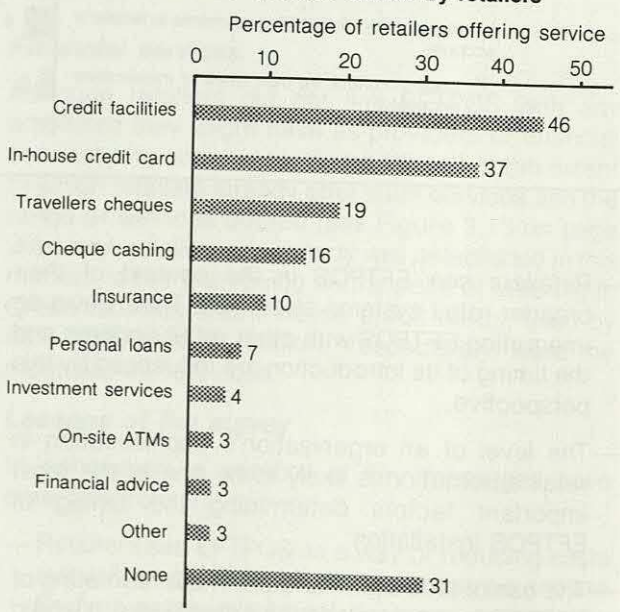


Figure 3.13 Financial services offered by retailers



ISSUES FOR RETAILERS

Many strategic and practical issues influence the decision by retailers to install EFTPOS. First, lessons can be learned from the way in which leading-edge retailers have adopted EFTPOS, and secondly, their experience sheds light on the extent to which anticipated benefits can be achieved in practice, in so far as today's EFTPOS technology will allow.

We discuss these issues in the following sections and also review a set of decision criteria designed to help retailers decide whether, when and how to introduce EFTPOS.

The experience of leading-edge sectors

Overall, the retail sectors which have so far taken the lead in EFTPOS installation are fuel retailing and supermarkets and hypermarkets.

Fuel retailing

Fuel retailing has been the leading sector in many countries, despite marked differences in customer payment habits, implementation objectives and approach. Thus in the UK, EFTPOS has been developed to handle credit card sales at petrol stations, whereas in Belgium, where credit cards are not accepted (apart from in-house credit cards for fleet owners), a debit system has been developed. In the US, Mobil's system caters for both debit and credit payments. However, whereas in Europe debit might be expected to substitute for cheque payments, Mobil do not accept cheques for petrol and are offering debit simply as an additional payment mechanism. In many countries EFTPOS also helps with in-house credit card and customer account schemes.

Differences in approach are also evident in the choice between the sales office and the forecourt as the locus of payment. In Belgium and Scandinavia, forecourt systems have become popular, permitting unmanned operation and therefore extended opening hours. Many station operators in the UK, however, would prefer customers to pay at sales offices, increasing the likelihood of additional sales of goods from sales office shops. In the US particularly, fire and safety regulations restrict the use of unmanned operations.

The main similarity between countries where EFTPOS at the petrol station is well advanced is that the petrol retailing market is characterised by intense competition between a few very large companies. Their operations are on a sufficient scale to enable them to make the necessary investment to obtain the marketing advantage offered by an additional payment alternative, and to achieve worthwhile savings on bad debts, float and better operational efficiency.

Supermarkets and hypermarkets

Similar features, in terms of the scale of operation necessary to take the initiative and a very competitive marketplace, characterise the development of EFTPOS in supermarkets and hypermarkets.

Here, too, the potential benefits to the retailer encompass more than just cost savings. The checkout and its attendant queueing is seen to be the Achilles heel of hypermarkets, which at least partially offsets the advantages of shopping at this type of store. The retailer who finds means to solve this problem could win a substantial bonus in terms of increased sales and a higher market share, at least in the short term. If EFTPOS can reduce payment time at the checkout (and it has the potential to do so, especially where cheque payment is frequent), it can make a contribution to reducing queues and thereby attracting more customers.

Sectors benefiting most and least from EFTPOS

As we discussed under the previous heading, the leading edge sectors in EFTPOS — fuel retailers and hypermarkets and supermarkets — stand to gain increased sales revenue in the short term as well as being able to achieve cost savings.

Other sectors where EFTPOS might bring specific benefits are:

- —Retailers whose average transaction value is high, and for whom, therefore, cheque acceptance and credit card authorisation can present problems. Retailers of furniture, jewellery and luxury goods and travel agents fall into this category.
- —Other retail sectors adopting a supermarket approach, such as do-it-yourself and convenience stores.
- —Sectors where expenditure has to be authorised some time before it is incurred, such as car hire firms and hotels.
- —Sectors where credit card fraud is a particular problem. Since the credit card companies would be the specific beneficiaries here, the motivation to the retailer would have to lie in changes in the card companies' fee structure.
- —Retailers with in-house credit card schemes.
- —Unattended vending machines, particularly if smart card technology can be used.

Based on our research, sectors that probably have least to gain are:

- —Small retailers, for whom the cost-benefit picture is least attractive.
- —Retailers with large volumes of low-value cash transactions, such as confectioners, tobacconists and newsagents.

However, some EFTPOS service providers have already introduced tariffs which differentiate between sectors. Where this happens, the relative attractiveness of EFTPOS to different retailers will depend on the tariff structure in force. Therefore, EFTPOS could still be attractive to some smaller retailers. It is also possible for small retailers to join forces, thereby negotiating as a more powerful group with EFTPOS service providers.

THE EFTPOS BALANCE SHEET IN PRACTICE

We review and analyse in this section the key factors that affect the profitability of EFTPOS implementation for the retailer, the benefits achieved in practice, customer usage levels (which determine the proportion of total transactions on which those benefits are realised) and costs.

Benefits achieved in practice

Because EFTPOS is such a new technology, and most current systems are still in a trial stage or new, the extent to which benefits achieved can be readily translated to future systems is not easily assessed. Current experience does, however, provide an indication of the magnitude of benefits, and the circumstances under which they may be achieved. Our research indicates that many of the projected benefits are indeed obtained by most organisations but that their achievement is by no means automatic.

Faster throughput of customers

Transaction times are important where volume of business depends on the speed with which customers can be cleared — from the garage forecourt or through the supermarket checkout, for example. EFTPOS can indeed reduce throughput times, but in some cases they have actually been increased.

Faster throughput of customers can be achieved only if a number of conditions are met. First, EFTPOS saves time only if the time taken to make the payment determines speed through the checkout. If, in practice, it is the time taken by the customer to pack the shopping which is critical to throughput, then the introduction of EFTPOS will not help. Only studies in a particular retail context would determine whether packing is a critical factor. For example, in the US, where EFTPOS has demonstrably speeded transit through the checkout, it is normal practice to have a second employee at the checkout to pack the goods.

Secondly, staff need to be adequately trained to take advantage of the potential of EFTPOS. The US experience in particular emphasises the importance of staff training to achieve fast throughput. Indeed, we have observed sites where EFTPOS equipment actually slowed down customer throughput because it was more complex to use than equipment used previously, and staff were unfamiliar with its operation. Raising the awareness of customers and familiarising them with the use of the system are also important.

Thirdly, where on-line communications are used, whether for data capture or solely for authorisation, system response time is critical. The response time will include communications delays in the network and the response time of bank computer systems. The one-minute delays experienced in some trials are unlikely to be acceptable at a supermarket checkout, and in some countries the PTTs have not yet provided sufficiently rapid, reliable and cost-effective communications for on-line applications to be viable. Checkout throughput may be critical only at peak times; these may also be peak times for the EFTPOS system as a whole. Unless the network and bank systems are capable of rapid response even at peak times, benefits from faster checkout transaction times are unlikely to accrue.

Reduced bank charges

Retailers can share in the projected savings on paper handling which EFTPOS debit transactions will bring the banks. As an extreme example, some retailers on the Iowa Transfer System EFTPOS network receive a credit of 10 cents from the banks for each EFTPOS transaction if they have installed the EFT terminals themselves. Alternatively, they pay nothing where the bank provides and supports the EFT equipment.

Elsewhere, however, banks see electronic services as an opportunity to introduce charges more in line with costs, especially where a free service was provided before. In Belgium, for example, where banks do not normally charge retailers for cheque handling, the network operators charge for debit EFTPOS transactions. In France (also a country accustomed to 'free' cheques) the banks insist on including value-added components in their EFTPOS service for which they charge the retailers.

Reductions in transaction charges

Reductions in credit card transaction charges have also been obtained by retailers submitting transaction details electronically. For example, a saving of 6 pence (over 8 cents) per transaction has been quoted by a UK fuel retailer. In the case of both debit and credit transactions, retailers do, however, need to bargain hard to obtain such reductions. The size of the benefits per transaction achieved depends very much on the size of the retailer and the relative negotiating 'muscle' of retailers and banks. In the US, large retailers wield considerable power over numerous small local banks. In Belgium, GIB, the large supermarket chain, appears to have obtained

a better deal from a bank network than have smaller retailers. In the UK, reductions on credit card transactions are negotiated individually between fuel retailers and the credit card companies. In the UK and France, where both banks and retailers are powerfully represented, the debate about charges actually threatens to hold back EFTPOS development.

Float savings
Projected float savings have been obtained in many EFTPOS installations we researched. As electronic payment radically reduces the time to clear and process payments and makes the time required for the process almost fully predictable, the point at which the retailer's account is credited can be defined in the initial contracts specifying the system and its design. Float savings are therefore among the benefits EFTPOS can deliver most reliably.

Fraud reduction
EFTPOS has in many instances contributed to reducing cheque and credit-card fraud. Retailers with on-line debit card systems almost unanimously report that bad cheques are no longer a worry to them. Even off-line magnetic card systems with signature authentication have been found to reduce credit card fraud.

The reduction may not, however, remain so marked when EFTPOS becomes more widespread and familiar. ATM fraud, where a PIN as well as a magnetic stripe card is required, is burgeoning, and some of the deterrent effect of current EFTPOS systems may simply be due to unfamiliarity. Criminals do not yet know enough about how the new systems work to know whether they will allow their intended fraud.

Error reductions
Where EFT is integrated with the cash register or POS system, a further benefit is the elimination of the rekeying or writing out of payment totals; this removes a significant source of error and facilitates reconciliation. Double entry has been a significant source of problems on some non-integrated EFTPOS installations.

Paper slip handling
Eliminating credit card slip handling by using EFTPOS is another benefit that tends to be achieved in practice. At a petrol station, for example, this represents a saving in staff time required to sort the slips and take them to the bank. Larger companies operating their own credit card schemes also achieve savings at head office by eliminating or reducing paper slip handling and data entry.

Increase in customer spending
Perhaps unexpectedly, debit EFTPOS appears to encourage customers to spend more. One retailer we investigated reports the average EFTPOS transaction value to be higher than that for credit cards, cheques or cash. Another found that the average transaction value at dedicated EFTPOS checkouts was 50% higher than at his other checkouts, and even some petrol stations have found the value of EFTPOS transactions to be higher than those using other forms of payment. One supermarket is concentrating its new EFTPOS terminal installations at those counters where impulse buying is most significant.

High spending may, however, be a characteristic of those customers who are early EFTPOS users rather than one encouraged by the payment medium itself. Typically, younger and more affluent customers have adopted EFTPOS most enthusiastically. Also, the way in which EFTPOS is implemented affects its impact on spending. For example, petrol station systems which allow card payment on the forecourt rather than in the sales office may reduce sales of other items in the sales office shop.

Competitive advantage
Petrol retailers, grocery supermarkets and even small retailers all cite the additional marketing advantage of being the first to offer their customers an alternative payment mechanism. Some retailers we investigated felt that use of the debit card tied customers more tightly to their stores. Such benefits are, however, intrinsically difficult to quantify.

Conventional credit cards provide an interesting comparison: the perceived marketing advantage which they initially conveyed (and which was used as an argument to offset the cost of the transaction fees levied on retailers by the card companies) has disappeared or become less marked as they have become more widely accepted. In those retail sectors in which their use is prevalent, they are a facility which customers have come to expect as a matter of course, so that any marketing advantage now exists only in the negative sense, in that absence of the facility may result in loss of custom.

There is already evidence of the same kind of change in the perceived marketing value of debit card EFTPOS where it has become commonplace, for example in fuel retailing in Belgium. Aside from the other benefits of EFTPOS, its marketing advantages may be worth pursuing even if they are likely to be only transient. They may last some years and may act as a springboard to further developments. Indeed, leadership in the application of technology to retailing has proved in the past to be a successful commercial strategy for many major retail organisations.

Impact on usage levels

Where existing credit card schemes are automated using EFTPOS, the benefits can be obtained for all credit transactions. If EFTPOS makes this type of

payment more attractive to the customer, for example by speeding up the transaction, it can increase the share of total credit transactions. For example, EFTPOS is said by one UK fuel retailer to have increased credit sales from 12% to 25%.

By contrast, where it is introduced to support a new payment medium, whether in-house cards or direct debit, the resultant benefits will depend on the proportion of total transactions captured by the new medium. In both fuel retailing and large stores, the current proportion of transactions handled by EFTPOS ranges from very low, where a scheme has just been introduced and little marketing effort has been devoted to it, to as high as 10% for well-established and actively marketed operations where a high proportion of customers have appropriate cards. Exceptionally, in Belgium EFTPOS accounts for over 30% of the turnover of petrol stations equipped for EFT, and fuel retailing in Belgium must be regarded as a prototype for other mature EFTPOS markets. Usage may vary quite markedly between different sites belonging to one organisation, however.

Overall, in both the fuel retailing (outside Belgium) and the large stores sectors, leading EFTPOS users are setting themselves a short-term target for EFTPOS transactions of 15% of the total, say, one to two years after introduction.

Among small retailers, the proportion of EFTPOS transactions will ordinarily depend on the nature of the business and the effectiveness with which the EFTPOS sevice is marketed by its operator.

Costs

Cost patterns vary widely, depending on the degree to which a retailer participates in service and equipment provision, the nature of his business, the tariff structure of the EFT service operator, his geographic location, and the nature of the EFT service. Fuel retailers, small shops and large retail establishments have very different EFT requirements and we review the costs for each of these sectors in turn.

In the fuel sector, retailers report site equipment costs ranging from $1,450 for a simple EFT terminal with no other functions in the US, to $8,000-10,000 for a fully communicating off-line kiosk EFTPOS system in the UK (including about $950 for a modem and telephone line connection) and around $13,000 for a forecourt card reader system in Belgium. Communications costs (at least local call charges), installation, staff training, and maintenance costs are additional in all cases. In addition, the retailer faces charges by financial institutions and service bureaux. For debit transactions, these range from zero in the US, where the oil company networks transactions to the banks, to 8 cents per transaction on a trial site in the UK, and $105 per month for connection and the first 1,000 transactions plus between 6 and 4 cents (on a declining scale) for each subsequent transaction in Belgium. For credit card transactions in the UK retailers might pay $60-75 per site per month to the service bureau for processing the transactions, but then achieve a reduction of some 8 cents per transaction in the credit card companies' merchant fee.

Among small retailers, EFT is encountered to a significant degree only in Belgium and France. In Belgium they pay between $21 and $35 per month for service and terminal rental, in addition to some 8 cents per transaction for transaction and communications charges.

Costs facing the large retailer include some or all of the following:

—Terminals.

—Store EFT processor.

—Wiring.

—Installation.

—Staff training.

—Maintenance and system support.

—Bank charges.

Costs of terminals currently being installed are in the range $800-1,450. A number of retailers we researched reported higher terminal costs, but these related to systems installed two to four years ago.

One Belgian EFTPOS service operator we researched put the cost of a store processor at some $7,250. Where the service provider does not insist on the separation of EFT and POS processors, a separate EFT processor may not be necessary, or the POS processor may simply be upgraded. Retailers quoted equipment costs per store, including terminals and the store processor, of $1,000-2,000 per terminal for a 12- to 25-lane supermarket. Where POS system wiring cannot be used, wiring costs will be an additional expense.

Bank charges reported by retailers ranged from 8 cents per transaction to zero where the banks had provided in-store EFT equipment, and from zero to a payment of 10 cents per transaction from bank to retailer where the retailer provided in-store equipment. Where the retailer undertook networking himself, the associated costs were so large that they dwarfed all in-store costs. Estimates of system maintenance and support costs quoted by organisations we researched varied enormously — from $19 to $500 per terminal per year!

DECISION CRITERIA FOR EFTPOS INSTALLATION

In Figure 3.14 we present a checklist of factors for retailers designed to help in deciding whether or not to go ahead with the implementation of EFTPOS. Most critical are the strategic decisions, which define the business objectives being pursued and consequently the type or types of system that would be required. They will also set the framework for parameters that can be used to evaluate the system subsequently, if a decision to proceed is taken. The decision to implement EFTPOS will also depend on consideration of the following factors:

—What will installation and running costs be?

—What would be the best timing and schedule for EFTPOS implementation?

—What technology, and what expertise, will be needed to implement and run the system?

Checklists covering these factors are given overleaf in Figures 3.15 to 3.17.

A number of strategic decisions on the nature of the EFTPOS service to be provided and discussed below are closely linked to the commercial motivation for offering the service:

—Should the service support in-house cards, cards issued by other organisations, or both?

—Should it support debit, credit or both types of transaction?

—Should the organisation develop an in-house system, or choose an EFTPOS service provider?

In-house cards

The decision to develop an in-house card scheme will depend on marketing and commercial factors related to the scheme itself. But in-house card schemes and EFTPOS can be mutually beneficial: the use of an EFTPOS system for handling in-house credit card transactions can cut the operating costs of the card scheme, make it more flexible and attractive and increase its power as a tool for capturing marketing information. Conversely, support of an in-house card scheme can make the economics of installing EFTPOS more attractive.

If the primary motivation for installing EFTPOS is to support an in-house card scheme, the decision whether to support cards issued by financial institutions is likely to be secondary. Typically, supermarket and hypermarket chains with in-house card EFTPOS systems take decisions on the support of other cards on a store-by-store basis, on commercial rather than technical grounds. It could be argued that supporting bank cards might undermine the attractiveness of the in-house card, but may be necessary to cost-justify the system.

An important issue consequent on the decision to proceed with an in-house card scheme is whether the retailer should manage the scheme himself or contract it out, say to a specialist finance house. This will, however, have only a secondary impact on overall EFTPOS system planning, the decision depending primarily on questions of relative economics and technical expertise, rather than on market-related questions.

Figure 3.14 Checklist of decision criteria for EFTPOS installation

Strategic decisions:

- What business objectives would EFTPOS help achieve (eg cost reduction, marketing advantage, enable in-house credit card to be launched)?
- What transactions would you want to handle electronically (debit, credit card, in-house credit or debit card, or some combination of these)?
- Is an appropriate EFTPOS service available from third parties, or would one have to be developed in-house? If the latter, is the scale of your operation sufficient to make it viable?
- Who would be responsible for marketing the service, and how would it be marketed?
- What benefits would you look for?

Decision criteria on debit EFTPOS schemes:

Marketing advantage conveyed by offering an additional method of payment?

Increased sales per customer?

Risks of cash handling reduced?

Costs of cash and cheque handling reduced?

Bank charges reduced (or ability to charge banks for payment processing)?

Reduced cheque fraud?

Decision criteria on credit EFTPOS schemes:

Credit-authorisation telephone calls eliminated?

Reduced credit card fraud?

Reduced fees to credit card companies?

Credit card slip sorting and handling eliminated?

Decision criteria on in-house credit or debit card schemes:

Is EFTPOS needed to make in-house card scheme viable?

If yes, Ability of the organisation to operate the scheme? (either by managing it in-house, or contracting it out)

Costs and benefits of scheme (marketing benefits, reduced fees to credit card companies, etc)?

If no, More effective credit control?

Increased efficiency or manpower reduction in in-house card scheme operation?

For all EFTPOS schemes:

A better or more attractive service to customers?

Longer opening hours possible?

Opportunities to offer financial services opened up?

Faster transaction times per customer?

Reduction in errors at the point of sale?

Reduction in 'negative float' — payments credited to your account more quickly?

Reconciliation facilitated?

More up-to-date cash management information available?

Customer acceptance?

Figure 3.15 Checklist of EFTPOS cost items

- Terminals
- In-store wiring
- In-store processors/concentrators
- Communications — fixed network costs
  — costs per transaction
- Central processing and switching (or bureau service)
- System installation
- System support and maintenance
- Bank charges
- Staff training
- Marketing and promotion

Figure 3.16 Checklist of issues governing timing of EFTPOS introduction

- When will a third-party-operated system be available?
- Do we want to be leaders with the technology, or to learn from the experience of others?
- Will timing be affected by the need to upgrade point-of-sale or other systems in the organisation?
- Does timing depend on equipment, service or other cost trends?
- How long will system implementation and testing take?
- How long will it take for the system to achieve full acceptance by customers?
- Should a pilot installation be used first, or should we proceed directly to full implementation?

Figure 3.17 Checklist of EFTPOS technological considerations

In addition to the usual criteria for technology and supplier choice, the following factors are particularly important for EFTPOS:

- If a third-party-operated system is to be used, to what extent does it constrain choice of technology?
- Will EFTPOS be integrated with existing equipment, or will EFTPOS equipment stand alone?
- Is an on-line or off-line system required?
- How are communications to be carried, and to what communications standards and protocols must they conform?
- Does the overall system design and the specific equipment chosen allow for our security criteria and, where relevant, for those of a third-party-service operator to be met?
- How can system reliability be ensured?
- What additional functions will the equipment have to perform?
- Is equipment of the required specification available off-the-shelf?

Debit or credit service

The characteristics of existing payment patterns and other commercial factors which lead an organisation to proceed with EFTPOS will to a large extent determine whether it adopts a debit or a credit service. If the aim is to reduce fees to credit card companies, it will be a credit service; if it is to provide an alternative payment mechanism, a debit service. However, the EFTPOS infrastructure is justified on the basis of one type of transaction, the benefits of adding the other may well outweigh the additional marginal costs that may be involved.

The choice is more open if the main motivation for EFTPOS is to support an in-house card scheme. In many cases a debit card scheme would not be viable without EFTPOS, and such a scheme may depend on the existence of a sufficiently fast and flexible national clearing system. Leading-edge retailers prefer to take advantage of EFTPOS to offer their customers the most attractive option — a single card that can be used in debit or credit mode according to preference on any particular occasion.

In-house EFTPOS systems

There are a number of questions that need to be addressed if EFTPOS systems are to be developed in-house:

- How and by whom is networking to be provided, ie how is the collection of EFTPOS communications from retail outlets and the transmission of this information to the appropriate banks to be undertaken.
- Where EFT service operators provide an in-store system as part of the service package, whether a different in-store system for connection to their network should be adopted by the retailer.

IMPLEMENTATION

Once commercial objectives have defined some of the basic parameters of the system, a number of important issues in implementation must be considered, which we discuss in this section:

- Choice of any remaining system parameters, eg on- or off-line operation, verification method.
- Supplier selection, equipment choice and integration with existing systems.
- Networking options.
- Timescales and phasing of the implementation.
- Service marketing.
- Staff training.
- System support.

—Sponsoring the technical development of a proprietary in-store system.

Not all these aspects are necessarily relevant in all cases of in-house EFTPOS system development, although networking is a common denominator.

Perhaps the most important criteria affecting the decision to develop an in-house system are the size and market dominance of the retailer considering it and the type of EFTPOS system he requires. Networking and the sponsorship of technical development are likely to be cost-effective only for the largest retail organisations. And only the most powerful and dominant retailers are likely to be able to force banks to accept their participation in networking or the adoption of their own in-store system, if these activities do not conform to the initial terms of the banks' services.

System parameters

If an EFTPOS service provided by another organisation is being used, all the major decisions on system characteristics will normally already have been taken. If an in-house service is being developed, however, commercial decisions on whose cards to accept and whether to offer credit or debit service will leave some important system parameters undefined. Chief among these are whether the service should be on- or off-line, and the method used to verify the identity of the customer.

The main advantage of on-line working is greater security. An up-to-the-minute check can be made on the status of the card and the funds available in the account. On-line working does, however, incur substantially higher communications costs, and transaction times can be slower because of the need to wait for system response. On-line terminals using less sophisticated technology may be slightly cheaper than off-line terminals.

A number of compromise solutions are available. Early EFT technology offered on-line credit authorisation and verification, but transaction details were downloaded in batch. The more sophisticated programmable terminals now available provide considerably more flexibility, operating basically in off-line mode but switching to on-line if the floor limit for authorisation is exceeded, or for random checks or for checks at prespecified times.

The alternatives for verifying the identity of the customer are the traditional signature and the entry of a Personal Identification Number (PIN). The PIN is much more secure than the signature, which has given rise to the current problems of cheque and credit card fraud. However, the pinpad and communications link to the central computer enabling the PIN to be verified need to be highly secure, and they are therefore costly.

Supplier selection, equipment choice and integration

Key factors in supplier selection and equipment choice vary between retail sectors. For small retailers the choice will be very limited, since they are likely to take equipment provided or approved by their EFTPOS service supplier.

For petrol stations where EFT and POS functions are combined in a single sales office terminal, retailers emphasised the importance of using equipment and software not only fitted to fuel retailing in general, but also capable of being tailored to specific in-house reporting procedures. Simplicity of operation and keyboard layout and the absence of unnecessary functions are considered important. Also, both kiosk EFTPOS terminals and forecourt card readers need to be compatible with existing equipment (pumps, control units, tank gauges, etc) so that replacement can be avoided.

Compatibility with existing equipment, achieving a high level of integration, and also with bank networks and systems, is by a considerable margin the most important issue for the large retail store chains we investigated. Proven system reliability is also an important factor.

A number of approaches to in-store integration are possible:

—Complete integration, with the POS terminal handling both EFT and POS functions over the same communications link.

—Separate EFT and POS terminals and networks, connected at the terminal.

—Separate EFT and POS terminals and networks, connected at the store controller level.

In the absence of standards, the higher levels of integration with existing equipment usually mean choosing the same supplier. In some cases, too, bank networks support proprietary EFTPOS protocols. If retailers feel obliged to use their existing POS system supplier for EFTPOS equipment as well, they are likely to be even more tied to this supplier subsequently.

One large retailer we talked to, who was less then happy with his EFTPOS system, felt that he would nevertheless need to continue with the same supplier because he did not want to jeopardise an already operational system. In this particular instance, the learning costs were very high (it had taken two to three years to master the system fully), and, in his view, the costs of switching to a different system would consequently be enormous.

Chains that operate a decentralised POS equipment purchasing policy may need to integrate EFTPOS with several different kinds of POS equipment. Bespoke technical solutions to such incompatibilities can be achieved, although they tend to be less complete and satisfactory than a single supplier's ready-made solution.

Networking

Networking and centralised processing and transmission of EFT transactions to a number of banks or finance organisations are the major source of costs and perhaps the most critical factor in implementation for the minority of retailers who decide to undertake networking themselves. For example, physically establishing the communications network will be a critical factor in determining the timing of EFTPOS implementation at individual sites.

Timescales and phasing of implementation

There are three important phases in the implementation of an EFTPOS system:

—Piloting and technical testing.

—Installation in all selected retail outlets.

—The build-up of customer usage at each site.

Early EFTPOS installations needed up to four years to test the service and to achieve satisfactory levels of system performance and reliability. Experience and the availability of production equipment have reduced this time, but it still tends to take a year to install a complex system, test out new equipment or trial-market a new EFTPOS-based service such as an in-house EFTPOS card.

After a successful pilot trial, some retailers rapidly install EFTPOS in all their outlets, while others plan a programme phased over a number of years. The need to spread investment over a number of years is the main reason for the latter approach, although some chains introduce EFTPOS into an outlet at the time when it is likely to become cost-effective there. One danger of phasing system introduction over a long period is that the equipment supplier may well make major changes in his product range, as some retailers we researched have found.

Where EFTPOS handles existing credit card transactions only and has no impact on the payment alternatives available to the customer, the problem of customer acceptance does not arise, but where it is designed to support a new payment mechanism such as debit EFTPOS or in-house cards, retailers find that customers need considerable time to accept and adapt to the new payment medium. In the case of debit EFTPOS, the length of adjustment time customers need will depend on their familiarity with the concept of debit cards in general (eg degree of use of ATM machines) and EFTPOS in particular (especially in the same retail sector). Even in the relatively advanced EFTPOS market of fuel retailing in Belgium, operators still estimate that it takes two to three years for usage of a forecourt card reader at a given site to reach its peak.

Site selection and terminal numbers

A retailer operating a large number of outlets, or outlets whose size, turnover or transaction profiles vary widely, may find it economic to install EFTPOS at some locations but not others. In addition to market considerations, implementation costs may also vary from one site to another, depending, for example, on communications costs.

Because of the very competitive environment in which they operate, fuel retailers in particular need to choose sites where EFTPOS is likely to be economic, although definitions of what constitutes an 'economic' site differ. In the UK, for example, the most important factor is seen to be turnover. In the US Mobil has developed a set of interlinked criteria, in particular total business volume, volume of credit card sales and cost of connecting the site to Mobil's communications network. (Mobil's EFTPOS system is described in more detail on page 62.)

In addition, retailers with multiple points of sale on each site, and particularly supermarkets and hypermarkets, need to decide whether to equip all checkouts for EFT or only a few. We found examples of both strategies but as terminal costs fall and debit EFTPOS becomes more widely accepted as a payment medium more establishments are likely to equip all checkouts. This will also be the only viable strategy where credit card transactions are handled by EFT.

Service marketing

There is unanimous agreement among the organisations we researched on the importance of marketing and promoting EFTPOS services. In general, two kinds of promotion are required:

—Generic, mass-media advertising to develop customer awareness of the service.

—Marketing at the point of sale to remind the customer of the availability of EFTPOS as a payment alternative.

Generic advertising is beyond the scope of small retailers and therefore needs to be undertaken, at least in their case, by the service provider.

Marketing at the point of sale is seen to be particularly important in promoting usage and ensuring that the

potential benefits of EFTPOS are realised. It has a number of major purposes;

- To remind the customer that EFTPOS is available as a payment alternative in the store.
- To teach the customer how to use EFTPOS.
- To indicate the points of sale at which EFTPOS is available, and whether they are also open to other types of payment.

Checkout staff also have an important role in selling EFTPOS to the customer and showing him how to use it, but properly designed displays will reduce the burden on them and speed checkout transactions.

Staff training

Experience has shown that appropriate training of staff at the point of sale is critical to the achievement of faster transaction times, minimisation of system problems and successful selling of EFTPOS service to the customer. It also determines to a large extent whether the introduction of EFTPOS has a positive or negative effect on staff morale. Indeed, many of the problems with early EFTPOS systems have been attributable to inadequate training and motivation of checkout or point-of-sale staff. Even retailers who have taken the development of staff training programmes seriously have found it necessary to modify and intensify the programme to achieve acceptable levels of performance.

System support

System support is an important consideration in ensuring the reliability and availability of EFTPOS systems, as it is for other complex systems. Two aspects have been found to be particularly significant for EFTPOS — help for staff at the point of sale and fault diagnosis and repair. The former is likely to be a particular problem for fuel retailers, who tend to have large numbers of widely scattered sites with only a small number of staff at each. One fuel retailer reports that providing help and advice for service station attendants required setting up a central 24-hour help desk to cope with problems — a much bigger undertaking than was envisaged at the outset.

Equipment maintenance and technical system support costs vary widely among equipment providers and among EFT service providers. As already noted, estimates of maintenance costs per terminal varied among supermarket operators we interviewed from $19 to $500 per year. Similarly, estimates of system support costs vary widely.

SUMMARY

Retailers are still extremely cautious about introducing EFTPOS. Much current experience with the technology is still too recent and scant to shed sufficient light on many of the benefits that may be achieved. As a consequence, most retailers insist on seeing clear benefits in terms of cost savings, as opposed to marketing advantages. However, and although cost savings are achieved, say, by savings in float or bank charges, the experience of EFTPOS pioneers demonstrates that in many cases the marketing advantages, be they faster throughput of customers or 24-hour operation, can deliver the most value. Retail operations will vary on the kinds of benefits they are most likely to achieve and we have presented and discussed decision criteria designed to help retailers in making a decision that is likely to have far-reaching consequences for their business.

CHAPTER 4

EFTPOS: THE CURRENT STATUS AND FUTURE OUTLOOK OF THE MARKET

It is not without reason that in some countries EFTPOS is very advanced while in others it is barely in the early trial stages. Different cultures, different payment habits, and different retailing and banking structures determine the propensity for EFTPOS to be adopted. These factors also affect the nature and segmentation of the supplier market and the future outlook for EFTPOS in each country.

We begin this chapter by discussing the main reasons that underlie the differences in EFTPOS development and describe the situation in the major countries and in those where EFTPOS is most advanced. Although the scope of our report is Europe, we also review the main developments elsewhere in the world.

We then describe suppliers of EFTPOS services and equipment and discuss how the market is segmented from the suppliers' point of view; we also provide our analysis of future market trends and our forecasts. The forecasts are based on a model which takes into account the environment that governs the timing of adoption and growth of EFTPOS in different countries.

REASONS UNDERLYING THE DIFFERENCES IN EFTPOS DEVELOPMENT

The extent to which EFTPOS is developed and the types of organisations pioneering its use vary considerably from one country to another. The status of EFTPOS in several major countries is shown in Figure 4.1. The reasons underlying the differences are many, but the most significant are current payment practices and the local structure of the banking and retail sectors.

Payment practices

The nature of current payment practices in each country (as indicated in Figure 4.1) is an important factor determining the extent to which EFTPOS has developed. In particular, where use of cheques and credit cards is widespread, the motivation to adopt EFTPOS is highest.

The costs associated with cheque handling are a major incentive for banks to look at electronic alternatives, and the extent to which cheques are used is therefore important in determining EFTPOS growth. The use of cheques is particularly widespread in the United States, France, and the United Kingdom, but much less so in Germany and the Netherlands (where giros account for a much greater share of non-retail payments than cheques) and in Italy, where great reliance is still placed on cash. EFTPOS is, therefore, a much more important development for the banks in the former countries than in the latter.

Similarly, both retailers and companies operating credit card schemes tend to be motivated to adopt EFTPOS in order to reduce credit card slip handling and the associated costs and inefficiencies, such as delays in funds being credited to the retailer's account. This applies particularly to countries such as the UK and the USA, where card usage is high.

Structure of the banking system

The relationship between cheque and credit card usage and EFTPOS development indicated in Figure 4.1 is not, however, a simple one, and the structure of the banking system has also profoundly affected the way EFTPOS has developed in different countries to date. Thus, in the UK the number of clearing banks is smaller than in most other countries, making it, in principle, easier for them to reach agreement. Coordination between them has allowed a joint approach to planning the development of a national EFTPOS system.

By contrast, in the US the large number of banks and their unwillingness to cooperate have largely prevented the establishment of EFTPOS services able to attract a sufficient volume of transactions to be viable, although US banks could, in theory, benefit from less cheque usage at least as much as those in the UK. In some cases, retailers with sufficient local or national coverage have been able to establish systems instead. However, the structure of the US banking system is determined by legislation at both national and state level, and in some states regulation has favoured the development of shared ATM networks. The existence of such networks and the basis of cooperation on which they depend, means that a significant barrier to EFTPOS introduction has

already been overcome, albeit at state rather than national level.

However, national coordination between banks to introduce EFTPOS is not necessarily a prerequisite for success. It is notable that in those European countries in which EFTPOS is furthest advanced, namely France and Belgium, its spread has been stimulated by competition between rival commercial networks. Only now that the market in both countries has reached a certain degree of maturity, have the advantages of a single network outweighed those of independent growth, and in both countries the rival networks have agreed to cooperate, interworking their services.

By contrast, in those countries where a coordinated approach has been adopted, notably in the UK and West Germany, progress has been slowed by disagreements over tariffs, standards and roles. In some countries where the basis for a coordinated approach by the banks exists, notably in Sweden and Norway, the initiative has in fact been taken by retailers.

The structure of the retail market

The benefits of EFTPOS are more clear-cut for some retail sectors than others. Retail markets with large chains of retail outlets will tend to accept EFTPOS more readily, both because card and cheque usage tends to be high in such establishments and because they are sizeable enough to have the power to negotiate with the banks. By contrast where the retail market consists mainly of small independent retailers, there will be less propensity to adopt EFTPOS, even if the total retail market is large. (These differences in the structure of the retail market in different countries are taken into account in our forecasts, and Figures 4.12 and 4.13, on page 47, give the total number of retailers and the number of retailers likely to adopt the technology, based on the structure of the retail market in each country.)

Interaction between different factors

None of the factors we discussed appears to have been sufficient by itself to determine the extent of development of EFTPOS. For example, the retail market structure in West Germany is in principle favourable, as it includes many large chains, but current payment practices and the banking structure are not. As a consequence, the German market is highly underdeveloped, compared to the UK and France and even smaller countries such as Belgium. In addition to the main overall factors that influence EFTPOS development in any country, there are also particular local circumstances that have encouraged the (albeit still piecemeal) development of EFTPOS in some countries. We discuss these in the next section where we describe developments country by country.

THE CURRENT STATUS OF EFTPOS IN VARIOUS COUNTRIES

We describe and discuss EFTPOS developments in both European and non-European countries in this section. Figure 4.2, overleaf, provides an overview of the status of EFTPOS in different countries in mid 1985. Although several countries in Europe lead in terms of EFTPOS development, some interesting trials and services exist outside Europe. The position in each country is changing rapidly, however, and we review major trends below in each country or geographic area.

Europe

Overall, two countries, France and Belgium, are the

Figure 4.1 Payment practices and EFTPOS development in different countries

	EFTPOS terminals installed [1]		*Volume payments per inhabitant per year*	
Country	*Total*	*Inhabitants per terminal*	*Cheques*	*Credit card*
Germany	50	—	10	0.1
Italy	60	—	10	0.07
Netherlands	0	—	8.5	small
Sweden	>1000	<8,300	15	5
Belgium	2,500	3,900	10	N/A
France	50,000	1,080	60	2
Switzerland	20	—	10	0.5
UK	330	170,000	45	6
USA	6,000	40,000	170	12

Notes: [1] Estimate, August 1985.

Figure 4.2 Status of EFTPOS in European countries

Country	*Status of EFTPOS*[1]	*EFTPOS terminals installed*[2]	*National coordination of EFTPOS*	*Retailer initiatives*
Austria	**	<10	Almost all major banks and financial sectors to participate in Bankomat EFT network.	
Belgium	*****	2,500	Mister Cash and Bancontact, the two competing EFTPOS networks, have now agreed to interwork.	GB-Inno-BM
Denmark	****	600	National Dankort scheme operated by PKK (the national bank card company).	
Finland	**	<100	Mostly authorisation telephones only. EFTPOS network under discussion.	
France	*****	50,000	Most banks nationalised. Tariffs being negotiated nationally. Government promotion of smart card technology. Carte Bleue and Credit Agricole, largest EFTPOS system operators have formed Groupement-Carte Bancaire to establish a national interbank EFTPOS system.	Carrefour and other hypermarkets, fuel retailers (eg Total, Shell)
Germany	***	50	Banks coordinating through the Gesellschaft für Zahlungssysteme.	
Italy	***	60	Trials conducted under auspices of Italian Bankers Association (ABI) Credit card companies undertaking joint trial.	
Luxembourg	****	250		
Netherlands	*	0	All banks, major oil companies except one have agreed to participate in trial.	
Norway	****	600	Infrastructure exists for national system: there is a national bank card and commercial and savings banks EFT networks interwork.	Fuel retailers (Esso, Shell, Norol)
Spain	***	250		
Sweden	****	1,000-1,500		
Switzerland	**	20	PTT, Nationalbank and major commercial banks preparing initiative.	Fuel retailers
UK	****	330	Committee of London Clearing Bankers, coordinating national development.	House of Fraser

Notes: [1] Relative status of EFTPOS:
***** Extensive commercial service
**** Limited commercial service
*** Extensive trials
** Limited trials
* No trials yet under way

[2] Estimate, August 1985. The installed base of EFTPOS terminals is rising rapidly in all countries.

most advanced in terms of current EFTPOS development in Europe. The UK, Luxembourg and the Scandinavian countries follow. EFTPOS is least developed in West Germany, the Netherlands, and in the remaining European countries.

France

France is unquestionably the most advanced country in Europe in terms of the current extent of installation of EFTPOS.

The market has developed in a number of distinct sectors:

—Bank networks.

—Smart card applications.

—Supermarket chains.

—Petrol stations.

Figure 4.3 shows the installed base of terminals in each of these sectors in France.

Figure 4.3 The installed base of EFTPOS terminals in France

Sector	*No. of terminals installed*
Bank networks	40,000
Smart card terminals (including payphones)	3,000
Supermarket chains (in-house cards)	5,000 terminals (100 stores)
Petrol stations	2,500

The Crédit Agricole and Carte Bleue credit and banking organisations have developed EFTPOS systems supporting some 20,000 terminals each and accepting their respective magnetic stripe credit cards ('Carte Verte' in the case of Crédit Agricole). The terminals are installed in all types of retail establishments. Both systems are off-line but differ in the procedure for downloading transaction data. In the Crédit Agricole systems the central computer polls the terminal, whereas in the Carte Bleue system the terminal initiates the call.

The two organisations have now agreed to operate as the Groupement Carte Bancaire in the development of a joint system using hybrid smart/stripe cards. Both debit and credit EFTPOS options are likely to be available. Plans include the ordering and placing of 70,000 EFTPOS terminals by the end of 1988. In addition, they hope to distribute 300,000 'certifiers' (small terminals which will accept smart card payments but have no communications facilities; transaction details are recorded on paper vouchers for the bank instead — see Appendix 1 for a more detailed description). Under the terms of the agreement, the existing Crédit Agricole and Carte Bleue systems are also to be made compatible.

Three trials of smart cards involving a total of 650 terminals were initiated in Blois, Lyon and Caen in 1982. In addition, the PTT is conducting a programme of installing smart card payphones: 17,000 are expected to be installed by the end of 1985. The use of smart cards in public transport is also being tested, but the next step for smart card technology in the retail sector as a whole is the Groupement Carte Bancaire proposal for hybrid cards.

Developments in major hypermarket and supermarket chains have been proceeding along an independent path. A number of major chains have developed EFTPOS services using in-house cards, and there are now some 5,000 terminals in approximately 100 shops. Carrefour operates the largest system, with 3,300 terminals in 45 stores. In constrast to the other EFTPOS terminal markets, which are dominated by domestic suppliers, the market leaders in this sector are IBM and NCR.

Finally, the major oil companies are developing their own EFTPOS networks. Total, for example, has installed terminals at 1,000 petrol stations, with 2,000 more on order, and Shell is installing 1,400 terminals at its petrol stations.

Belgium

The Belgian EFTPOS market is one of the most advanced in Europe, second only to that of France. The development of the market was initially driven by the competition between two rival bank networks, Bancontact and Mister Cash, offering on-line debit services. The incompatibility between the two networks increasingly impeded development, and these two network operators therefore agreed that the networks should interwork, allowing the cards of each to be used at the terminals of the other.

The current Belgian market for EFTPOS divides clearly into three sectors: fuel retailing, large stores and smaller shops (see Figure 4.4).

The petrol station market has already been substantially penetrated, with over 1,300 out of 7,000 sites already equipped with forecourt card readers, and with the ultimate potential market in this sector estimated to be 5,000 petrol stations. Other retail establishments make up the total of some 2,500 terminals installed in Belgium.

Figure 4.4 The Belgian EFT market

Type	*Total installed base of all terminals*	*Total potential market estimated*	*Projected installed base 1990*
ATMs	675		
EFTPOS: oil sector	1326	5000	4000
EFTPOS: large retailers	23 (stores)	83 hypermarkets 438 supermarkets 10,000 checkouts	521 stores
EFTPOS: small retailers	565	80,000	30,000

Source: Bancontact and Generale de Banque, 1985.

The large-store market has been the most affected so far by the incompatibility between the two EFTPOS networks. Several chain stores are equipping a single store within their chain on a trial basis. The agreement between the two networks to interwork their systems may now help this market take off. Both networks have also installed several hundred terminals in smaller shops, but the economic case for EFTPOS in this sector is more doubtful as, for example, the experience of the Pauli chain of bookshops, described on page 60, illustrates.

United Kingdom

A national scheme for on-line debit EFTPOS is being developed by the Committee of London Clearing Bankers (CLCB), but it is not expected to be fully operational before 1988. In the meantime, a number of services have been developed and trials are being undertaken.

The Clydesdale Bank has installed terminals in 26 petrol stations (the first was installed in 1982) and one supermarket. Three further trials have been announced: Barclaycard, the credit card company, with 1,000 terminals, initially at Brent Cross (near London) and accepting credit cards only; Midland Bank, with 30 terminals at Milton Keynes; and the National Westminster Bank, with terminals at 25 petrol stations. In addition, the Anglia Building Society started a trial at the end of October 1985 with over 100 terminals in Northampton.

Cresta, a small UK service supplier backed by British Telecom has recently launched a service called Teletran, offering on-line authorisation and off-line data capture for credit card transactions.

EFTPOS in fuel retailing has developed ahead of other retail sectors. Some 300 petrol stations now have EFTPOS terminals installed, mostly off-line systems at sales offices used to handle credit card transactions (see Figure 4.5).

Off-line credit card-handling systems, downloading transaction details to the credit card companies via BACS (the automated clearing-house for commercial banks), are beginning to appear in other sectors.

Figure 4.5 EFTPOS in UK fuel retailing

Total fuel stations	25,000
Fuel stations suitable for EFTPOS	6,000
Current total EFTPOS sites	300
Debit card sites, on-line	26
Credit-card sites, on-line	53
Credit-card sites, off-line	220

Note: Estimate, August 1985.

Luxembourg

Luxembourg is well advanced in terms of EFTPOS, with Crédit Européen operating an EFTPOS system for both debit and Visa credit card transactions. The system supports 200 on-line and 20 conventional off-line terminals, and the installation of a further 300 off-line hybrid card terminals is in progress, with some 30 of these installed by mid 1985, making up the total of some 250 terminals installed at that time.

Scandinavia

The market for EFTPOS at petrol stations has developed in Norway, Sweden and Finland, although differing approaches have been taken in the different countries. Activity in other sectors has been limited so far.

Overall, some 600 EFTPOS terminals are installed in Norway, the large majority in petrol stations. Two major oil companies, Shell and Esso, are operating on-line systems using bank debit cards. Together they serve some 200 petrol stations. Norol, the other major Norwegian oil company, operates an off-line in-house credit card system for 70 petrol stations.

In Norway, the IDA (the banks' data processing organisation), the PTT, and a number of Norwegian banks are also setting up a smart card EFTPOS trial in Lillestrom. A total of 36 POS terminals and 24 smart card payphones are being installed.

The Norwegian commercial banks and savings banks each have a jointly owned EFT network, and the different networks now interwork, giving Norway the basis for a national EFTPOS service.

In Sweden, some 1,000 to 1,500 terminals have been installed by oil companies, and they accept credit cards and in-house debit cards. Thus, Esso has developed an in-house debit card scheme operating at 164 petrol stations, and Shell is now following suit. In addition, an on-line trial system comprising some 400 terminals has been installed, covering different retail sectors in large cities. However, in Sweden most retail payments are made in cash, providing little incentive for EFTPOS development.

Denmark is developing a national EFT service coordinated by PKK, the national bank card company. Some 600 EFTPOS terminals are installed and current plans envisage a total of some 10,000 by 1988. Although the PKK coordinates the system, terminals are ordered by and available from the PTT. The terminals are manufactured by Great Northern Telecom. At present, only bank cards are accepted, but the system will be opened up to all types of card.

In Finland, EFTPOS is still in its very early stages,

although a small number of credit authorisation terminals (less than 100) have been installed, and an EFTPOS trial was carried out in 1983/84. But savings banks and cooperative banks have now come to an agreement and are expected to develop an EFTPOS network.

Germany

In Germany, the banks and savings institutions are cooperating with the Gesellschaft für Zahlungssysteme (GZS), an organisation which is responsible for organising the development of EFTPOS on a national basis. Activity is at present limited to trials: a small trial using off-line operation in Munich with just 17 terminals has been joined this year by an on-line trial in Berlin, where 100 terminals are to be installed by the end of 1985, and another in Frankfurt, where over 500 terminals will be connected over the next two years. The Eurocheque cheque guarantee card is being used in all cases.

In addition, the Deutsche Bundespost is conducting a trial with 30 smart card pay telephones.

The Netherlands

The efficiency of the existing payments system in the Netherlands has delayed interest in EFTPOS, but a trial at about 60 petrol stations in the Eindhoven/Tilburg region is planned to start by early 1986, with the participation of all the banks and a number of oil companies. The intention is that terminals will combine on-line and off-line solutions.

Other European countries

Italy has come late onto the EFTPOS scene, but a number of trials are starting. Its major credit card companies are planning a 1,500-terminal off-line trial and Bancomat has launched a 60-terminal on-line trial using its ATM debit card. A 35-terminal smart card trial was conducted in Bormio in Spring 1985 under the auspices of the Italian Bankers Association (ABI); this trial was of limited duration and has been discontinued.

A trial with over 1000 terminals is planned for 1986. The terminals are to be installed in various types of retail outlets located in six regions throughout Italy. The trial is open to banks linked into the Bancomat ATM system, the objective being to take advantage of the 3.2 million Bancomat cards in circulation in Italy.

In Spain savings banks are running trials in Pamplona and Madrid of 130 and 100 terminals respectively. The Madrid trial is to be expanded to 1,000 terminals.

In Austria, for the last three to four years an EFTPOS trial has been running in Salzburg, involving the Salzburger Sparkasse and the Interspar chain of supermarkets. However, under the umbrella of GABE (Geldausgabe Automation Services), which runs the Bankomat network of ATMs, the Austrian banks have started a pilot trial in December 1985, beginning with the installation of a Nixdorf terminal at a railway station in Vienna. The system will be supported by all the major Austrian banks.

In Switzerland, only some 20 terminals have so far been installed at petrol stations (eg Shell, Migrol), but the number is expected to rise. The Swiss are planning a large trial and have set up a working party consisting of the banks, the PTT and a number of retailers to evaluate alternatives. The system is expected to start before 1990.

The Americas

EFTPOS services are being developed in countries in both North and South America.

In the USA, the MasterCard MAPP credit card network supports some 28,000 terminals. ATM networks, eg the Iowa Transfer System and Network Exchange, are also connecting EFTPOS terminals, and retailers, notably some oil companies, are installing their own systems.

In Canada, the Hudson Bay Company has 300 stores on-line for credit card transactions, and small debit EFTPOS trials are under way. In Brazil, about 150 petrol stations now use EFTPOS.

Australasia

Australia appears to be embracing EFTPOS enthusiastically, with some 1,400 terminals now operating. Of these, the Westpac and Commonwealth Bank networks, which have now reached an interworking agreement, account for some 1,200. A national standard has been agreed for terminals, but the principles for network sharing on a national basis are still being discussed. Non-bank institutions such as building societies are also interested in participating in a national network.

In New Zealand, three EFTPOS schemes are being developed, by the Bankers Association, Trusteebank, and EFT (an independent network operator part owned by Fletcher Challenge, one of New Zealand's largest companies).

Far East

In Hong Kong the 29 major banks have organised an EFTPOS trial to last until the end of 1985. The 'Easy Pay System' has 270 terminals installed in 100 shops owned by some 40 different retail organisations. The system accepts both debit and credit cards but at present provides only transaction authorisation and not data capture for credit cards.

In Singapore, an EFTPOS pilot, 'Network for Electronic Transfers' (NETS), has been launched by five major banks, with 65 terminals installed in 30 retail establishments of the twelve retailers who are participating. Ten thousand customers have been issued with suitable debit cards.

A number of trials are also taking place in Japan, some using smart card technology.

PRODUCTS AND SUPPLIERS

Which suppliers are active in the EFTPOS market? What kinds of products do they offer? How is the market segmented in terms of requirements for equipment? And how is it likely to develop? These are all questions of concern to both users and suppliers of EFTPOS and are addressed in this section. The information is based on a survey of 25 major suppliers undertaken for this study.

Characteristics and segmentation of the equipment market

Several conclusions about the market for EFTPOS equipment emerge from our research in terms of its segmentation, maturity and product requirements in different retail sectors.

National market segmentation and differences in market maturity

The market is clearly segmented along national lines. Within each country EFTPOS is being coordinated on a national basis, or, alternatively, banks and retailers with national network coverage are taking initiatives. There has been some discussion at international level on the need to allow customers to use their bank cards outside their country of origin, and multinational equipment suppliers are seeking to sell equipment working to the same proprietary standards in a number of countries. However, the impact of these homogenising trends on the overall picture has been a minor one so far.

In most European countries the market for EFTPOS equipment has not yet developed beyond the trial installation stage. The installed base of equipment is small, and although the scale of trials may be expected to increase, in most cases plans for full commercial service still have to be finalised. In particular, the specification of the equipment to be used and the technical standards to which it will have to conform have yet to be agreed upon.

The exceptions to these general observations are France, Belgium and Luxembourg. Here, EFTPOS is a commercial reality in most sectors, except perhaps among small retailers, where it has yet to prove its commercial viability.

In the UK and in Scandinavian countries, commercial EFTPOS services have developed in fuel retailing, albeit in different forms in each case. In the UK the requirement now is predominantly for credit card handling, accounting for some 90% of current EFTPOS installations. Of credit card installations most (80%) are off-line. Almost all EFTPOS terminals are housed in the sales office; however, there are about 30 experimental forecourt card readers.

In Norway, Esso and Shell operate bank card debit systems, but the third large Norwegian oil company, Norol, and all companies with EFTPOS fuel stations in Sweden use EFTPOS off-line for their in-house credit card schemes. Extensive use is made of fourcourt card readers in Norway and Sweden, but EFTPOS payments may also be made in the sales office to encourage sales of other goods as well as fuel.

Differences in product requirements between retail sectors

There are differences between retail sectors in terms of both market development and product requirements. The fuel retailing sector has the highest penetration of EFTPOS systems in most countries. Supermarkets and hypermarkets have also taken EFTPOS initiatives to a significant degree. In France and Belgium, a broader spread of retailers, albeit predominantly large ones, have begun to use EFTPOS significantly.

The differences in product requirements between sectors depend on the constraints placed by the banks on the way the service is implemented. Where they insist on complete separation between retail point-of-sale systems and electronic funds transfer equipment (except perhaps for a connection at cash register or store controller level to allow purchase totals to be transferred to the funds transfer system), EFT terminals must stand alone, and there is relatively little scope for differentiation to suit different retail sectors. However, general types of configuration for in-store EFT equipment have evolved to suit the requirements of petrol stations and large retail establishments. (Further variations may be anticipated when EFTPOS begins to make headway in other sectors, where requirements are likely to differ yet again.)

A typical EFTPOS configuration for a petrol station is shown in Figure 4.6. This kind of layout, with EFT integrated with POS functions, is the most common in the UK and Scandinavia. The card readers may incorporate pinpads if PINs are being used for verification. In Belgium, however, forecourt card readers usually operate as self-contained EFTPOS terminals.

Figures 4.7 and 4.8 show two possible EFTPOS

Figure 4.6 Typical configuration for a petrol station EFTPOS system

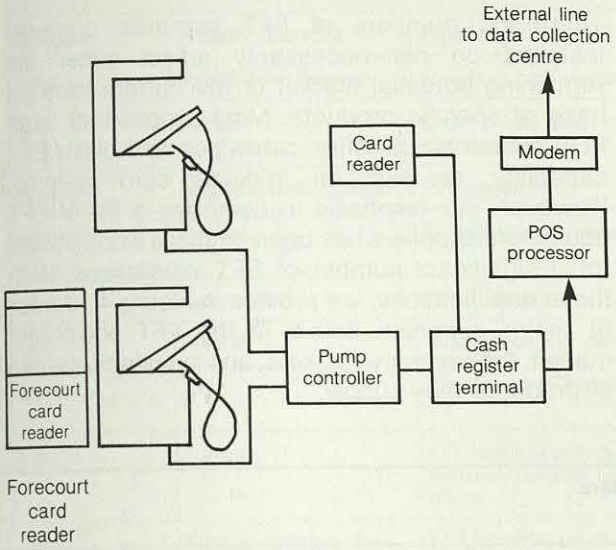
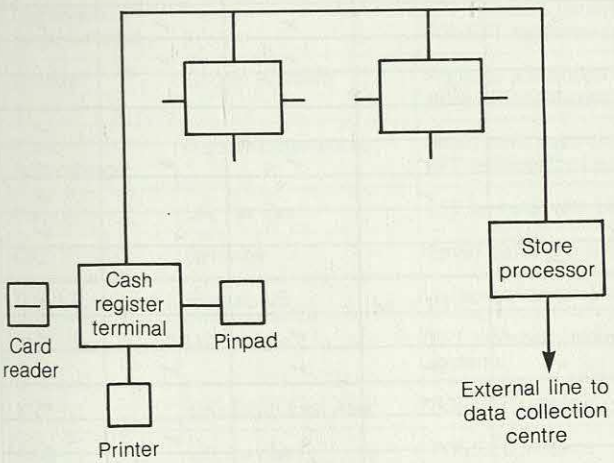


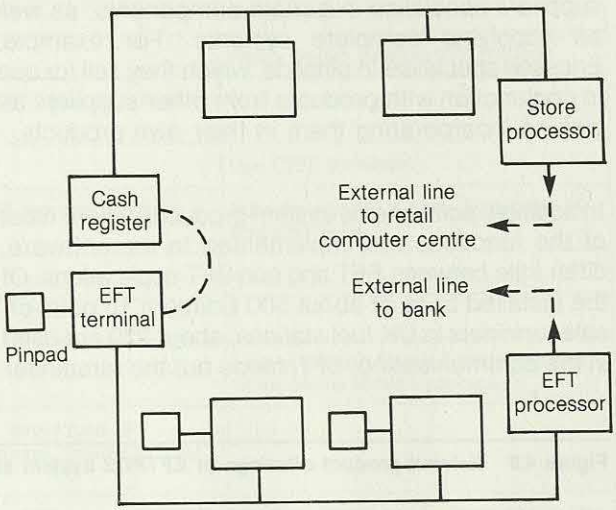
Figure 4.7 Integrated EPOS/EFT system for a large retail establishment



configurations for a large retail establishment. Figure 4.7 shows an integrated EFT and EPOS system such as might be suitable, for example, for an in-house credit card operation. In this and the other configurations described in this section the card reader and receipt printer are often integrated with the cash register terminal (or EFT terminal, where applicable).

Figure 4.8 shows a configuration where separation between POS and EFT systems has been ensured. Purchase values may be communicated from the cash register to the EFT terminal if a link between the two is provided, or they may have to be rekeyed into the EFT system. The two system configurations illustrated represent extremes, and intermediate approaches are also possible.

Figure 4.8 Separate EFT and POS systems in a large retail establishment



The customer with prime responsibility for system specification may be either a retailer or a bank, and their differing priorities are reflected in system design requirements. Retailers tend to prefer integrated approaches. But for a banking organisation (which may subsequently sell, rent or loan terminals to retailers) security considerations dictate a preference for separate solutions. These different priorities may also be reflected in criteria used to choose a supplier, depending on whether the retailer or the bank has the ultimate say.

Suppliers

Supplier activity in the EFTPOS field also reflects the fragmentation of the market along national lines. In most countries, national companies are taking the lead, in particular where EFTPOS development is being nationally coordinated or where the banks are taking the initiative. Examples are Nixdorf in Germany, Olivetti in Italy, and a number of domestic manufacturers in France. ICL, Racal and Fortronic are prominent in bank-driven systems in the UK, as Prodata, Cableprint and GTE/ATEA are in Belgium. Where retailers are taking the initiative, established retail suppliers, notably IBM and NCR and the Scandinavian suppliers of petrol station equipment, are prominent.

EFTPOS is still a new market, and equipment suppliers are converging on it from a number of different product areas, notably banking systems, retail systems and communications products (see Figure 4.9 overleaf). The extent to which their approach to EFTPOS reflects their prior experience is notable, and at present they appear strongest at selling to their existing client base, rather than to new customers.

Two main factors complicate an analysis of the supplier market. First, most EFTPOS systems comprise a number of components, and some suppliers specialise in certain components, as well as supplying complete systems. For example, Ericsson specialise in pinpads, which they sell for use in conjunction with products from other suppliers as well as incorporating them in their own products.

In addition, point-of-sale system products, where most of the functions are implemented in the software, differ little between EFT and non-EFT applications. Of the installed base of about 500 Edacom 10 point-of-sale terminals in UK fuel stations, about 220 are used in the communicating, EFT, mode but the remainder could be upgraded through software modifications and the addition of a cardwipe and modem.

Therefore, numbers of EFT terminals currently installed do not necessarily reflect either the remaining potential market or the current installed base of specific products. Most suppliers of large POS systems now offer cardwipes and claim EFT capability, at least for in-house card systems. However, our emphasis in compiling a list of EFT equipment suppliers has been on those who account for a significant number of EFT installations. With these qualifications, we provide in Figure 4.10 a list of major suppliers active in the EFT equipment market, their primary markets, and the principal types of products they supply.

Figure 4.9 Related product offerings of EFTPOS system suppliers

Supplier	*ECRs*	*POS systems*	*Fuel retailing systems*	*Authorisation telephones*	*ATMs*	*Bank terminals*	*Telecommunications products*
Autotank			✓				
Bull					✓	✓	✓
Burroughs					✓	✓	
Casio	✓						
CKD							✓
Cableprint[3]		✓	✓	✓	✓	✓	✓
CSEE				✓			✓
Crouzet		✓					✓
Dresser Wayne			✓				
Edacom		✓	✓				
Electronique Serge Dassault		✓		✓	✓	✓	✓
Ericsson[2]			✓	✓	✓	✓	✓
Flonic Schlumberger				✓			✓
Fortronic						✓	
GTE/ATEA				✓			✓
IBM		✓			✓	✓	✓
ICL		✓		[4]		✓	[4]
NCR	✓	✓	✓		✓	✓	
Nixdorf		✓	✓		✓	✓	✓
Norfrond		✓					
Olivetti	✓	✓	✓		✓	✓	
Omron	✓	✓		✓	✓		✓
Philips		✓			✓	✓	✓
Prodata		✓	✓				
Racal				✓			✓
RTC		✓	✓				

Notes:
1. Crouzet produces automatic vending equipment.
2. Ericsson also have connections with Autotank, a wholly owned subsidiary, and a minority shareholding in Edacom.
3. Cableprint is a subsidiary of the ASLK bank of Belgium.
4. ICL is now a subsidiary of STC, who produce authorisation telephones.

Figure 4.10 Major EFTPOS equipment suppliers active in European and other countries

Company	*Primary markets*	*Products*	*Comments*
Autotank	Scandinavia, Belgium	Forecourt card reader	Wholly owned subsidiary of Ericsson
Bull	France	Smart cards, smart card EFT terminals, smart card certifiers	
Burroughs	Australia, New Zealand	EFT systems	Use CSEE terminals
Cableprint	Belgium	Forecourt card reader, EFT terminal, pinpads	Subsidiary of ASLK bank. Distributed by Ambitron in UK.
Casio	Japan, US	Smart cards	
CKD	France	Smart/stripe EFT terminal	
Cresta	UK	Credit card EFT terminal	Rented through British Telecom as part of an on-line service package
Crouzet	France	EFT terminal with pinpad, smart card EFT terminal, portable EFT terminal, smart card pay phone	
CSEE	France, Australia, New Zealand, Hong Kong	EFT terminal, petrol-station EFT terminal, mixed-card EFT terminal	Products distributed by Burroughs in Far East
Dresser Wayne (Ljungmans)	Scandinavia	Petrol-station systems, forecourt card reader	Systems incorporate Datapoint 1560 mini as station processor, Edacom 10 cash terminals
Edacom	Scandinavia, UK	POS systems with EFT capability	Primary market fuel retailers
Electronique Serge Dassault	France	EFT terminals, smart card EFT terminals, POS/EFT systems, authorisation telephones	
Ericsson	Europe, Australia	Pinpads, authorisation telephone, EFT terminal, store EFT controller	
Flonic Schlumberger	France, Luxembourg	Smart card payphone, smart cards, smart card EFT terminals, mixed card EFT terminals	
Fortronic	UK, Far East	EFT terminal with pinpad	Distributed by ICL in Far East
GAO	Germany	Smart cards	
GTE/ATEA	Europe, US	Authorisation telephone, EFT terminal, pinpad	Joint venture with Ferranti in UK
IBM	US, Europe	EFT terminals, store controllers, POS/EFT systems	
ICL	UK, South East Asia	POS/EFT systems	
NCR	US, Europe	POS/EFT systems	
Nixdorf	Germany, Scandinavia, UK	EFT terminals, POS/EFT systems	
Olivetti	Italy	EFT terminals, EFT/POS systems	
Omron	Far East, Australia	EFT terminal, authorisation telephone, POS/EFT systems	
Philips	France, Holland	Smart cards, smart card EFT terminals, mixed-card EFT terminals, petrol-station EFT terminals	
Prodata	Belgium	EFT terminals, petrol-station EFT terminals, EFT store processors	
Racal	UK, Australia, Scandinavia, Far East	EFT terminal with pinpad, authorisation telephone	
RTC	UK	Petrol-station EFT terminal, POS systems with EFT capability	
Siemens	Germany	Smart card payphone	
Toshiba	Japan	Smart cards, smart card EFT terminal	

THE MARKET FOR SMART CARDS AND SMART-CARD-RELATED TECHNOLOGIES

Smart card technology is now emerging from the development phase. Its development and use is led by France, where ambitious plans have been laid down, but the technology is also being tested in other countries.

The French banks have set up a consortium, the Groupement Carte Bancaire, to exploit smart card technology, and have drawn up ambitious plans to introduce smart cards nationwide over the next four years. They are planning to issue over 16 million cards supplied by Bull and Philips at an average price of $2.94 per card (see Figure 4.11). The first stage, to take place in 1985/1986, calls for the distribution of 3 million cards in four regions, Britanny, Normandy, Lyon and the Cote d'Azur. The plans also envisage procuring 70,000 EFTPOS terminals, to accept both smart and magnetic stripe cards, and 300,000 certifiers. (These are small stand-alone devices costing about $50 each which check the PIN entered by the customer against the number stored in the card and display a confirmatory code for recording on a paper receipt by the retailer and subsequent checking by the bank.)

The French PTT is also investing in smart card technology for its public telephones and for use in conjunction with its videotex service. It is installing smart card payphones at a rate of 15,000 per annum, a process which started in late 1984, and has ordered 500,000 prepaid memory cards and 350,000 intelligent cards. It has also ordered 50,000 card readers for connection to its Minitel videotex terminals, to be available from end-1985 at a monthly rental of some 40 FF ($6).

Outside France, smart cards are being evaluated in trials in Germany, Italy and Norway. The cards are also being tested in Japan.

Most significant perhaps for the future of smart cards is the fact that the international credit card organisations Visa and MasterCard are evaluating them. MasterCard are planning two trials in the US with smart cards supplied by Bull and Casio.

Figure 4.11 The smart card programme in France

Over 12 million smart cards have been ordered from Bull, according to the following programme:

200,000 in 1985
3,000,000 in 1986
4,000,000 in 1987
5,000,000 in 1988

A further 4 million are to be ordered from Philips

FUTURE DEVELOPMENTS IN EFTPOS TECHNOLOGY

Technical and product developments over the next few years are likely to be characteristic of a maturing market, and most suppliers do not anticipate radical developments. In fact, the view among suppliers we have talked to is that consumers, banks and retailers now need to catch up with the capabilities of the technology that already exists.

As EFTPOS moves from trials to full commercial service, a greater consensus on market requirements and product definitions is likely to emerge. This process will be encouraged by suppliers interested in minimising the number of different products in their range and maximising the volume of each sold, and it will also be eased by the development of standards. One major area of diversity at present is security requirements. The variety of requirements is likely to be lessened as banks and retailers understand and specify their requirements with greater certainty.

Terminals are likely to develop in the direction of greater programmability and modularity to provide more flexibility for different and changing requirements. In particular, debates on the relative merits of on-line and off-line operation and on the need for separation between EFT and POS equipment are far from resolved, but the trends in equipment development are likely to make them less important. Already the more sophisticated terminals can be adapted relatively easily to on-line or off-line working, and a modular approach in which interfaces between POS and EFT functions are carefully designed should permit retail information and bank security requirements to be more easily reconciled.

Given these trends, the market is likely to see the emergence of equipment tailored to specific retail sectors, as has already happened for fuel retailing. Equipment integrating other automated POS functions (for example bar-code reading) with EFT should increasingly become available. Where practicable, the emphasis is likely to shift towards transaction data capture and utilisation; credit authorisation applications will be supplemented by transaction data capture, and retailers are likely to require a single entry of the nonsecure elements of the transaction details, to serve both EFT and retail management purposes.

As regards prices of EFT terminals, it is the general consensus among suppliers that these will stabilise. Increases in production volume should cause prices to fall, but market inertia is likely to preclude the 100,000-unit production runs which would allow substantial economies of scale to be achieved, for

some time to come. If increased production volumes are accompanied by a demand for both additional security and increasing numbers of other features, a significant net reduction in prices is unlikely to result.

EFTPOS MARKET FORECASTS

In this section we present our market forecasts for EFTPOS. We forecast markets for communicating EFTPOS terminals, ie all funds transfer devices at the point of sale with a communications capability.

We base our forecasting assumptions on two main factors: the structure of the retail market and an analysis of the market propensity for EFTPOS in a particular country.

The structure of the retail market

Figure 4.12 provides the number of retailers in various European countries. As we have discussed on page 37, the structure of the retail market differs from country to country in terms of the numbers of outlets of different types and their size. For example, in Germany or the United Kingdom the ratio of the number of shops to the number of inhabitants is low, the average shop is relatively large, and the proportion of outlets operated by large multiple retailers is high. By contrast, in some countries, such as Italy, there are a very large number of shops, and small independent retailers predominate.

On the basis of our research we assume that for the next five years EFTPOS terminals will be installed almost exclusively in hypermarkets, department stores and retail outlets belonging to large multiple groups, ie retail organisations operating ten outlets or more. This will include supermarkets, variety stores, petrol stations and food and non-food multiples. This implies that the take-up of EFTPOS in small multiple groups and independent retailers lags behind the large multiples by several years. In Belgium, however, because of the advanced state of the market, we expect EFTPOS to begin to establish itself among smaller retailers as well towards the end of our forecasting timeframe. In France we expect this segment of the market to be taken by non-communicating smart card certifiers. (We have discussed the smart card certifiers in more detail on page 46.)

In Figure 4.13 we therefore present the numbers of retail outlets in each country which represent the total potential market for communicating EFTPOS terminals (ie the market ceiling) within our forecasting horizon. These include the types of retailer we have indicated in the previous paragraph. Barring a small number of exceptions, earliest installations are and will continue to be those by fuel retailers and by the largest retail outlets. But we assume that after the first two years, as the market matures, there will be no marked differences between the retail sectors' multiple groups in their propensity to install EFTPOS.

The second column in Figure 4.13 shows the estimated average number of points of sale per retail outlet in the sectors that represent the potential market. These numbers also reflect the characteristics of national retail markets. For example, retailing in Spain has developed from small independent outlets to hypermarkets and large self-service stores, bypassing the intermediate stage of variety and chain

Figure 4.12 Number of retail outlets in different European countries

Country	*Number of retail establishments*
Austria	41,000
Belgium	111,000
Denmark	51,000
Finland	38,000
France	615,000
Germany	413,000
Italy	909,000
Netherlands	91,000
Norway	33,000
Spain	391,000
Sweden	66,000
Switzerland	60,000
UK	350,000

Figure 4.13 Potential market ceiling and average number of terminals per establishment in different European countries

Country	*Potential market ceiling (establishments)*	*Average number of points of sale per establishment in potential market*
Austria	12,800	2.9
Belgium	35,500	1.3
Denmark	14,600	2.9
Finland	6,300	3.9
France	63,500	2.1
Germany	45,000	4.0
Italy	22,800	3.6
Netherlands	14,300	3.4
Norway	5,400	3.9
Spain	3,200	7.8
Sweden	10,800	3.9
Switzerland	13,300	2.9
UK	55,000	3.4

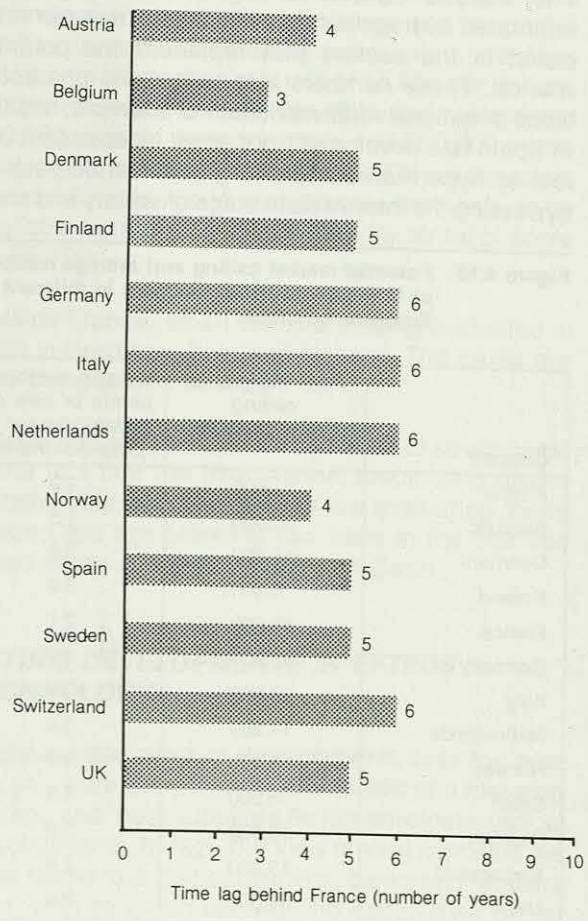
stores. The retail outlets in Spain which have the potential to adopt EFTPOS in the next five years, although few in number, are therefore, on average, very large in terms of number of points of sale. On the other hand, the low average number of points of sale per retail outlet in Belgium reflects our assumption that the potential market in that country includes some smaller outlets.

Market propensity for EFTPOS

There are certain factors which influence the extent to which any particular country is ready for EFTPOS development, which we have discussed under the heading 'Reasons underlying the differences in EFTPOS development' on page 36.

To recapitulate briefly, current payment habits affect the potential size of the market, in that a country where payments by cheque and credit card are common, EFTPOS is likely to be more readily adopted. Also, the national banking environment in a country may be more, or less, favourable than in others.

Figure 4.14 Estimated time lags between France and other European EFTPOS markets



Predisposing factors are technological sophistication among the banks, a market composed of relatively few large banks, and a mode of market conduct which is either strongly competitive (to generate competing networks) or strongly cooperative (to produce a shared network). The availability of national EFTPOS services will undoubtedly encourage market growth, but will by no means be the sole determinant of market propensity.

On the basis of these factors we have estimated the time lags between France, the most developed European EFTPOS market, and the other countries, as measured by the time it will take them to reach an equivalent level of penetration of the potential market. The time lags are presented in Figure 4.14.

The forecasting model

Figure 4.15 shows our forecasting model in schematic form. The take-up of new applications in information technology, as measured by the percentage penetration of the potential market, tends to follow a pattern of growth represented by the logistic, or S-curve. Curves for different countries are offset by the amount of the time lag between them.

The forecast

Our forecast of the European market for EFTPOS terminals to 1990 is shown in Figure 4.16. Figure 4.17 gives country-by-country forecasts for EFTPOS terminals for 1990, while Figure 4.18 gives the proportions of the European market accounted for by different countries in 1985 and 1990.

Figure 4.15 The forecasting model

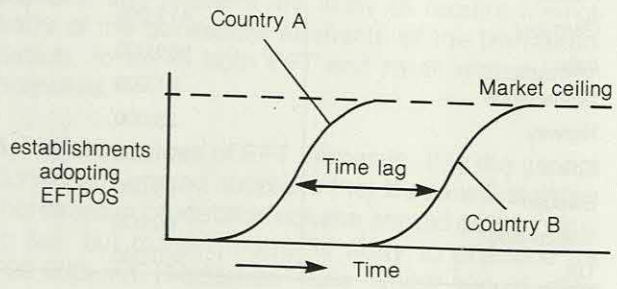
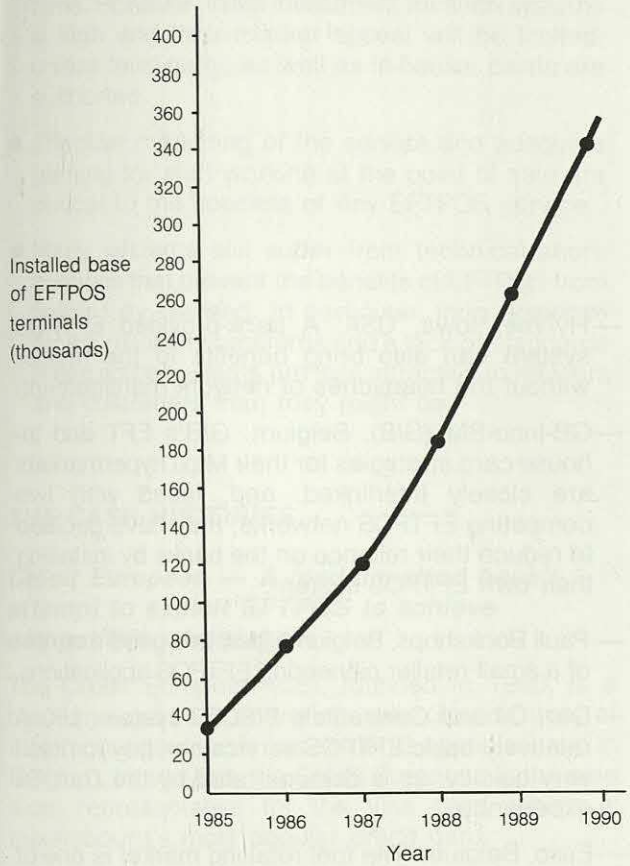


Figure 4.16 Forecast of the installed base of EFTPOS terminals in Europe

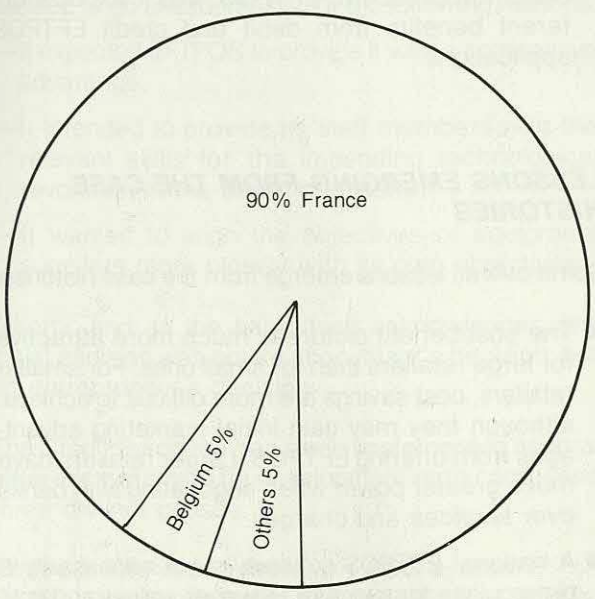


Note: Forecasts are for the status at the beginning of each year.

Figure 4.17 Country-by-country forecasts for EFTPOS terminals for 1990

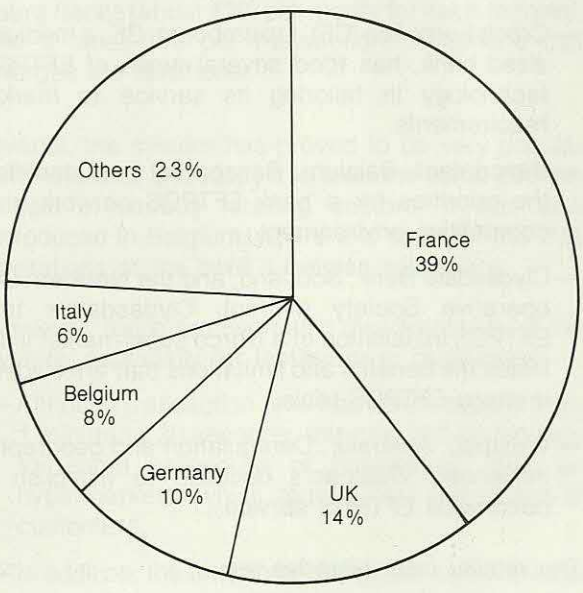
	Number of establishments adopting EFTPOS	*Total terminals*
Austria	2,400	7,000
Belgium	21,000	27,000
Denmark	4,200	12,000
Finland	1,900	7,400
France	63,000	132,000
Germany	8,600	34,000
Italy	5,600	20,000
Netherlands	2,700	9,200
Norway	2,400	9,400
Spain	1,000	7,800
Sweden	3,300	13,000
Switzerland	4,000	12,000
UK	14,000	48,000
Total	134,100	338,800

Figure 4.18 Geographic breakdown of the installed base of EFTPOS terminals



1985

Estimated total market 36,000 terminals (January 1985)



1990

Estimated total market 340,000 terminals.

CHAPTER 5

EFTPOS: THE USER EXPERIENCE

Full commercial EFTPOS implementations, as opposed to trials, are still in their infancy. Enough practical experience has, however, been gained from both trials and full services to illustrate the practical issues and to spotlight problem areas.

Different goals drive EFTPOS in different countries and retail sectors, as we have discussed in the preceding chapters. These differences are inevitably reflected in approaches to, and experiences with, implementation. The case histories we have chosen illustrate the range of contexts in which EFTPOS is being used, approaches taken by different organisations, the benefits achieved and the problems encountered.

We review eleven case histories of EFTPOS implementations in Europe, the US and Australia. Seven of these describe the experiences of retailers installing EFTPOS, and four are of banks and other financial organisations offering EFTPOS services.

The bank and financial institution case histories we describe are:

—Crédit Européen (CE), Luxembourg. CE, a medium-sized bank, has tried several types of EFTPOS technology in tailoring its service to market requirements.

—Bancontact, Belgium. Bancontact has identified the priorities for a bank EFTPOS network in a competitive environment.

—Clydesdale Bank, Scotland, and the Northern Co-operative Society (Norco). Clydesdale's trial EFTPOS installation in a Norco supermarket illustrates the benefits and limitations that are evident in many EFTPOS trials.

—Westpac, Australia. Deregulation and geography influenced Westpac's decision to establish a nationwide EFTPOS service.

The retailer case histories are:

—Publix, Florida, USA. Publix supermarkets have demonstrated that taking over banking operations can be profitable to a retailer.

—Hy-Vee, Iowa, USA. A bank-provided EFTPOS system can also bring benefits to the retailer without the headaches of network management.

—GB-Inno-BM (GIB), Belgium. GIB's EFT and in-house card strategies for their Maxi hypermarkets are closely interlinked, and, faced with two competing EFTPOS networks, they have decided to reduce their reliance on the banks by installing their own EFTPOS system.

—Pauli Bookshops, Belgium. Pauli is a good example of a small retailer pioneering EFTPOS applications.

—Dart Oil and Centrefile's PISCES system, UK. A relatively basic EFTPOS service can pay for itself very quickly, as is demonstrated by the Dart Oil experience.

—Esso, Belgium. The fuel retailing market is one of the few in Belgium in which EFTPOS is relatively well established. Esso hopes for increased sales from 24-hour opening, made possible by use of EFTPOS.

—Mobil, USA. Mobil has developed a careful cost/benefit approach to EFTPOS, and it expects different benefits from debit and credit EFTPOS applications.

LESSONS EMERGING FROM THE CASE HISTORIES

Some overall lessons emerge from the case histories.

- The cost/benefit picture is much more attractive for large retailers than for small ones. For smaller retailers, cost savings are more difficult to achieve, although they may gain initial marketing advantages from offering EFTPOS. Larger retailers have much greater power when negotiating with banks over services and charges.
- A national EFTPOS scheme is not necessarily a prerequisite for success. However, unless and until individual competing EFTPOS schemes agree to interwork, success will be piecemeal and full acceptance by retailers will be hindered.

- Retailers can achieve the greatest control over EFTPOS if they operate their own in-house systems. However, initial investment for such systems is high and their market appeal will be limited, unless third-party, as well as in-house, cards are supported.
- Effective marketing of the service and adequate training for staff working at the point of sale are critical to the success of any EFTPOS service.
- Many systems still suffer from technical shortcomings that prevent the benefits of EFTPOS from being fully realised. In particular, long response times, reliability problems and a lack of standards mean some systems are less attractive to retailers and customers than they might be.

THE CASE HISTORIES

Crédit Européen — A medium-sized bank's attempt to exploit EFTPOS to achieve competitive advantage

The Crédit Européen (CE), founded in 1960, is a medium-sized bank operating in the Grand Duchy of Luxembourg (where it has some 13 agencies) and in Belgium. In addition, the Crédit Européen is the sole local representative for the Visa card, which is Luxembourg's most popular credit card.

The bank first decided to develop an EFTPOS system in 1979, even though there was at that time little specialist knowledge and no suitable hardware, and no such systems were in operation from which experience could be gained. Nevertheless, the bank decided to go ahead, mainly for the following reasons:

—It expected EFTPOS to provide it with a competitive advantage.

—It intended to provide its staff members with the relevant skills for the impending technological revolution in the banking industry.

—It wanted to align the objectives of equipment suppliers more closely with its own objectives.

Clearly, and as the bank itself acknowledges, the initial decision was not an accountant's decision, but an entrepreneur's decision.

The Crédit Européen has since implemented several different systems. The development path comprised three distinct phases:

Phase I: The first-generation POS system
In 1980, the bank started its first POS trials, and by July 1981 some 20 POS terminals were installed in retail outlets and petrol stations; in this first system, which is still in use today, the customer keys in his confidential code (his PIN) and may demand a receipt on the spot.

Technically, the system was a success, and the bank feels that it greatly enhanced its skills in electronic money transfer systems. The system also promoted CE's standing in the marketplace as a progressive and forward-looking bank. Commercially, however, the system was only a limited success: the tendency of customers to forget their PIN, the low overall number of terminals, the low number of Visa cards in circulation at that time, and the reluctance among suppliers to provide competitively priced equipment greatly reduced the appeal of the system from a strict commercial point of view.

Phase II: The VISA PHONE I
The bank, therefore, opted for a new generation of telephone-based terminals produced by GTE/ATEA (a large Belgian supplier, subsidiary of GTE), enhanced and adapted by the bank's own data processing service company. The system, which combines credit authorisation and data capture, is not PIN-based but has several advantages:

—The average time required for a transaction is reduced from 1 minute, using conventional methods, to 30 seconds.

—The system is on-line, which considerably reduces the risk of fraud.

—International Visa cards can be accepted.

—It is designed as an open system, and could, in principle, be used for non-Visa cards as well.

The Crédit Européen charges about 1,110 Luxembourg francs (about $20) per month for each terminal, and a small fee per transaction. Telephone call charges are additional.

Overall, the system has proved to be very popular with retailers, and today it is linked to some 200 terminals in various retailing sectors. It was also introduced in Belgium, where it is used for the Visa operations of the bank's Belgian subsidiary.

However, there are two basic disadvantages of the system, especially for fast-turnover businesses.

—Although transaction time has been reduced from 1 minute to 30 seconds, this may still be too long for some categories of businesses, such as hypermarkets, which require fast throughput of customers.

—In addition, the telephone charge per call (one local call unit) may prove to be a heavy burden on the already tight margins of some businesses, such as petrol stations, which operate in fiercely competitive environments.

Phase III: The VISA PHONE II

In order to overcome these disadvantages, the Crédit Européen is implementing a new system, the VISA PHONE II, which is being installed in over 300 locations. The VISA PHONE II is based on equipment delivered by Flonic Schlumberger SA (a French supplier of EFT equipment), and has the following characteristics:

—It is based on off-line operation, with the exception of transactions paid for by international Visa cards and those exceeding a preset ceiling. These two types of transaction use on-line operation.

—The preset ceiling amount changes daily.

—Transactions falling below that amount are checked on a random basis.

—Each terminal contains a list of 4,000 'oppositions' (stolen or invalid cards), which is updated daily.

—Each terminal can store up to 400 transactions, which are transmitted to the bank's data processing system at a preset time during the night.

—Up to 15 dumb terminals can be connected to each POS terminal.

Lessons of CE experience

Overall, the following lessons emerge from the Crédit Européen EFTPOS experience:

—An EFTPOS system evolves over a period of time, and it is necessary to build up skills over that time. A learning period may be required to identify the technology best suited to the market.

—It is possible for a medium-sized bank to develop a competitive EFTPOS system if it has the necessary motivation and especially if it perceives a likely long-term competitive advantage (eg the exclusive link between Visa and Crédit Européen).

—Different types of businesses tend to require very different types of EFTPOS systems.

Bancontact — A banking consortium operating EFTPOS services in a competitive environment

The Bancontact EFTPOS venture is one of the most advanced in Europe. Bancontact is an organisation formed by three large and 21 smaller Belgian banks to operate a shared EFT network. The Bancontact network is one of two large competing networks in Belgium supporting ATMs and EFTPOS terminals, the other being Mister Cash. (In addition to these two main EFT networks, the Belgian Post Office bank operates the smaller Postomat ATM network.)

In mid-1985 Bancontact had equipped 1,025 establishments with EFTPOS, out of a total Belgian market of 1,915 equipped establishments.

After competing with each other for some time, Bancontact and Mister Cash have agreed to allow each other's cards to be used at their EFTPOS terminals; the transaction data will be switched between the two DP centres as required.

Bancontact has its own dedicated DP centre operating on DEC equipment. On-line operations will be switched in early 1986 to Tandem equipment running software developed in-house. Batch operations, for the transfer of transactions to the Chambre de Compensation (the Belgian interbank clearing-house), will continue to run on a DEC VAX.

In terms of marketing policy, Bancontact has developed separate marketing and pricing strategies for three retail sectors:

—Large retailers.

—Smaller retailers.

—Fuel retailers.

Large retailers

Bancontact offer three alternative system architectures for large stores (see Figure 5.1). The first option is for an EFT system completely independent of cash registers or point-of-sale systems, and is suitable where cash registers or point-of-sale systems already installed or being purchased now do not offer suitable interfaces for interconnection. The shop assistant uses a separate cardwipe and keypad on which the total value of the purchase is entered. The second and third options allow for connection between POS and EFT systems for communication of Bancontact card information and purchase amount. In these cases, the retail system has cardwipes attached to cash register terminals and interfaces for communicating the information to the EFT system. In one option, the communication link is between the cash register and the pinpad, while in the other, it is at the store processor level.

The EFT store processor was designed by Bancontact and is manufactured for them by Prodata, a local supplier. Bancontact manufacture the shop terminals and decoding black box themselves. Bancontact bear the cost of the store processor, which amounts to BF400,000 (around $7,600); the retailer pays BF1 ($0.02) per transaction; and the leased telephone line costs BF5,600 (about $100) per month.

Current penetration of the service is largely in the bigger towns and includes:

—2 Delhaize supermarkets.

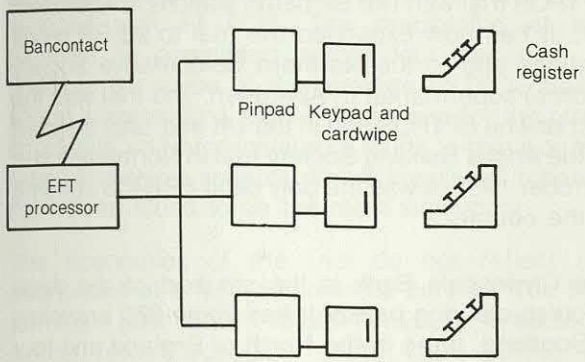
—1 GB supermarket.

—1 large Cora supermarket.

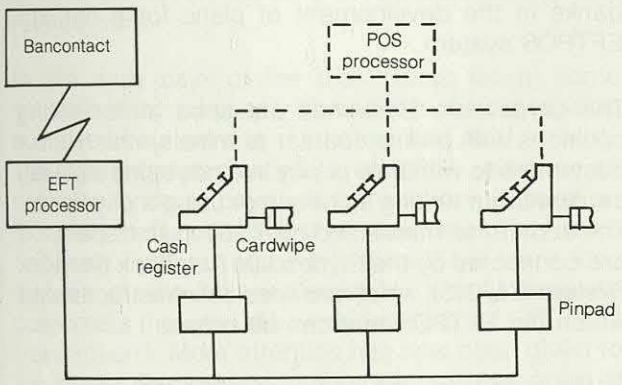
—1 Makro supermarket.

Figure 5.1 Three EFT system architectures offered by Bancontact for large stores

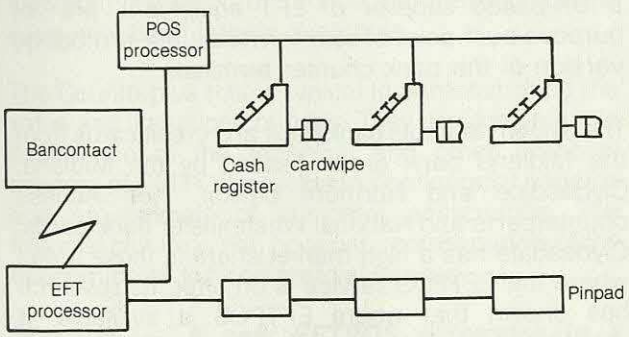
Option 1: EFT system independent of cash registers



Option 2: EFT and POS systems linked at cash register level



Option 3: EFT and POS systems linked at store processor level



All these are considered by both network operators as test cases. All the large retail chains had waited for compatibility between the two EFT networks before committing themselves substantially. After extending their presence in these retail chains, Bancontact's next objective will be to attract the smaller and more numerous supermarkets of the same chains.

Smaller retailers

For smaller retail organisations, Bancontact offer an EFT terminal coupled to a Teledata phone provided by the Beglian PTT and equipped with a card-reading slot. Bancontact is not happy with this system, which is slow and not very secure, and to date only some 200 have been installed. The retailer pays between BF1,100 and 1,800 ($20 to $35) per month to rent the terminal, plus the price of a normal telephone call for each transaction. At these prices, Bancontact consider that EFT is a profitable proposition only for those small retailers selling high-priced luxury items.

Fuel retailers

Forecourt EFT terminals for petrol stations have also been developed and patented by Bancontact and they are also manufactured by Prodata. The customer inserts his card into the terminal and enters his PIN and choice of petrol pump for authorisation before filling up. When the petrol has been dispensed, the amount and cost is transmitted to Bancontact. The customer can obtain a receipt on the spot if he requires one. The EFT terminals can control up to four petrol pumps each.

Each EFT terminal averages 1,200 transactions per month; this has risen to 2,000 per month for terminals that have been installed for two years or more. EFT payments account on average for over 30% of turnover in petrol stations where EFT is installed.

The costs to the petrol station operator are:

—The cost of the terminal.

—Installation and maintenance charges.

—A monthly fee of BF5,600 (about $107) which covers connection to the network and the first 1,000 transactions per month.

—BF3.25 ($0.06) per transaction for the 1001st to the 3000th transaction.

—BF2.5 ($0.05) per transaction for all additional transactions.

Oil companies in Belgium have been willing to undertake this investment because EFT enables them to offer longer opening hours and hence generate higher sales. Bancontact's strategy for this market, which has given it market leadership, was to ally itself with a leading oil company (Shell), which was quick to introduce EFT at its petrol stations.

Security measures

Security has been a key element in Bancontact's product strategy. Now that interworking of the Bancontact and Mister Cash networks has been agreed, competition between them will be on service features, such as extra security. Bancontact feel that a guarantee of payment will be a key competitive

aspect of EFTPOS services to retailers; this requires a high level of security in the EFT system, and Bancontact feel it has a competitive advantage in this respect.

Bancontact's approach to security is based on the separation of retailing and EFT equipment. In this respect they claim to differ from Mister Cash and also from GB-Inno-BM (the Belgian retail organisation which is setting up its own EFTPOS system for both retail and EFT systems). They also manufacture, supply, install and maintain the pinpad themselves. This enables them to ensure that it meets their strict criteria of both physical and logical security. In addition, since account details encoded on the card and the customer's PIN reside together in the pinpad and nowhere else (and it is these two pieces of information together which enable counterfeit cards to be produced), the pinpad is the element in the system most critical to security. Bancontact feel that if it were provided by other suppliers, it would be nearly impossible to trace the source of any leakage of this information.

Bancontact cite two further reasons for supplying EFT terminals themselves. They have upgraded their system continuously over the past five years, and feel that this would have been impossible if they had had a number of suppliers, each producing equipment with different characteristics and limitations. They also believe that if a number of suppliers were producing EFT terminals, the cost of testing the various types of equipment would be prohibitive.

A third element in Bancontact's approach to security is to protect their ATM operations from security problems arising with EFTPOS. They do this by using different tracks on the card for data relating to ATM and EFTPOS transactions. (ISO — the International Standards Organisation — has specified a standard for coding data on magnetic strip cards, defining the position and function of three tracks on the stripe. These tracks are commonly referred to as ISO 1, 2 and 3, and Bancontact use ISO 2 for EFTPOS and ISO 3 for ATMs.)

Bancontact have evolved their product and marketing strategy for an environment with competing EFT networks, and they may be regarded as a prototype by participants in similar markets when they develop elsewhere. Their approach to security may, however, require modification for interworking with other networks, let alone for a 'multi-card, multi-card-issuer' environment. Similar retention of the monopoly of the EFT terminal supply would probably be untenable for a nationally coordinated EFTPOS service or for a service provider with a de facto monopoly.

Clydesdale Bank and Norco — A pioneering EFTPOS venture between bank and retailer

In February 1982 the Clydesdale Bank began an EFTPOS trial with two BP petrol stations in Aberdeen, UK. It has now expanded the trial to 28 BP petrol stations and to the Northern Co-operative Society (Norco) supermarket in Aberdeen. The trial was the first on-line EFTPOS trial in the UK and, until the start of the Anglia Building Society trial in Northampton in October 1985, it was the only debit EFTPOS scheme in the country.

The Clydesdale Bank is the smallest of the three Scottish clearing banks. It has some 380 branches in Scotland, three in the North of England and four in London. It is a wholly owned subsidiary of the Midland Bank, one of the 'Big Four' English clearing banks. As a member of the Committee of London Clearing Bankers, it is cooperating with the other banks in the development of plans for a national EFTPOS system.

The Clydesdale Bank has equipped all its telling positions with on-line counter terminals, which allow customers to withdraw or pay in funds using a plastic card, without writing a cheque or using a pay-in slip. The counter terminals and over 250 cash dispensers are connected by the Clydesdale Autobank Network System (CLANS), which provides an infrastructure on which the EFTPOS trial can be based.

In the long term, the bank sees EFTPOS as a way of containing the increase in the volume of cheques it has to handle. The current exercise was conceived strictly as a trial; the terminals supplied by Fortronic, a UK-based supplier of EFT equipment, are not purpose-built point-of-sale terminals but a modified version of the bank counter terminals.

The system accepts bank debit and credit cards from the Midland bank group (issued by the Midland, Clydesdale and Northern banks), their Access counterparts and National Westminster bank cards. Clydesdale has a high market share in those areas where the EFTPOS service is on offer. Its research has shown that where EFTPOS is available, it substitutes for 50% of Midland group cheques.

Norco (the Northern Co-operative Society) is a co-operative retailing society operating in northeast Scotland. Its 22-checkout Aberdeen superstore is the flagship of its food operation. By May 1984 three of its checkouts were fitted with Counterplus EFT terminals. Norco also operates a petrol station near the store, which also uses Counterplus equipment, and there is an in-store Clydesdale ATM for use by customers. The Counterplus terminals accept both debit and credit transactions. At the Norco

supermarket, EFTPOS now accounts for about 4% of all transactions, or about 10% of all cheques.

As well as reducing cheque handling, Norco's experience shows that checkout times have been reduced with EFTPOS. The processing of the payment is completed within four seconds. In addition, the value of the average EFTPOS transaction is some 50% higher than those for the other checkouts, so Norco installed a fourth terminal on the wines and spirits counter, where impulse purchases have been found to be the most significant.

The economics of the trial do not reflect the economics of a fully commercial service. The four terminals cost about £10,500 ($15,225). In addition, Norco paid Clydesdale some £500 ($725) for installation and training, and pay £1,500 ($2,175) per annum for maintenance. Bank charges for EFTPOS transactions are, however, half those for cheques, at about 6 pence (8.7 cents) and 12 pence (17.5 cents) respectively.

In the early days of the trial, Norco learnt some valuable lessons not only about the technical aspects but also about service marketing and staff training. The Counterplus checkouts could be used for all ordinary kinds of payment transactions as well as EFT, but staff noticed that at peak times they were relatively lightly used, even when there were long queues at the other checkouts, simply because customers thought they were reserved for EFT debit transactions. More attention has now been given to explaining the service to customers at the point of sale. Initial reliability problems with the terminals were compounded by staff not following optimum procedures for getting the fault rectified with the minimum disruption of service, but these problems have now been largely overcome.

The Counterplus trial is typical in demonstrating the value and limitations of trials. They provide valuable experience of the technical and other practical aspects of EFTPOS, a guide to nonfinancial benefits and an estimate of customer acceptance. The financial picture is not, however, representative of the economics of full commercial service.

Westpac — A new EFTPOS enterprise in a deregulated environment

Participation in the Australian banking market has until recently been heavily restricted by regulation; there are only four national banks and a further bank in each state. Recently, however, radical changes have been made in the laws governing bank licensing, and a large number of new banking licenses are being awarded. Sixteen have so far been granted, and eight more are expected to be issued soon. The changes are markedly increasing the competitiveness of the market.

The distances to be spanned by a nationwide organisation in Australia and the population distribution make electronic banking particularly attractive, and the big banks have the resources to support the development of electronic services. As a result, developments in EFTPOS, corporate cash management and home banking services have been extremely rapid.

Westpac is one of the four major banks in Australia with branches nationwide. Its motives in deciding to provide an EFTPOS service were twofold. EFTPOS was seen as an attractive new service in the context of a marketing philosophy of increasing and improving the range of services offered to the customer, and it could reduce the cost of processing transactions from 60 Australian cents ($0.40) per cheque to some 30 cents ($0.20).

The system started operation in 1984 and currently consists of 1,010 terminals in Woolworth department stores, grocery outlets and BP petrol stations nationwide. The terminals are on-line, and handle both debit and credit transactions. At present the system supports two magnetic stripe cards issued by Westpac (the Westpac card, a debit card, and the Westpac MasterCard, a combined debit and credit card), as well as Commonwealth Bank cards.

The terminals are built by Ericsson to a Westpac specification. Westpac's criteria in choosing their supplier were the ability to deliver a terminal built to specification by the prescribed date, and price. The Westpac specification has now been adopted as a national standard for EFTPOS terminals.

Westpac's marketing strategy is unusual in that it has chosen to offer its service initially to only a small number of retailers. It feels that this is important to allow Westpac to work closely with the retailers to help define objectives in installing EFTPOS and develop a strategy, so that the two parties can arrive at shared objectives and expectations of the system. Westpac chose retailers with a nationwide presence who were likely to generate a lot of traffic. EFTPOS appeals to the retailers because of its potential for reducing cash handling and its associated expenses, and because it is an attractive new service which could increase their market share.

After an initial free introductory service, retailers will be charged a fee for each EFTPOS transaction. This will be the same as is levied for cheques. Their customers will face no additional charges either; EFTPOS transactions will be treated like cheque transactions for the purpose of calculating bank charges. Customer acceptance is said to be good, and transaction volumes are running at 250,000 a month, or about 10 transactions per terminal per day. Customers regard EFTPOS as a natural progression

from ATMs, and value the opportunity to shop and obtain cash at the same time. Cash is issued from the same tills used for EFTPOS payments.

Westpac have now concluded an agreement with Commonwealth Bank to exchange transaction data, so that customers can use their Westpac cards at retailers whose terminals have been supplied by Commonwealth Bank and vice versa. Authentication is performed by the bank at which the account is held, and messages are switched to it by the bank supplying the terminal. The major Australian banks generally support this approach to networking, but other financial institutions favour a single national switching system, perhaps operated by Telecom Australia, through which all calls would initially be routed.

A major issue in the debate about whether other financial organisations should have access to the EFTPOS network is the guarantee of payment. Banks currently participating in the clearing process are governed by the Banking Acts, which specify the ratios to which they must operate and the reserves they must carry. Other financial institutions seeking to participate in EFTPOS are not bound by the same rules, so that in principle they may be more exposed to financial risk and therefore less secure in their guarantees of payment.

Westpac attribute the rapid growth of EFTPOS in Australia to the bilateral approach in establishing agreements for the provision of service. Agreements are drawn up between individual banks and retailers, without the involvement of government agencies, the telecommunications authority or any other parties. The sole constraint is the need to comply with the national standard for terminals.

Westpac anticipate a number of developments in the marketplace. Automatic EFTPOS petrol dispensers are now appearing, and new suppliers are active in the terminal market. In the long term, the smart card is likely to have a role to play, but this is not likely before issues of cost, durability and standards are resolved.

The Westpac example offers a number of messages of broader applicability:

— The bilateral approach, with individual banks and retailers concluding agreements, has undoubtedly been a major factor in the rapid expansion of EFTPOS in Australia.

— In this context, EFTPOS terminal standards and the switching of messages between banks have allowed bank EFT networks to interwork and form the basis of a national service.

— Westpac's strategy of providing EFTPOS service initially to only a few but large retailers has enabled it to achieve significant market penetration rapidly, while providing a high level of support to retailers.

— Competitive initiatives by a single bank and terminal supplier have opened up the market rapidly to others. Westpac's launch of the service based on their own terminal specification led to this standard being adopted by other banks. Although the terminal was initially developed in conjunction with a single supplier, the standard it set now enables others to participate in providing EFTPOS services.

Publix — A dominant retailer using an ATM infrastructure to develop EFTPOS

Publix is the dominant retail grocery supplier in Florida, USA. It operates 290 stores and accounts for 25% of the Florida food shopping market. Three years ago, Publix started installing ATMs in its stores, and it now operates 335 ATMs able to serve customers of 1,000 banks and financial institutions, together with the network and processing facilities to support them.

Publix entered the ATM market for three main reasons: better customer financial services, more efficient operation and the failure of local banks to provide adequate alternative facilities. Wages and salaries in the US are still commonly paid by cheque, and the fragmentation of the local banking market (few banks are able to support an extensive branch network), coupled with the tendency to decentralise shopping centres to local shopping malls, creates a substantial demand for customers to be able to deposit and cash cheques in supermarkets. Publix saw an opportunity to turn cheque cashing, from being an overhead, into a source of profit, and it now charges the banks as a result of providing the ATM service, instead of paying them 7 cents per cheque to have the cheques cleared.

The ATM network gave Publix a ready-made infrastructure to support EFTPOS, and in August 1984, preliminary installation of EFTPOS terminals began: 42 stores were equipped by end-1985 with a total of 600 terminals. Only debit transactions are supported. The reasons for the decision to go ahead with the EFTPOS scheme known as 'Presto!' were three:

— To gain a competitive advantage by offering the alternative payment mechanism to customers as a new and convenient service.

— To improve the efficiency of store operation by speeding customers through the checkouts. Publix estimates that payment by cheque takes 1.5 minutes, whereas the average EFTPOS transaction only takes 30 seconds.

— To reduce the costs of non-cash transactions.

Cheque handling currently costs Publix some 32 cents per cheque. The cost of a transaction on EFTPOS is expected to be 5 to 10 cents. At present between 60% and 75% of payments are made by cheque, equivalent to between 50 million and 75 million transactions per year.

The first year is being used to get the system off the ground. The service has not yet been advertised, and currently only 2-3% of transactions are handled by EFT. However, usage is increasing by 15-20% per month and Publix plans to provide Presto! in all its stores by the end of 1986, with some 3,600 terminals. It expects to see over half its payment transactions handled by EFT by 1990.

NCR EFTPOS equipment has been chosen to make integration with existing systems easier, and almost all the stores are currently equipped with NCR 1780 ATMs, NCR scanning POS terminals and front ends. However, IBM Series 1 processors with Quadstar software handle the networking.

The total cost of upgrading all stores to EFTPOS will be between $15 million and $20 million, only $3 million of which will be for EFT equipment at the point of sale ($10,000 per 12-checkout store). The network is the most expensive element of the system, but Publix feels it is important to keep this element under its own control in order to ensure standards of service, which is the key factor in determining its use by many customers. Maintenance costs are estimated at $18 per terminal per year.

Key issues

Publix sees the current key issues in its EFTPOS system as staff training and obtaining the required quality of service from the banks. It emphasises that above all it must be a positive customer service and that therefore staff at the checkout need to be involved and feel enthusiastic about it, in order to encourage use by customers.

One of the major activities during the start-up period has been the recruitment of new banks to on-line operations, and 300 banks are currently participating. The main hurdle to be overcome before service is established on a full commercial basis is the negotiation of pricing levels with the participating banks.

The bank systems need to be tested to ensure that downtime is acceptably low, that transactions are captured in valid form, and that response times are satisfactory. Thirty-five seconds is allowed for the bank system to respond to the Publix switch, before the interchange is timed out. Publix aims for 95% network availability. However, they have found poor telecommunications to be the major cause of downtime on the ATM network.

The development of the service by the retailer from an in-store ATM service has made marketing relatively simple, emphasising the increased convenience of paying for groceries using the ATM card. The presence of in-store ATMs also reduces the problem of embarrassment at the checkout, as the customer can check his account status at the ATM before shopping.

Lessons of Publix's experience

A number of clear messages emerge from Publix's experience. The retailer has taken the lead in service provision, and done so in a way which in marketing terms represents a natural progression from previous activities, giving it an excellent chance of success with the customers. Factors specific to the US, and perhaps even to Florida, have put Publix in this happy position. In particular, the fragmentation and relative 'backwardness' of the banks in an otherwise technologically sophisticated environment contrasts with the market dominance of Publix and results in a balance of power between banks and the retailer which differs considerably from the norm elsewhere. Nevertheless, Publix still has some tough negotiations to face over the tariffs the banks will pay before it can fully assess the benefits of its initiative.

First with its ATM network and now with its own EFTPOS service operation, Publix has become heavily involved in the provision of financial services. The savings on cheque handling do not by themselves, however, appear to cover the costs of installing EFTPOS. The justification lies, instead, in giving Publix a competitive edge in its main line of business and more efficient store operation, for better customer service.

Finally, standards issues, blocking the development of EFTPOS services in some European countries, do not seem to have hampered Publix in its implementation of the service. It has opted for a proprietary solution to the problem of communications standards for terminals connected to its network, using the same supplier for both ATMs and EFTPOS equipment, and also for integrating EFT with point-of-sale systems. The user-friendliness of the customer interface has been an important design issue. One-off solutions have been applied to the problem of establishing communications between the Publix system and those of the participating banks.

Hy-Vee — Incorporating EFTPOS into traditional retailing

The Hy-Vee supermarket chain in Iowa, USA, has pursued an approach different from that followed by Publix. This approach is designed to benefit from EFTPOS without departing from traditional retailing activities; the banks provide terminal equipment and networking.

Hy-Vee operates a total of 153 supermarkets in six states, but its 16 EFTPOS stores (with a total of some 240 checkouts) are in Iowa and they use the Iowa Transfer System (ITS), a network supporting ATMs and EFTPOS which has been developed jointly by Iowa financial institutions and whose use is shared by them. The bank providing the EFTPOS equipment varies according to locality; in Des Moines, where Hy-Vee has 11 EFTPOS stores, it is First Interstate.

The store equipment is all NCR-based, with NCR 2552 scanning systems connected to NCR 8200 store processors. Upgrading to EFT requires the addition of a 10-key pinpad and bank card reader. Only debit transactions are accepted. The system operates on-line, and the customer's account is debited and Hy-Vee credited the same day.

NCR EFTPOS equipment was initially made available to Hy-Vee on a pilot basis four years ago. The pilot phase is complete, and EFTPOS is now being introduced in other stores. EFT currently accounts for about 10% of payment transactions in the stores where it is installed. Only a minority of cheque transactions have been replaced by EFTPOS, but there are still over 200 transactions per day for which the worry of bad cheques has been alleviated and which yield substantial time savings at the checkout. For a period of time, congestion on the ITS network and the consequent slow response time prevented realisation of these savings, but the capacity of the ITS network is now being increased to solve the problem.

An unexpected result of the Hy-Vee trials was that customers paying by debit card spend more on average than other customers. Hy-Vee also found that typical EFTPOS customers are younger (20-50 years old) employed people.

Marketing the service at the point of sale has proved important. Illuminated signs have been displayed at the point of sale, but the cashiers play the most important part in encouraging customers to use EFT. Hy-Vee have found that people are reluctant to trust the system initially, but become enthusiastic once they have used it two or three times. Tying customers to Hy-Vee if they wish to pay by debit card is seen as one of the most important benefits of the system.

Hy-Vee has relatively few costs to offset against the benefits. The bank owns the EFT terminals, which cost about $2,500 per checkout, and it pays for installation, communications and maintenance. The financial arrangements governing the use of the ITS are such that the debited bank pays 10 cents per transaction, 6 cents of which goes to ITS, with the remainder being shared between Hy-Vee and its bank, so that the store also enjoys a reduction in bank charges in addition to the other benefits gained.

Hy-Vee's experience is notable in a number of respects. It has managed to attain appreciable benefits, including a reduction in bank charges, while leaving costs and responsibility for terminal provision to the banks. It has been fortunate, too, in being able to integrate EFT with its point-of-sale equipment, because its POS supplier could also supply EFT equipment supported by ITS. It has also learnt the importance of actively marketing EFT service at the point of sale and the importance of commitment and enthusiasm in the cashiers promoting its usage.

GB-Inno-BM — A large retailer developing its own EFTPOS system

GB-Inno-BM (GIB) is the largest retailer in Belgium, accounting for 12% of all Belgian retail sales and 70% of large chain store sales. It operates 56 Maxi hypermarkets, 100 supermarkets, 80 Inno department stores and 75 petrol stations.

GIB has been interested in the introduction of EFTPOS for a number of years, seeing the main benefits as lower error rates, faster checkout speeds and the opportunity for more personalised service. Consequently, it opened discussions with the Belgian banks on operating such a service. The banks, however, developed two competing and mutually incompatible EFT networks (Mister Cash and Bancontact) supporting ATMs and EFTPOS, each with its own bank card, and the Post Office has yet another smaller ATM network with its own 'Postomat' cards.

GIB wished to avoid using terminals dedicated to only one of the bank cards at its checkouts. It also planned to introduce its own payment card, the Maxi card. It therefore decided to develop its own system that would be capable of handling a range of cards and of interfacing with more than one network. It did this in conjunction with its EPOS system supplier, NCR, and in 1983 an initial pilot system was installed in the Maxi hypermarket at Evere. By December 1984, 16 hypermarkets had been equipped for EFTPOS, using some 400 terminals. The Maxi card is accepted in all these stores, and in addition the bank networks have authorised eleven stores to accept Mister Cash and one store to accept Bancontact cards. GIB plan to extend the system to all Maxi hypermarkets as soon as possible.

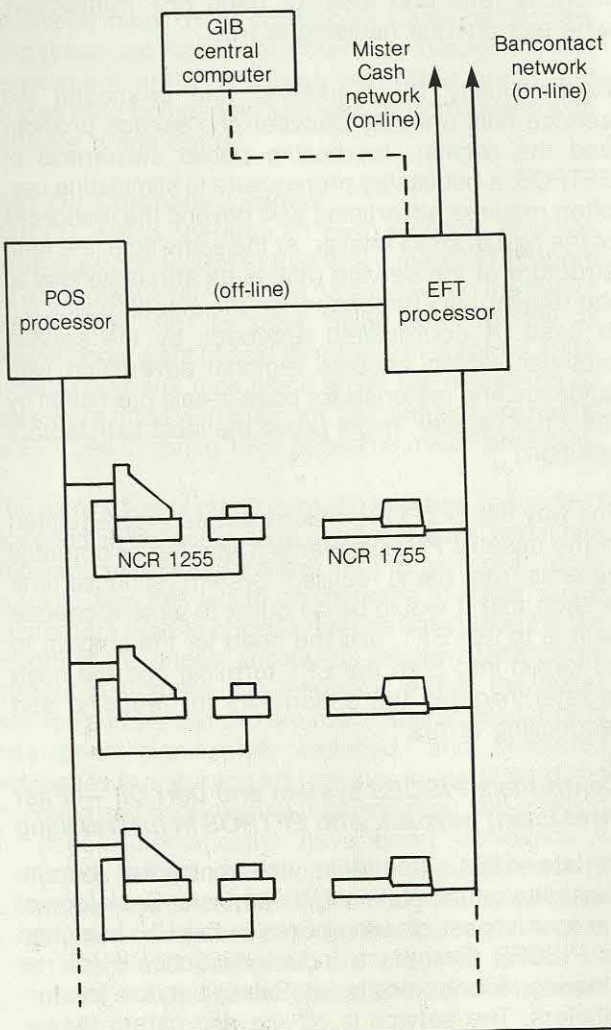
A major issue in GIB's negotiations with the banks has been the question of charges for their EFTPOS services. Banks in Belgium do not charge for cheque handling, but both bank networks levy charges for EFTPOS. Given its own investment in EFTPOS, GIB objected to paying fees to the banks, and it has succeeded in negotiating a progressive fee structure with Mister Cash, which reduces GIB payments to zero if transactions exceed a monthly volume of approximately half of what they are currently

averaging with conventional media. In addition, GIB shares some of the communications costs.

The in-store EFTPOS system (see Figure 5.2) has a number of distinctive features. The same pinpad and cardwipe are used for all cards and to access the different bank networks. For security reasons, and to enable the addition of EFT to existing EPOS systems, EFT is handled by a separate and parallel set of equipment. The pinpads are linked to an NCR in-store EFT processor, which is separate from the in-store EPOS processor controlling the EPOS terminals. However the processors are linked in order to obtain information about the value of a customer's purchases for forwarding to the banks.

The Mister Cash and Bancontact networks operate on-line, but details of Maxi card transactions are collected off-line in the EFT processor for polling by the GIB central computer. The EFT processor supports the different communications standards required by the two networks. It also holds lists of hot cards (stolen or uncreditworthy Maxi cards) against which each card is checked, and which are updated daily. The average cost of EFTPOS equipment for a 25-lane Maxi store is about $50,000 excluding wiring.

Figure 5.2 The GIB in-store EFTPOS system



Continuing issues in the negotiations with the banks have been the security and reliability of the GIB system. Bancontact in particular like to maintain complete control over in-store EFT equipment, supplying and even manufacturing their own pinpad. The GIB system requires the sharing of the pinpad (as will any multicard system which avoids duplication of pinpads), but makes provision for each network operator to supply his own PIN verification module inside the NCR pinpad, which furnishes the necessary interfaces.

The Maxi card is an important element of the scheme both because of its advantages as a marketing tool and as an important factor in GIB's negotiations with the bank networks. It is unusual in that it can be used as either a debit or credit card, with the customers deciding at the point of sale which they prefer. In debit mode, transaction details are passed on magnetic tapes from GIB's central computer to Belgium's automated clearing-house, and thence to the customer's bank for debiting. In credit mode, the card is used as a conventional credit card.

At present, utilisation of Maxi and bank cards in GIB stores is roughly similar, with 4% of sales paid for by Maxi cards and 4.6% by bank cards. In some stores the Maxi card accounts for 8-9% of total sales. Within GIB stores the Maxi card duplicates the facilities offered by bank debit and credit cards. The extent to which it substitutes for these will affect the strength of GIB's bargaining position with the banks and the importance of making provision for other cards in its system.

GIB's case illustrates very well the opportunities and problems facing retailers where competing EFT networks operate without agreements on interworking or common standards for security or communications. Technical solutions to the problems of catering for a range of cards and EFT networks can be found, but at some risk of overdependence on a single equipment supplier. Agreement on standards for pinpad security and sharing seem to be the most critical priority to enable multiple-card operation.

GIB's strategies for EFTPOS and its in-house card are highly interdependent. The extra facilities and flexibility made possible by EFTPOS greatly enhance the value of the card as a marketing tool. In addition, the cost effectiveness of EFTPOS is enhanced by the use of the card to maximise GIB's marketing advantage. Furthermore, GIB needed to provide the system itself to obtain the flexibility and control it required,

specifically to connect to both bank networks and to run its own card operation as well. The option of debit or credit use of the Maxi card is one of the benefits that have resulted. The attractiveness of the debit option for GIB if enhanced by its ability to control when debit instructions are input to the Belgian banks' automated clearing-house, which gives GIB close control over the length of credit it gives to customers and the float it supports.

Pauli Bookshops — A small retailer's mixed experience with EFTPOS

The Pauli chain consists of eight bookshops of which three are located in the Brussels area and five in the Walloon area of Belgium. The proprietor decided to install Mister Cash (Teledata) terminals in the three Brussels shops early in 1985, mainly because he was already a client of the Générale de Banque (one of the largest Belgian banks) and they approached him with the idea. His main motivation in getting involved with EFTPOS is his belief that pioneers win in the long run.

Each shop has one standard Mister Cash pinpad terminal supplied by GTE/ATEA (the Belgian supplier), consisting of a numeric keyboard and a small screenwindow, linked to a telephone, featuring additional keys and a window. The client first introduces his card and code number on the Mister Cash terminal, and then the cashier introduces the amount on the telephone keyboard. After approximately one minute waiting for balance verification, the two windows show the message 'accepted' and the client withdraws his card. The cashier then still needs to enter the amount on the normal cash register.

Pauli's view is that technically and commercially, the system works satisfactorily: only once during four months of operation ending in May 1985 was the link with the computer interrupted. Also, customers do not seem to mind the one-minute waiting time.

The three terminals accounted for a total of 500 transactions over the four months of operation. It was estimated that, because of the growth pattern over these four months, the last month (May 1985) would account for approximately 250 transactions. The shop management notices a distinct difference in use according to the location of shops: the more fashionable locations account for more than half of all card payments. Currently, card payments account for 5% of all sales, and this is deemed by shop management to be too low and not growing fast enough. They would like to see a level of 10% and are currently trying to convince Mister Cash to advertise the service more.

Mister Cash levy a fixed monthly charge of BF2,000 ($38) per terminal and a charge of BF5 ($0.09) per transaction. At the level of transactions for May 1985, this would result in an average cost per transaction of BF15 ($0.3), which represents too big a share of the gross margin achieved on the average sale by the shops.

The Pauli management will consider extending the service to the other five shops, not yet included in the scheme, when the test in Brussels has been assessed conclusively in terms of cost-benefits. However, they doubt if the progressive, 'higher-class' customers who appear to be their card customers in Brussels will be found in sufficient numbers outside Brussels to justify expansion.

Pauli's experience highlights a number of issues facing the smaller retailer introducing EFTPOS. Generally, the main motivation of small retailers such as Pauli in introducing EFT is to gain an advantage in the marketplace by offering a new customer service. The savings available through increased efficiency are unlikely to be realisable in a small operation, although for shops specialising in high-value items, fraud reduction could be a major benefit. Furthermore, in the Pauli case, bank charges are increased rather than reduced, since Pauli pay both monthly fees and fees for each EFT transaction, whereas cheque handling is free.

Responsibility for marketing and promoting the service falls uneasily between the service provider and the retailer. Increasing public awareness of EFTPOS, a necessary prerequisite to stimulating use, often requires advertising well beyond the resources of the typical small retailer. At the same time, the tariff structure of the service makes its attractiveness to the retailer very dependent on the extent to which it is used. A coordinated approach by the service provider, which couples regional advertising with guidance and materials for point-of-sale promotion by the small retailer, might prove the most satisfactory solution.

The way the EFTPOS service has been implemented in the case of Pauli prevents a number of potential benefits from being realised. System response time is such that it would be as quick to write a cheque as it is to use EFT, and the need for the amount to be keyed into both the EFT terminal and the cash register negates the opportunity for reducing and reconciling errors.

Centrefile's PISCES system and Dart Oil — Fast investment payback with EFTPOS in fuel retailing

In late 1984, Centrefile, the computer bureau subsidiary of the National Westminster Bank (one of the four largest clearing banks in the UK) launched its PISCES (Petroleum Industry's Scheme for the Clearing, Electronically, of Sales) service for fuel retailers. The service is off-line and caters for the

electronic capture of credit card data only, but it fills a genuine need efficiently and cost-effectively.

PISCES can operate with credit card readers located either on the petrol station forecourt or in the sales office. When it is used in the sales office, the attendant passes the card through a cardwipe. Authorisation is by signature, and the terminal prints out an invoice for the customer to sign and retain.

Cards are checked against blacklists stored in the terminal and updated daily. Card details and transaction values are stored in the terminal, which is polled overnight by the Centrefile computer during British Telecom's low-rate nighttime communications period, to collect the transaction data for the previous day. Centrefile provide a 2,400-baud modem, but not the terminal. The day after the data is collected, the transactions for each credit card company are separated, and magnetic tapes of the relevant data are sent to the card companies by 1700 hours. The card companies credit the petrol station operator's account via BACS (the UK's automated clearing-house).

PISCES currently serves 180 petrol stations operated by several major UK oil companies. Cards by Barclaycard (Visa) and Access are currently supported, and negotiations are in progress with other credit and charge card companies and with oil companies with in-house credit cards.

Dart Oil Company Limited

Dart Oil, which operates 85 Esso stations, now has all its sites connected to PISCES. It installed Edacom 10 point-of-sale terminals in 33 sites when they were rebuilt from 1981 to 1984, using them initially as conventional point-of-sale terminals. In summer 1984, a major upgrade took place when the remaining 52 sites were fitted with Edacom. Subsequent upgrading to EFT use in spring 1985 posed no major problems.

The elimination of credit card slip handling has indeed speeded up the completion of transactions, and it has allowed customers to move off the forecourt more quickly. This has led to an increase in trade, since customers tend to choose their petrol station by the length of the queue. Insofar as the new technology affects customers, the feedback is that the faster service and printed slip are much appreciated. Fraud has been significantly reduced, and predicted increases in accuracy and savings in credit card slip handling and bookkeeping (reconciliation and addition is done automatically) have been achieved. A reduction in the transaction fee of about 6 pence (9 cents) per transaction has been negotiated with the credit card companies participating (currently Access and Visa), and payments are credited to the oil company's and station operator's accounts more quickly.

The oil company paid for the initial purchase of the POS terminals and their subsequent upgrading. The provision of the telephone line and modem cost £650 (about $940) per site. Dart estimate the payback period for the costs involved in the upgrade to EFT (ie the cost of the adaptation of the POS terminals, card swipe, modem and Centrefile link) at eight months.

Dart Oil provides a good example of how a relatively simple application of EFTPOS (off-line, and handling credit cards only) can pay for itself very quickly. The characteristics of fuel retailing make off-line operation without credit authorisation acceptable, since transaction values are restricted by the capacity of the car petrol tanks.

The choice of Edacom as the point-of-sale equipment with a view to EFT requirements in the future made relatively straightforward upgrading of the equipment possible, as the emphasis on software implementation of functions in the terminal design provided the flexibility required.

Esso Belgium — Increasing sales with EFTPOS by offering 24-hour service

All major petrol companies in Belgium were contacted in 1981 by the two EFT network operators (Bancontact and Mister Cash). Esso chose Mister Cash because competition (Shell) was favouring Bancontact and because one of the four terminal suppliers suggested by Mister Cash was Autotank, who had already supplied Esso with equipment for their self-service stations.

By mid 1985, Esso had equipped 230 of its 700 service stations with Mister Cash facilities.

Esso pays for and installs the equipment at the stations for an average cost of about BF 700,000 ($13,350). Additionally, it pays for the local part of the telephone line rental; the operator pays the interlocal part. The network operator credits the station operator and debits the clients. It also provides the station operator with daily listings of all transactions, transactions per pump, etc. Esso receives only a report of transactions per station.

Currently, a station operator receives a commission of BF 1.58 (0.03 cents) per litre sold, regardless of payment mode. This level of commission could lead a number of oil companies to consider more seriously the economics of unmanned stations. Esso, however, believes that the human element in service provision is an important one which requires motivated operators. These operators currently earn less because clients do not visit their shops as often, now that they can pay with bank cards without having to enter the office. However, the forecourt card readers

connected to the EFT network do allow petrol sales outside normal opening hours, and Esso hopes for increased sales from being able to sell round-the-clock.

Once Esso installed the Mister Cash cardmachines, it introduced its own Esso credit card for fleetowners. At present, there is a potential market of 10,000 fleetowners in Belgium. Processing of payments is done by the same organisation that processes all Mister Cash payments (CIG in Brussels). A magnetic tape of all transactions is delivered to Esso daily.

Esso's prime motivation for offering EFTPOS services to customers is its impact on sales, not cost reduction.

Esso aim to reach a level of 15% of sales via bank cards using EFTPOS. In their experience, at any one petrol station where the facility is made available, two or three years may be needed before wide acceptance by customers can be achieved. Their plan for the future is to equip all their self-service stations by 1990 with EFTPOS. Currently, self-service stations account for 60% of total sales, and this share is still increasing, rising to an estimated share of 80% by 1990. This would mean some 550 Esso service stations, or roughly double the current installed base, equipped with EFTPOS facilities.

Mobil Oil Corporation — Aiming for different objectives for credit and debit EFTPOS

Mobil is one of the major US oil companies, operating a chain of petrol stations nationwide. It is currently engaged on a $30-million programme to provide EFTPOS on-line at 3,600 of its sites, of which 2,400 have already been equipped. The system caters for credit card transactions at all sites, but of those installed about half also cater for debit transactions. The first major area to offer the debit facility was brought on stream in early 1984 after a pilot trial. Ultimately, Mobil hope to offer the debit capability at all petrol stations on their credit network.

EFTPOS terminals are located in the kiosk. Although Mobil has reviewed and tested an integrated customer-operated system, it has found that the complications and resulting costs outweigh the potential benefits. Also, fire and safety regulations limit the use of unmanned operation.

Debit EFTPOS is being introduced by Mobil in partnership with major banks or bank network providers in each area. Mobil operates the communications network, provides all the system support required, and transmits to the banks transaction data formatted to suit their particular accounting requirements. Authorisation and data capture take place in real time, and funds are credited to Mobil in batch overnight.

Debit cards currently account for only a small proportion of transactions. However, growth is steady, though slow, especially in those areas where ATMs are not heavily used, and where Mobil is the first retailer in the market to offer a debit card facility.

Mobil is pursuing different objectives in providing the credit and debit EFTPOS capabilities. With credit cards Mobil is seeking operational savings, particularly with regard to its large in-house credit card operation, where it is seeking to reduce the costs of its central card account handling office. It also hopes to reduce fraud and bad debts. It also accepts MasterCard and Visa, and with these it anticipates achieving operational savings on transaction handling costs. In both cases it hopes to reduce 'float', money owed but not yet received because of delays in the processing of information about credit card transactions. The debit capability is not expected to result in cost reductions or increased operational efficiency (petrol stations in the US do not as a rule accept cheques), but as the first US oil company to provide this additional payment mechanism, Mobil hopes to gain a market advantage.

Mobil is planning to install EFTPOS only at those petrol stations with the highest volume of sales, where it believes that the investment will be justified. However, a number of criteria are considered when suitable sites for EFTPOS are selected — in particular, the total business volume, volume of credit card sales and the cost of connecting the station into Mobil's communications network.

When Mobil surveyed the market for a suitable EFTPOS terminal in 1982, it could not find one which adequately met its specification. Mobil specified an inexpensive and relatively simple device with a card reader, keyboard for entering transaction information, modem, receipt printer, alphabetic display for messages to indicate card nonacceptance or attendant error, and a small amount of intelligence to control the process. In particular, it did not require additional electronic cash register or accounting capabilities. Eventually, after fruitless searches among established suppliers, a relatively small company, Datatrol, was commissioned to make a bespoke product.

Establishing the communications network proved to be the critical element in the implementation of the system, as it determined the timing of service availability. It has also been a major cost element; the breakup of AT&T has resulted in higher telecommunications tariffs than originally anticipated, and there is still considerable uncertainty about how current regulatory activity in the telecommunications field will ultimately affect Mobil.

The $30 million budget for EFTPOS covers all aspects of system implementation, including hardware,

facilities, manpower, and training. EFTPOS terminals account for only a relatively small fraction of the total costs, at less than $1,500 per terminal for large-volume purchases, or $5.4 million in total. Mobil have successfully negotiated reductions in transaction fees with the credit card companies. Debit card services are being introduced on the basis of no transaction fee either way between Mobil and the banks. Mobil believes that this is an equitable solution, as EFTPOS will bring worthwhile economies to the banks as well as to Mobil.

Apart from the installation of the communications network, major issues in system implementation have been staff training and providing system support. Considerable effort had to be devoted to developing the training programme for service station attendants before the desired levels of competence were achieved. Mobil have also provided a central 'help desk', manned round the clock and with on-line access to the system. Its objectives are to help station attendants with procedural problems, to diagnose technical faults and to dispatch maintenance staff if required.

Mobil's approach is an interesting one in a number of respects:

— It has recognised that the basis for cost-justifying credit and debit EFTPOS needs to be different, and it has planned system development accordingly.

— It has developed selection criteria designed to select those sites where the cost-benefit picture is likely to be most advantageous. With a large number of petrol stations of varying sizes spread over a wide area, the costs and benefits of installing EFTPOS will vary widely from one site to another. Mobil have decided to convert only a proportion of their sites initially, choosing the most suitable sites according to the criteria developed.

— Mobil's experience also indicates that training and system support are as important to the successful operation of EFTPOS as to other complex systems.

CHAPTER 6

CASH MANAGEMENT: CORPORATE SERVICES

The previous chapters described how IT can improve the efficiency with which large volumes of cash transactions are effected. We now turn to how IT can improve the management of cash as an asset rather than as a means of payment.

Clearly, the amount of cash handled will determine how important it is to manage it well, and hence the means to be deployed. The problems faced by a large multinational corporation with many accounts, several in different currencies, are greater than those of an individual managing his own personal affairs. But IT can help both. In this chapter we concentrate on corporate cash management; the next chapter deals with cash management services for the individual.

Tight cash management is important to corporations

High interest rates and fluctuating foreign currency exchange rates have made organisations especially conscious of the need to control their funds closely. An extra $100,000 which need not be borrowed, or else may be invested, can add $10,000 per year to the bottom line. The choice of best currency for export orders, and the reduction of value of foreign exchange transactions are also directly reflected in increased profits. Large corporations have set up specialist treasury functions to manage their funds. The application of IT has even made it feasible for some organisations to run their treasury function as a profit centre, as we shall see in one of the case histories described later in this Chapter. But there are potential benefits from IT which are well worthwhile for small companies, as we shall also describe.

The key to tighter cash management is the use of on-line services

There is already extensive use of IT by corporations to handle their routine payments and receipts. Batch systems are used to transfer payments to staff and suppliers in electronic form to their banks. They are used mainly as a means of effecting transactions more cheaply, rather than to use corporate funds to earn more profits. They also cater for only part of the corporate cash flow. Typically, such batch systems have not been suitable for ad hoc large value, low volume transactions.

To control funds the corporate treasurer requires:

- Information on the balances in the corporation's bank accounts.
- Information on current and forward interest and exchange rates available for fund investments and transfer.
- Tools to enable him to analyse his financial situation and identify what is the optimum deployment of the funds at his disposal.
- The means to invest surplus funds or transfer them between accounts.

If he is to exercise tight control — on a day-by-day basis — then all the above information must be accurate and reflect the exact position at the time he requires it; he must have access to his decision tools immediately; and he must be able to effect any decisions to transfer funds there and then. On-line IT services can meet these needs more effectively than the use of paper, telephone or telex. They can also provide benefits to the other parties involved in the transfer of the funds, such as the banks, and they also provide a business opportunity for third party suppliers.

Other uses of IT can usefully supplement on-line cash management services

We concentrate our attention in this chapter on the on-line cash management services available to those responsible for managing a corporation's funds. But we also have to give some consideration to two other applications of IT to cash management.

Bulk payment services
As mentioned above, batch services have been in existence for some years to handle payments in bulk. More recently, their suppliers have started to offer on-line access to effect transactions at shorter notice, and to make it economic for smaller volumes of transactions to be submitted. Hence they are starting to meet one of the corporate treasurers' needs defined above.

Workstations and treasury management systems
The other application of IT aiding the cash manage-

ment function is the provision of computing systems used locally in the treasurer's office. While decision tools to aid cash management have been made available via on-line services, the low cost of microcomputer workstations makes it more cost effective to hold and run such tools locally in the office, rather than to incur the communication and processing costs of accessing them on a remote computer bureau. Hence the appearance of the 'treasury workstation' to replace the dumb terminal linked to on-line services.

Large corporations with complex treasury functions may require more powerful systems to perform the same functions, and in these cases extensive automation of treasury functions may be necessary before the benefits of on-line services can be realised. It is also worth linking the cash management systems in large corporations to their own internal data systems to gain most benefit from on-line cash management services linking the corporation to its external accounts. The relationship between on-line financial services and internal treasury automation is illustrated in Figure 6.1. Hence IT is also applied in the form of treasury management systems operated locally by the treasury function, and linked to both external and internal computer systems.

Opportunities for users and suppliers of on-line cash management services

The purposes of this chapter are:

—To review the corporate cash manager's needs, and how the services and products currently available meet those needs.

—To compare the costs and benefits of using those products and services both in theory and in practice.

—To identify who provides the products and services.

—To provide some guidelines for potential users.

—To predict how the market will develop and to identify possible opportunities for suppliers.

Like the rest of the report, the material in this chapter is based on interviews with both users and suppliers, and research of relevant literature. It is illustrated in detail by case histories chosen from our interviewees. They describe how IT has contributed to cash management of three organisations:

—A small stockbroker.

—A multinational company with multiple foreign currency accounts.

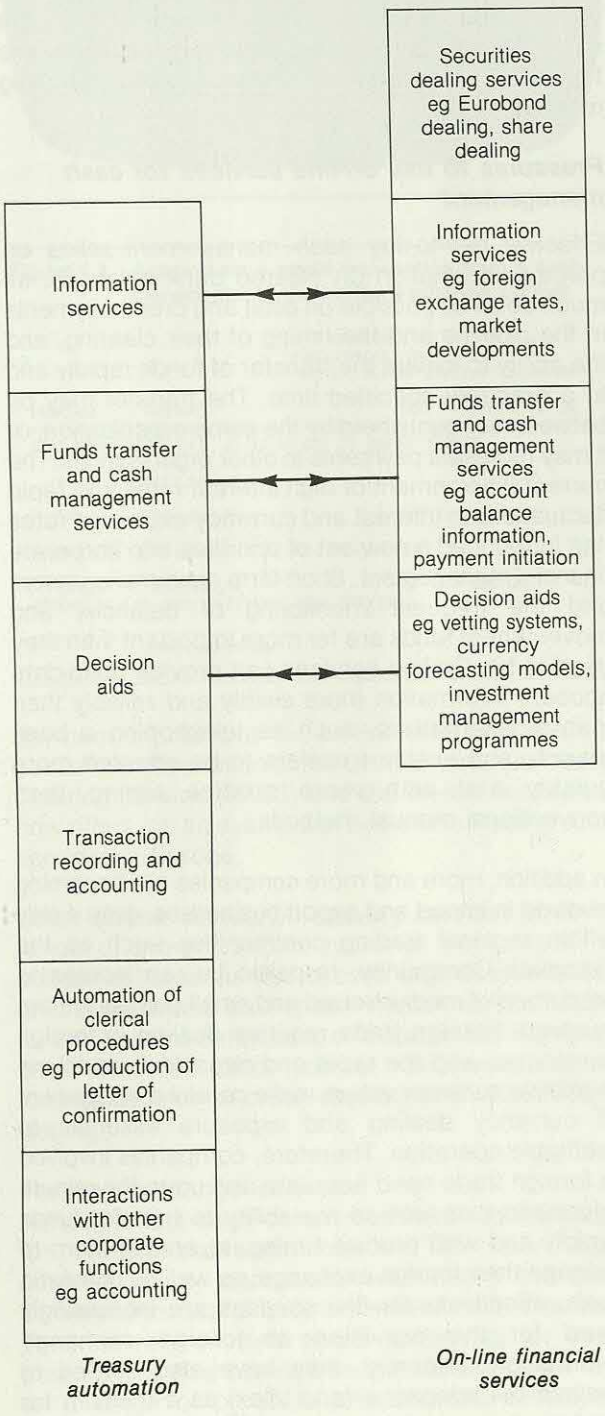
—A very large corporate group encompassing many different types of business.

They show how organisations, very different in both size and nature, have all benefited from the use of IT for cash management.

CASH MANAGEMENT NEEDS AND THE SERVICES TO MEET THEM

Most large organisations now have treasury functions which are responsible for cash management. In many companies they are relatively recent, having been

Figure 6.1 Treasury automation and on-line financial services



established only in the last five years or so. Typically the responsibilities of a treasury function are:

—To minimise borrowing and associated costs. This may include ongoing long-term finance for major projects or purchases as well as short-term cash needs.

—To maximise returns on cash assets.

—To manage foreign currency utilisation to minimise risks and transaction costs.

Even where the size of an organisation does not warrant a separately identified treasury function, the same objectives exist for those responsible for the financial management of any organisation handling money.

Pressures to use on-line services for cash management

Effective day-to-day cash management relies on precise information on cleared bank balances, as much detail as possible on debit and credit payments in the pipeline and the timing of their clearing, and the ability to initiate the transfer of funds rapidly and at a precisely specified time. The transfer may be between accounts held by the same organisation, or it may represent payments to other organisations. The current environment of high interest rates and rapid fluctuations in interest and currency exchange rates has introduced a new set of priorities into corporate financial management. Short-term cash management and the frequent monitoring of balances and movement of funds are far more important than they used to be. On-line services can provide up-to-date account information more swiftly and reliably than manual alternatives, such as telephoning a bank branch, and enable transfers to be effected more quickly and with more precise timing than conventional manual methods.

In addition, more and more companies are becoming involved in import and export businesses, even if only within regional trading communities such as the European Community. In particular, an increasing proportion of medium-sized and small companies are involved. Foreign trade requires dealing in foreign currencies, and the rapid and sizeable fluctuations in relative currency values make careful management of currency dealing and exposure essential to profitable operation. Therefore, companies involved in foreign trade need accurate and up-to-the-minute information, as well as the ability to transfer funds rapidly and with precise timing, to enable them to manage their foreign exchange, as well as domestic cash, effectively. On-line services are increasingly used for the provision of foreign exchange information. Recently, they have also started to replace the telephone (and telex) as a medium for trading.

Trends encouraging the use of IT for cash management

A number of trends are currently encouraging the use of IT in cash management and broadening the range of both the applications and the range of options available:

—Automation in the banking environment enables banks to offer their customers a greater degree of automation in payment and related services. Automated clearing-houses (ACHs) allow organisations to input payment instructions in bulk to a central point for distribution on magnetic media to a range of banks. The electronic clearing houses, of which the first were CHIPS in New York and CHAPS in the UK, go one stage further and accept and clear payment instructions on-line. Improvements in bank back-office systems allow banks to accept payment instructions input on magnetic tape and offer payment, inter-account funds transfer and information services by on-line communications.

—Automation in organisations using bank services allows them to take advantage of automated payment services more readily, and to derive much greater benefits from their use. Computerised payroll processing is an example: where the payroll has been computerised, it is much easier and cheaper to produce a magnetic tape of payment instructions than otherwise. Similarly, the spread of personal computers in treasury departments has stimulated the use of on-line cash management services.

Cash management services and products

The above pressures and trends have led to the emergence of a number of on-line services aimed at providing:

—Instant monitoring of account balances.

—The ability to transfer funds as and when required.

—Decision aids in the form of information about the financial environment, such as interest and exchange rates, and also calculation tools to evaluate the optimal disposal of funds as quickly as possible.

In the latter case, the increasing use of personal computers and their relatively low price have led to some of the decision aids being provided as software to be used in treasury workstations rather than as services accessed via a communication link.

In addition, there is clearly scope for applying data processing also to the administration of the treasury function and linking it to the internal data processing systems within the company. Here we focus, however, on those products and services directly con-

cerned with improving the management of funds rather than on ways of improving the internal workings of the treasury function.

Account monitoring

Account monitoring, or balance and transaction reporting, services provide information on the current status of balances in the client's bank accounts. The service may cover just the client's accounts with a single bank, or it may pool information from a number of banks. It may provide statements of individual transactions in varying amounts of detail on request, as well as balance totals. The balances may be cleared balances (ie available funds), ledger balances (ie including payments received but not yet cleared) or both. The service may provide the previous day's closing balance or the current day's opening balance, or periodic updates during the course of the day as well, or 'real time' data (the balance position as known to the bank at the moment of enquiry) or a combination of these. The latter takes account of any additional debits or credits which have been delivered during the course of the day. Figure 6.2 shows a screen display from a service giving a summary of account balances, while Figure 6.3 shows a report on a credit transaction.

The choice of approach to collecting balance information has an impact on how up-to-date it is. 'Extract, Store, Request and Report' (ESRR) systems collect information from the relevant bank systems and files and stores it on a separate database for access by the customer. 'Request and Direct Reporting' (RDR) systems provide the customer with information direct from the relevant files on the bank computer system on request.

Instruction delivery

Instruction delivery services may cater for several types of instructions to the bank:

—Transfers between accounts.

—Payments to other organisations.

—Currency exchanges.

—Delivery of instructions of other kinds.

Payment services are sometimes offered independently of other on-line bank services. The UK CHAPS service, offering automated same-day clearing of payments in excess of £10,000 (about $14,000), is a prime example, although banks are beginning to integrate other services with it.

Another on-line payment service, which has recently become available, is an extension of the batch payment systems which have been in operation for several years for automating bulk routine payments such as payroll. Such systems are now starting to offer the facility to receive small volumes of ad-hoc

Figure 6.2 A balance summary display from an on-line cash management service

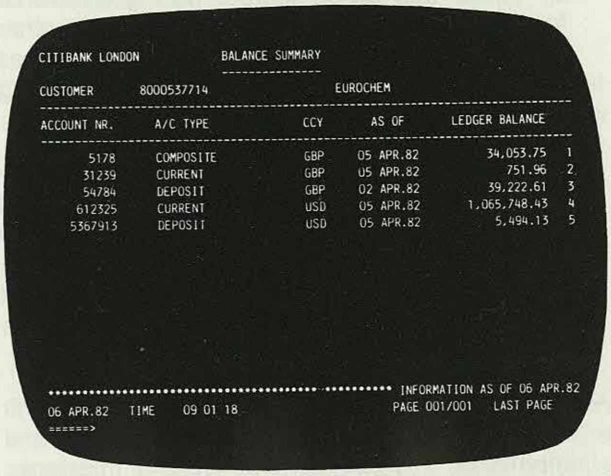


Figure 6.3 A report on a credit transaction from a cash management information exchange system

```
                         BANKLINK
                      EUROCORPORATION
                   CREDIT REPORT 22/11/83 09:33 GMT

TRANCODE      AMOUNT                      DATE    REFERENCE ID.
===============================================================
1234-123456789012345  21/11/83 GBP 20 SMYTHE STREET

   601        655,000.00                          01250000

   541        588,006.00                  DAY1+   35010082

PAYMENT OF  INVOICE 104-22E, ATT: MR. JOHN SMITH

   541        256,100,00                  DAY1+   35010083
ATTENTION J.P. BIG, REFERENCE YOUR 581/244

SUBTOTAL    1,499,106.00 GBP
```

payment instructions via on-line links. Appendix 2 contains a description of the UK Bankers Automated Clearing Service (BACS) and the on-line facilities it now offers, as an example of one of the leading such services in Europe.

Other on-line instruction delivery services cover a range of more complex types of instructions. A number of banks (as well as other organisations) offer on-line securities trading services of various kinds, for example for Certificates of Deposit, Eurobonds or other securities. Other types of instructions catered for include letter-of-credit applications and bid-bond issuing.

Foreign exchange services

Although most large companies have requirements for foreign exchange, only a few very large corporations or companies with heavy overseas commitments deal directly in the markets themselves. The rest rely on their banks as agents for such transactions. The companies that do deal direct rely on a range of products and services developed primarily for banks:

— *On-line information services.* These consist of frequently updated pages of information supplied by banks and other sources listing up-to-date foreign exchange rates, interest rates and other financial data. Some of the information services are beginning to be paired with direct dealing services.

— *Communications systems.* Foreign exchange dealing is typically conducted by telephone, and in the fast-moving foreign exchange markets effective communications are essential. Switching systems and interfaces which give the dealer rapid access to external links are vital to effective dealing.

— *Dealers' workstations.* These provide screens and keypads for accessing external and internal information sources, communications interfaces and software to allow the dealer to input and keep track of his positions.

— *Support systems.* These automate the paperwork related to dealing, and may also undertake book-keeping functions.

Decision aids

Decision aids for treasury departments are computer-based analytical tools to assist in treasury decision making to optimise cash management operations. Unlike account monitoring and instruction delivery, they do not, in principle, require or need to relate to any interactions with the bank. Banks provide them as an attractive component of a service package, for their potential to generate additional business, or as a product in their own right. They may be implemented on a bank computer and accessed on-line, or they may be supplied as software for a treasury workstation (see below). Some of the main types of decision aid on offer are:

— Simple analytical tools for the manipulation of balance data.

— Cash flow forecasting systems.

— Multilateral netting systems, which help companies with operations in a number of countries minimise foreign exchange transaction costs and float for intra-company payments.

— Foreign currency dealing aids, for example forecasting models and tools for identifying arbitrage opportunities.

— Investment and portfolio management tools.

Treasury workstations

The very first on-line cash management services available offered access via dumb terminals to bank computer systems for account information display, with little scope for data manipulation. However, current terminals, incorporating true intelligence, permit the downloading of data for subsequent off-line analysis, permitting a saving in communications costs. Smaller companies, however, may not need the full analytical capabilities of such a workstation and therefore may not be able to cost-justify the expense. Such smaller companies are likely to continue to use on-line services predominantly for simple information retrieval rather than for analysis.

All intelligent terminals with software written specifically for treasury operations are commonly referred to as 'treasury workstations'. They are stand-alone microcomputer-based products running software designed to support treasury management, administrative and analysis functions and capable of acting as an interface to on-line bank services. Almost all use IBM XT or PC hardware. Some software can run on other types of micro- or minicomputer as well.

Hence what constitutes a treasury workstation and treasury products varies widely, from systems which act as an intelligent front-end to bank systems; software packages which act as an interface between balance reporting services and standard micro-computer-based spreadsheet packages; to sophisticated systems designed to integrate all treasury functions, and to provide high-grade analytical support to one or more major areas of treasury operation.

Other on-line sevices

In addition to the cash management products discussed above, banks may offer other on-line information services not specifically related to a client's accounts or transactions as part of a service package. Information on interest rates and general financial and economic news are among the most popular and useful. Such services are also available from other sources such as companies in the on-line information business.

COSTS AND BENEFITS OF USING CASH MANAGEMENT SERVICES

A prospective user of an on-line cash management service must evaluate the costs and benefits for his particular circumstances. In this section we give some estimates of costs, and guidelines to evaluate benefits.

The costs of using on-line services

The costs of adopting on-line cash management and payment services may include some or all of the following:

— Hardware.

— Software.

—Service charges, which normally comprise both a signing-on fee and usage-related charges.

—Communications costs.

Most on-line cash management services can be accessed from either a dumb terminal or a personal computer. Most treasury departments will already be equipped with a suitable personal computer, but where this is not so, the cost of obtaining one will be only about $800-1000. If a personal computer is already in place, but is not already used to communicate with external computers, communications software and a modem or acoustic coupler will be required. These typically cost about $130-150.

Access to certain specialised services, such as the CHAPS payment service in the UK, requires special terminals based on a more powerful micro. These can be much more expensive, about US $10,000 or more.

If a personal computer is to be used as a treasury workstation, and not just as a terminal for accessing on-line services, treasury workstation software will also need to be purchased. This will cost from $6,500, to as much as $27,000 or more for a powerful system tailored to the requirements of a large corporation. In addition, a fee of some 20% of the purchase price per annum is usual for software support, maintenance, training and system enhancements.

Many banks are very reticent about providing information on charges for their on-line services, as price is a key element of competition. They seem to vary widely. One bank indicated a 'signing-on' fee of $50-100. However, for all, the most significant charging elements are usage-related. Typically these include an access charge (from $1-5 per call), and additional charges for each item of information accessed and instructions input (typically some 50 cents per item). One UK bank charges $8-9 for CHAPS (clearing house system) transfers, or $4 for a transfer to another account with the bank, but these charges need to be compared with those levied for alternative types of transfer, for example $15-20 for telephone transfers. One US bank makes no item charge for on-line transfers and allows a $1 per item reduction on its standard back-office handling charge, because the use of the service saves the bank the cost it would incur in using conventional payment methods. In addition, some banks may levy timesharing charges for use of the bank's computer or that of a timesharing computer network.

We found somewhat greater agreement between banks on estimates of typical monthly payments per customer, ranging between $200 and $675. Minimum monthly payments for UK clearing banks ranged from some $27-40 for account information reporting only, to $135 for full service. At the other extreme, one UK bank quoted $1600-1700 for UK reporting only, and the treasurer of a major German chemical producer commented that annual costs can easily reach several tens of thousands of dollars.

Communications costs comprise at least the cost of a local call to connect to the local node of the timesharing network operator by which the services are accessed. In some circumstances an additional telephone line may need to be installed. The communication costs incurred on the service providers' network are not normally billed separately from the service charges.

The benefits from the use of on-line services

The benefits of on-line corporate payment and cash management services need to be assessed in the context of treasury automation. Some major benefits of treasury automation are given in Figure 6.4. The greatest benefits are realised when on-line account information and transaction services are combined with automated in-house treasury systems and, in some cases, even integrated with systems in other

Figure 6.4 Benefits of treasury automation

Operational benefits

Savings in clerical time can be achieved.

Paper flows can be reduced.

Savings in professional time on routine tasks are possible, allowing more profitable use of professional skills.

Business benefits

Bank charges for information and payments services can be reduced.

Other payment handling costs, eg messenger costs, can be reduced or eliminated.

Other on-line financial services, eg securities dealing, can be integrated.

More systematic, precise and detailed record-keeping is possible, giving a greater degree of control over cash management and permitting:

— better return on assets
— better performance analysis
— simplification of operations
— more effective cost allocation

Faster more precise information permits better utilisation of idle balances and control of borrowing, and more effective foreign exchange management.

Reduced response times and more timely information enhance flexibility. Guaranteed timeliness of payments eliminates expensive and disruptive delays.

Minimising delays reduces risk, eg in foreign exchange dealing.

Computerised analytical tools permit better decision making.

Networking of funds flow reduces foreign exchange transaction costs and exposure, and facilitates single currency pooling and concentration.

Integration of treasury systems with those of operational units permits better cash forecasting.

Accuracy is improved, and incomplete information is easier to complete.

parts of the organisation. On-line services by themselves, however, do yield to a degree most of the benefits listed. In some circumstances, for example for small firms or for handling payments, they can be fully effective standing alone.

Benefits from account monitoring

Above all, on-line balance reporting and detailed account information allow better planning of short-term cash management than is practicable using manual methods. Information on cleared balances can be obtained at a time appropriate to the treasurer's daily timetable, and the details of payments received (in clearing or cleared) make forward planning easier. Allowing several days for payments to clear can result in significant losses of interest over a period of time, and unplanned short-term borrowing can be very expensive. Instead, funds can be invested profitably overnight. Tandy Europe, one of our case studies below, estimates that the on-line cash management service it uses enables it to act 3-4 days earlier than previously, avoiding losses on overdrafts and permitting the utilisation of liquid balances. Trevor, Matthews and Carey, another of our case studies, reports that it increased its income from bank interest by 50%. Some banks also have a policy of charging less for on-line than for telephone information enquiries, which can directly benefit the user organisation by reducing bank charges.

Where a substantial number of different accounts has to be monitored, the benefits of on-line reporting are the greatest in theory, but they are also the least likely to be realised in practice. Internationally, many banks still do not provide balance information on-line, or will not channel it through another bank for reporting. Also, banks differ in their data presentation formats. Automatic routines for polling a number of banks in succession and presenting their balance information in a standard format are available, but frequently take longer than telephoning.

Some companies, in particular large ones with considerable influence over the procedures of other organisations and with well established treasury practices, can keep sufficient track of balances by insisting on payment methods or procedures which give them advance notice of payments without needing balance reporting. However, these alternatives are unlikely to be practicable for less influential organisations, or for those with treasuries that have only recently been established.

Benefits from funds transfer

More precise and up-to-date information is of greatest benefit when coupled with improved facilities for the transfer of funds. Greater speed and more precise timing of funds transfer is particularly important when a number of interdependent payments have to be made, as in the buying and selling of houses in the UK. Typically, chains of interdependent transactions arise where each purchase depends on a prior sale, and a succession of payments between lawyers acting for the individual house-buyers and sellers needs to take place on the same day. A second example of situations in which on-line funds transfer brings significant benefits is that of a UK airline with operations in many countries. It takes advantage of on-line balance reporting and funds-transfer services provided by international banks at some of its overseas locations to effect same-day transfers to interest-bearing concentration accounts in London. The availability of on-line account information and funds-transfer facilities is now becoming an increasingly important factor in its choice of banks abroad.

The payback periods achieved after switching from telephone transfers for high value payments to on-line payments seem to be fairly short. Organisations we researched typically report average savings of about $7 per transfer, or $13,500 to $20,000 per year. One company reported that a CHAPS terminal had paid for itself in eight months, in terms of the cost of telephone transfers alone, excluding any savings on messengers taking instructions to the bank. Even a small firm making only a few payments per week saved nearly $7,000 in a year.

Benefits from decision aids

The simpler analytical tools, such as cost spreadsheets to give account analyses, result primarily in a saving of treasurer's time. By contrast, more complex aids can yield direct business benefits by allowing optimal decisions and appropriate actions to be taken more quickly. For instance, foreign exchange analysis tools can yield significant improvements in foreign exchange costs by providing the capability for rapid analysis and response.

As a specific example of one such tool, multilateral netting systems help companies with subsidiaries in many countries to minimise the numbers and amounts of intra-company payments, and thus funds transfer and currency exchange costs. They calculate the minimum net payments equivalent to a complex pattern of transactions (see Figure 6.5). The potential for savings on the foreign exchange turnover of multinationals is considerable. BP, one of our case studies (described on page 73), with an annual foreign exchange turnover of some $80 billion, estimated that less than a 0.1% improvement in efficiency would pay for its systems.

Benefits from treasury automation

As regards the cost-justification of broader treasury automation, one multinational car manufacturer is reported to be spending $1m on upgrading its treasury systems and expects this investment to pay back in one year. The savings that can be achieved

depend, however, on many factors that are organisation-dependent, and the potential savings for a small company may just be the saving of small amounts of staff time.

New business opportunities

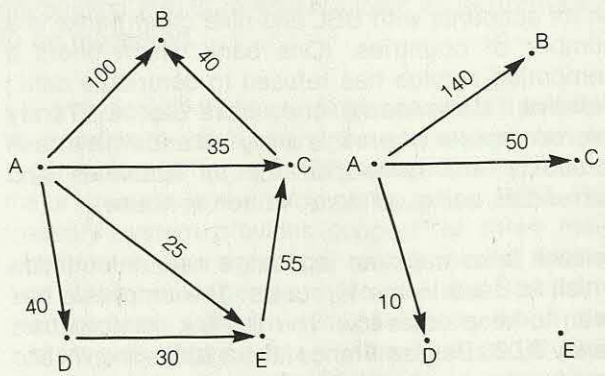
During our research we did not encounter any examples where the use of on-line cash management and funds transfer services had enabled companies to pursue new commercial opportunities, other than those encountered in any case during the normal course of cash and foreign exchange management. Treasury automation in general, of which on-line services are only one aspect, has made it easier, however, for treasury departments to be set up as separate profit centres, and has improved — sometimes considerably — the return on assets they are able to achieve.

USERS' EXPERIENCES OF ELECTRONIC BANKING SERVICES

Companies ranging in size from the small local company to the largest multinational have implemented electronic banking services, often in pursuit of widely differing objectives. Indeed, electronic banking has brought substantial benefits in a wide variety of contexts. In this section we present three case histories, illustrating the range of applications and benefits achieved in practice. The company case histories we describe are:

Trevor, Matthews and Carey Ltd (a small stockbroking firm based in the Channel Islands), which has derived substantial quantifiable benefits by using basic electronic payment and balance reporting services. Its experience has encouraged it to take advantage of other on-line financial services.

Figure 6.5 Netting in a single currency



The pattern of payments on the left is equivalent to the three net payments shown of the right.

Tandy Europe, the international electronics company, which uses cash management in its treasury department to manage a number of accounts in different countries, has obtained substantial benefits at relatively little cost.

British Petroleum Finance International, which provides banking and cash management services for the BP group of companies. It is only now that cash management technology is sufficiently sophisticated for such a large operation as this group. BPFI's automation of cash management has the potential to make a substantial contribution to the group's return on assets.

Trevor, Matthews and Carey — A small company benefiting from on-line payments

Trevor, Matthews and Carey Ltd* is a small-to-medium sized firm of stockbrokers based in the Channel Islands. It has offices in Jersey and Guernsey, with a total staff in the Guernsey office of just over 20.

Automated Payments

The business of the Guernsey office of Trevor, Matthews and Carey involves making substantial volumes of high-value payments (of the order of 6 per day). Before it considered switching to automated payments in early 1984, it was paying £10 (some $14) per transfer for wire transfers at bulk rates, a figure which excludes the cost of staff taking instructions to the bank. The firm was advised by its bank manager to consider making the payments on-line, and decided to use the Midland Automated Payments System (MAPS), operated by the Midland Bank. It now rents a Northern Telecom Displayphone at £80 ($110) per quarter and an additional telephone line from British Telecom to access the system. To make a payment, it is necessary to dial up MAPS, enter the relevant passwords, a code for the beneficiary and the amount. The recipient is credited the same day.

Trevor, Matthews and Carey originally accessed MAPS via telex. This proved unsatisfactory: it was very slow; staff had to leave their desks to use it; the telex was often in use for other purposes; staff wishing to make payments could not get to it as the midday deadline approached; and it also suffered occasionally from interference on the line. By contrast, they found accessing MAPS via the Displayphone quite easy, and staff training took only an afternoon. The system had to be pre-programmed with codes for each potential beneficiary; this cost £3 ($4) per item for 100 beneficiaries. More beneficiaries can be added as necessary.

* Since this case history was researched, Trevor, Matthews and Carey Ltd has associated itself with Hoare Govett, a major UK stockbroker, and now trades as Hoare Govett (Channel Islands) Ltd.

The firm has found it substantially cheaper to make the payments on-line. Midland charge £5 ($7) per on-line payment, a saving of £5 ($7) on each payment. The system will not make transfers of less than £10,000 ($14,000) and instructions need to be entered before midday for same-day payment, so that some requests still need to be taken direct to the bank. Nevertheless, at a conservative estimate, about three payments per day are handled on the system. A minor additional benefit is the printed record of payments produced by the system, which avoids problems of errors in cash-book entries.

Balance Reporting

Trevor, Matthews and Carey also makes use of Midland's balance reporting service. The firm finds it necessary to deal with a considerable number of banks in a number of countries, and has been slightly disappointed that its other banks have been unwilling to provide balance reports via the Midland. However, the Midland is its main bank and processes some 100 funds transfers a day for the firm, with cheques of some hundreds of thousands of pounds drawn on it at any one time. Therefore, balance reporting on Midland accounts alone has proved very useful. Previously, the firm needed to allow for cheques to be cleared on the third day after submission, but had no precise information on cheques to be cleared on any one day. Now it knows what cheques will clear at 9.00 in the morning, it can predict its cleared balance at the end of the day, and it can place any surplus funds on the money market overnight. The balance report costs £2 (just under $3) per day, and the cost of the service for the first year was effectively recovered in the first week. The firm estimates to have increased income from bank interest by about 50%.

Other services

Experience with MAPS have encouraged Trevor, Matthews and Carey to try other on-line financial services. It now makes use of two further services, CEDEL for Eurobond transfer and account monitoring, and Manufacturers Hanover's Geopak service for controlling the safekeeping of securities in New York.

Previously, information on Eurobond accounts could only be obtained by post, taking three days at best, so that the firm always found itself behind the market. Now it can give instructions, take reports, examine cash balances and stock holdings on-line and respond immediately.

Similarly, when dealing in securities in New York, Trevor, Matthews and Carey had to rely on their broker to hold purchased stock, incurring an additional cost, either as a loading of the stock price or as an additional fee. Establishing who held the stock in the first place often took considerable time and effort. Now it has centralised all its holdings into Geopak and is able to pass instructions to them on-line. Both these services are also accessed from the Displayphone used to make on-line payments.

Trevor, Matthews and Carey is considering acquiring another Displayphone soon, but has no other firm plans for the future. The firm was told that the MAPS system will be changed to accept transfers to any recipient, not just to those who are pre-authorised. This has caused some apprehension, as the firm has no need for this additional facility, and fears additional costs if the basic service needs to be changed to provide it.

A number of conclusions may be drawn from Trevor, Matthews and Carey's experience. Even quite a small firm handling significant volumes of high value transfers can benefit substantially from a service offering balance reporting and pre-authorised payments. As the firm gained experience, it learnt to benefit more from on-line services. Its initial unhappy experiences with telex preceded the fully satisfactory Displayphone implementation, and further useful financial services were added later. Implementation has posed no problems and the capabilities of the firm were not unduly stretched.

Tandy Europe — A multinational company benefiting from better account monitoring

Tandy Corporation, the international electronics and computer products company, controls 388 retail outlets in West Germany, France, the Netherlands and Belgium from its European headquarters in Belgium. The priorities of its treasury, to maximise interest earned on cash deposits, minimise short term borrowing costs and manage currency exchange, are similar to those of many others, but the nature of Tandy Europe's operation places special emphasis on the management of a number of accounts in different currencies.

Account monitoring and cash forecasting

Tandy uses the Banque Bruxelles Lambert (BBL) Telelink Service each morning to obtain information on its accounts with BBL and nine other banks in a number of countries. (One bank which offers a competing service has refused to contribute data.) Telelink downloads the data to a Tandy microcomputer where it is analysed and where cash forecasts are developed for all countries and currencies using software written in-house.

Telelink also supplies exchange rate information which is used in the forecasts. The emphasis has been to keep costs low. The Telelink service costs Tandy 2,000 Belgian Francs (about $25) a month, and new functions are added regularly. The development of the software was not charged to the treasury, but it is offered free to Telelink customers who buy Tandy computers.

The service has made it much easier for the treasury to manage accounts. Information is available three or four days earlier than it would have been from printed statements. In the case of statements posted from abroad it is available at least five days earlier, enabling corresponding amounts of interest to be earned or avoided. Transfers can be made immediately on receipt of the account information, and value dates are never missed.

Tandy evaluated services provided by other suppliers, but rejected them because tariffs were higher for their particular application, and they were structured in a way that made it difficult to estimate the scale of charges in advance.

Tandy does not use on-line funds transfer services because instructions would need to be submitted the previous afternoon for execution the next day, whereas by telex they can be initiated the same morning.

Tandy Europe's use of on-line cash management services is of particular interest on two counts:

—It has obtained substantial benefits in terms of earlier and more accurate account information at modest cost.

—It has found a satisfactory solution to its requirement for the reporting of information from a number of banks in different countries and in a range of currencies.

British Petroleum Finance International — Cash management in a complex organisation

British Petroleum Finance International (BPFI) is a separate profit centre within the BP Group. It acts as an in-house bank, and provides banking services for companies in the BP group. It was formally established at the beginning of 1985, and its objective is to manage BP's cash assets as productively as possible. It was set up as a profit centre with its own accounting structure which allows its performance to be monitored.

It is only recently that technology has made it possible to coordinate cash management on-line for an organisation as large as BP, and this has been a major element in the decision to set up BPFI. The treasury system provides support for three main activities: foreign exchange, money market dealing and cash management. No suitable treasury management software was available when the system was planned three years ago, so BP itself developed its own Treasury Accounting and Management System (TAMS), using the Arbat banking package as its basis, but with corporate cash management functions added.

TAMS

TAMS has a modular structure, with separate modules for major functions such as cash flow forecasting, money market dealing, external bank balance reporting and payment systems, and inputs from associate companies. A key module is the money control pad system. The money control pads are the interface for the treasury managers using the cash management system; they are screen displays of individual bank accounts, showing transaction records in chronological order, and can be grouped in hierarchies to provide a wider overview. Any entries on the money pads, or foreign exchange and money market deals recorded, cause appropriate entries in the accounts to be made automatically.

The system is implemented on two DEC VAX 785 machines in London. The second machine provides backup for the first, and also a testing and development facility. In addition, there are smaller stand-alone installations on VAX 730s in Hamburg and Stockholm. BPFI chose a packaged solution because they wanted the system to be operational quickly, and they felt that they lacked the knowledge to specify it completely themselves. They chose the Arbat package because it was a well-established product with high functionality and was suitable for adapting to a corporate environment. Evaluation of a range of banking packages produced a shortlist from which two were selected for inhouse testing. The choice of DEC hardware was dictated by the software.

Foreign exchange

BPFI has six foreign exchange dealing positions, shortly to be expanded to 12. Each dealing position has four screens, on two of which external on-line market information services can be selected, the other two give access to in-house information. Each also has a dealer board giving access to 150 direct lines to banks. A VAQ video switch is being installed which will allow dealers to choose from and switch between 20 external information services. Deals are arranged on the telephone, and the details are entered into TAMS. TAMS updates accounts and exposure, generates letters of confirmation automatically and initiates funds transfers electronically, by cheque or letter of instruction. It also provides decision aids, for example a model to evaluate hedging deals.

External services

BPFI makes use of a range of external on-line services. Autodiallers call up banks with which BPFI has accounts and capture balance statements to be ready at the beginning of each working day. An on-line service is used to control the issuing of commercial paper in New York, and separate funds transfer services are used for dollar and sterling funds transfers.

The benefits

BPFI sees the benefits of installing TAMS as considerable. The technology has permitted coordinated on-line cash management for the whole BP Group. It has enabled BPFI to be set up, allowing cash management performance to be monitored, clarifying relationships between the treasury and BP companies, and making the appropriate allocation of costs easier. A massive simplification of operations has been achieved, replacing a network of bilateral relationships, and the benefits will increase as more applications are added. For example, payments due to the corporate centre for oil sales to subsidiaries are collected by direct debit of their accounts with BPFI, and automation of payments between BP companies is now being considered. The system has enabled BPFI to cope with the increasing complexity of cash management and to handle a greater volume of work with fewer people. Furthermore, it relieves treasury managers of routine bookkeeping activities, allowing them to concentrate on other tasks.

However, the main criterion on which the system must be judged must be the effectiveness of BP's cash management and foreign exchange activities. BP has an annual foreign exchange turnover of $80 billion, so that even a minimal (less than 0.1%) improvement in efficiency would justify the expenditure on systems.

The scale of the BP treasury operations exceeds that of most other companies, but some elements of its approach are more generally applicable:

— It has used electronic treasury management systems to overcome the barriers to effective cash management which the complexity of its operations imposes.

— For all its complexity, the system is geared to providing support for treasury staff to enable them to use their skills to best effect. Thus routine aspects of accounting and payments have been automated, and a great deal of thought has been given to providing access to account or external information and to displaying it in ways which enable staff to carry out their tasks most effectively. Nevertheless, benefits will be seen strictly in the form of more effective utilisation of cash.

THE SUPPLIERS OF ON-LINE CASH MANAGEMENT SERVICES

The suppliers of on-line account information and funds transfer services are mostly international and national banks. Although banks are the ultimate source of account information, it can also be collected and networked by third-party computer service bureaux and network operators. Treasury workstation software may be supplied by software or systems houses or by banks themselves. In the latter case, a bank may have developed the product itself or it may merely be acting as distributor.

US banks

A number of US banks offer on-line cash management services throughout Western Europe. In most cases, the services are geared primarily to the needs of multinational companies, with the emphasis on the international management and movement of funds in a range of currencies and the provision of a similar service in all countries.

National banks

The extent to which national banks have entered the market for on-line cash management services varies markedly from one European country to another. Typically, their services are oriented towards domestic account management and funds transfer, although some also offer international services of varying degrees of sophistication for locally-headquartered international companies. In one or two countries, and most notably in Sweden, their international services rival those of the international US banks.

Service bureaux and network operators

It is common for many companies, especially those with operations in a number of countries, to have accounts with several different banks. Banks operating accounts for a company at a remote location are unlikely to be competing for its main business. Nevertheless, banks are in general extremely unwilling to pass information on a customer's account to another bank, even at the customer's request.

Banks have fewer reservations about passing account information at the customer's request to a non-banking organisation, and a market has therefore developed for computer service bureaux and network operators to collect information from a number of banks, forwarding it to the customer. The market leaders in Europe in this sector are GEISCO and ADP. These companies, as well as NDC, also supply on-line cash management systems to banks or operate them on the banks' behalf. In addition, Chemical Bank and Chase (major international US banks), recognising the problems of exchanging account information, have independent subsidiaries (Banklink and IDC respectively), which sell cash management systems to banks and operate balance information exchange services, with the potential for collating information from large numbers of banks.

Workstation software suppliers

Treasurers may obtain workstation software from specialist software houses such as Spectrum in the UK or Audival in France. It may also be obtained from

some of the computer bureaux who provide cash management systems or from banks themselves. The specialist software houses sell direct to the customer or use banks or the bureaux as distributors, especially where they market outside their country of origin. Finally, and as we have already indicated, a few users may write their own software or commission bespoke systems.

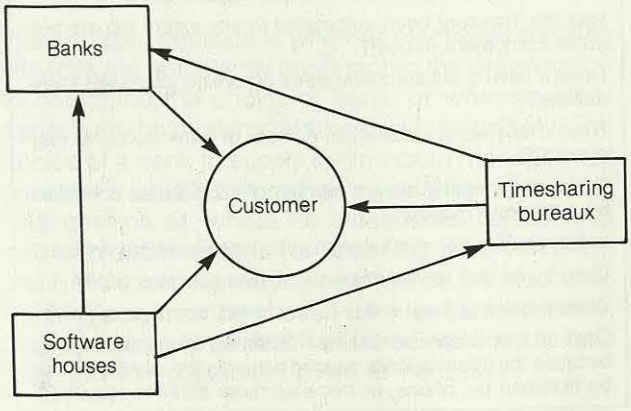
Timesharing bureaux and systems houses tend to sell treasury workstations and software to banks as part of a range of cash management services, but GEISCO at least will also sell directly to the customer. Some of the major international banks, notably Citibank, Chase, Manufacturers Hanover and First Chicago, have developed their own workstation products, whereas others, and almost all national banks, distribute products developed by software or systems houses. This pattern of sales and distribution arrangements is illustrated in Figure 6.6.

Some workstations, notably those provided by international banks and systems houses, are available throughout Europe. Others are designed specifically for local markets. For example, the requirements in France, Spain and Italy differ somewhat from those in other countries, and a number of systems (eg Logista) are sold predominantly in these three markets.

Suppliers of foreign exchange services

The prime suppliers of on-line information on foreign exchange and interest rates are specialist information providers, notably Reuters, Telerate and some videotex services, although some banks also provide on-line information on their own rates. The Reuter Money Dealing Service offers a related dealing service. Dealer workstations and communications systems are available from specialist suppliers, although banks and information service providers also offer dealer workstations.

Figure 6.6 Sales and distribution arrangements for treasury workstations



The motivations for the banks to supply on-line services

The motivations for the banks to supply on-line cash management services are not only to make more money from meeting a business need. The development of on-line cash management services has also been a function of other priorities, including:

- —To keep up with competitors and to be seen to be offering a full portfolio of such services.
- —To develop the relationship with the customer as a basis for selling traditional banking services.
- —To tap a valuable source of market information.
- —To reduce the costs of wholesale banking, and, in particular, to reduce manpower costs.

Increasing competition from overseas banks and financial institutions not traditionally associated with the provision of bank services, has forced banks to become more responsive to market trends, although sensitivity to customer demand is only one element of this responsiveness. National and international on-line funds transfer and cash management services are increasingly seen as necessary constituents of a bank's service portfolio, which are included in corporations' criteria for inclusion on shortlists when selecting banks. Not offering such services may therefore jeopardise a bank's chances of being shortlisted by a prospective client.

There are also opportunities for the bank to sell other services. The use of electronic cash management services by a company provides its bank with access to intimate details of its financial position and planning. This of course can provide the bank with valuable information identifying opportunities to sell other services, as well as high-quality market data to support the development of new products.

Treasury workstations in particular are seen as a valuable marketing tool by banks because:

- —They are an excellent way of keeping the bank's name in front of corporate customers. (Even where the bank supplies only software, it will normally display the source's name each time it is used.)
- —They provide an excellent way of entry into the corporate treasury as a basis for developing the relationship.
- —They provide opportunities for cross-selling other financial products.

The rising demand for wholesale banking has brought considerable costs, notably those associated with the volumes of paper handled and the servicing of telephone balance enquiries. Electronic delivery and capture of this information could permit substantial manpower savings to the banks.

However, these considerations by the banks can have an adverse effect on the value of their services to the client:

—Where the prime motivation of the bank is to be seen to be offering a full portfolio of services, there is a risk that individual products or the support provided for them may be less than fully satisfactory.

—Banks are unenthusiastic about providing access to services of other banks, or about passing information to them. Thus, banks are reluctant to cooperate in the pooling of account balance information for a corporate client.

—A range of different formats for information reporting have been developed by banks, as they have little motivation to introduce common standards which are preferred by their clients but which make it easier for other banks to compete.

The banks' internal and competitive objectives do, however, convey a major benefit to customers as in most cases charges for corporate electronic banking services do not fully reflect the costs of providing them. In some cases they are costed as a marketing tool rather than as a self-financing service. In other cases, they are priced below equivalent manual services as a matter of policy, in order to encourage customers to make the transition to the new services, and in anticipation of the savings to be made when the majority of corporate customers have opted for electronic, rather than manual, service delivery.

GUIDELINES FOR POTENTIAL USERS OF CASH MANAGEMENT SERVICES

Before deciding to use a cash management service, the potential user will wish to satisfy himself that the likely benefits outweigh the likely costs in his particular circumstance. He then needs to select the supplier and services which match his needs and to plan how the chosen service will be implemented.

Assessment of costs and benefits and choice of product

We have already outlined the costs and benefits which may be expected from cash management services. These will vary depending on the particular needs and circumstances of the prospective user.

A checklist of factors to take into account in deciding whether an organisation could benefit from on-line cash management services is given in Figure 6.7. The treasury department is normally the organisational unit dedicated to cash management. If a company has no separate treasury department, the use of on-line services is less likely to be beneficial. The extent to which the treasury is automated will determine not only the availability of suitable existing terminals without significant additional expenditure, but also the extent to which the treasury has learnt to use information technology in general to solve its operational problems.

Other items in the checklist relate more directly to operational problems to which on-line services can provide specific solutions. National differences in banking and business practices will have a direct impact on needs identified by this checklist. For example those countries with fragmented banking markets, such as those in Italy and Spain, are more likely to see a greater demand for on-line services for account monitoring, provided the information from a number of banks can be obtained on a single system.

The need for international on-line account information and transaction services will depend on the volume of international or foreign exchange transactions. A minimum of 20-30 such transactions per day or, alternatively, a substantial number of overseas bank accounts that need tracking, is likely to be required to justify using the electronic services of an international bank.

There are three types of treasury workstation functions that may be relevant to the potential user's needs:

—Automation of routine tasks.

—Downloading of account information for local analysis.

—Planning and decision making aids.

The basis of their cost justification differs. The automation of routine tasks, such as replacement or automatic generation of paperwork, is desirable

Figure 6.7 Checklist: Decision criteria for implementing on-line cash management services.

Does the company have a Treasury department?
Has the Treasury been automated to any extent (eg are personal computers in use)?
Does it have a substantial volume of foreign exchange transactions?
Does it operate a substantial number of bank accounts (say over 10)?
Does the company have a number of subsidiaries controlled by a central Treasury?
Is it a regular user of telecommunications payments systems?
Does it use the money markets to invest surplus cash?
Does it need to keep a day-to-day check on its cash flow?
Does it find telephone balance reporting unsatisfactory (eg because the information is needed earlier in the day than it can be obtained by 'phone, or because more detail is required)?

where a substantial volume of transactions (in particular foreign exchange transactions) generates large amounts of paper and clerical work.

Downloading of account balance and transaction details is desirable where reconciliation and account monitoring pose particular problems, due for example to value dating practices, multiple clearing systems and complex bank tariff structures. This is particularly the case in France, Italy and Spain.

Planning and decision aids and spreadsheet tools are of greatest potential benefit to large and multinational corporations. Cash management of many different operations at different locations (eg subsidiaries or offices) and the need to assemble reports against tight timescales from material contributed by many subsidiaries are all factors which enhance the value of such aids. They are also of value if the treasury engages in substantial forward planning or modelling activities, which is increasingly the case in large organisations.

The needs of the very largest companies (say the top 25 in a large country like the UK or France) tend to generate requirements that are too sophisticated for 'off-the-peg' bank products. Others may have complex and specialised requirements arising from the particular nature of their business. Typically, these organisations develop their own treasury systems, although they may still need to feed on-line account information and transaction services into these. Cost and a lack of know-how are likely to deter smaller companies from taking this approach, and mostly their requirements are not sufficiently complex to warrant it in any case.

Choosing suppliers of electronic banking services

A checklist of factors to consider when selecting a supplier of on-line electronic banking services is given in Figure 6.8. The checklist covers strategic issues, the selection of a main supplier of on-line cash management and payment services, the selection of additional service suppliers, and the selection of a treasury workstation supplier.

The principal decision is whether electronic banking services are sufficiently important to the organisation to determine the choice of bank, or whether other aspects of the banking relationship take priority. The choice of a bank to supply on-line cash management services is usually determined by established banking relationships or, where no established relationship exists, broader criteria for choosing a bank. Where this is the case, the starting point will be the electronic banking services the chosen bank or banks provide. The decision will be which of these services to take and how to supplement them, if necessary.

In some cases, however, characteristics of the

Figure 6.8 Checklist: Factors to consider when selecting a supplier of on-line electronic banking services

Strategic factors:

Are the traditional aspects of the banking relationship the most important in the choice?
- if so, are additional services required above what the chosen bank offers?

What are the potential costs and benefits of electronic banking services?
- are the costs justified at all?

What are Treasury priorities?
- do they help discriminate between service offerings?

Will one service supplier be sufficient, or will more be needed?

Selection of a main on-line service supplier:

Should the service be provided by bank or a bureau?

If a bank
- will other banks input balance data?
- is more than one bank service required?

If a bureau
- can it be cost-justified?
- will banks provide appropriate inputs?
- can it handle any funds transfers required?

What specific services are required?
- how will on-line information be used and inputs generated locally?
- will downloading of data for local manipulation be required?
- what geographical coverage is required?
- are any special instruction services, eg opening letters of credit, required?
- what degree of flexibility is needed? (eg forms in which data is available?)
- what types of funds transfer will be required?
- is real time reporting needed?

What are the relative prices and costs associated with alternative suppliers? What security features are available?

Do their services differ in quality (immediacy, depth of reporting, flexibility)?

What security features are available?

Selection of additional on-line service suppliers:

What specific services are required?
- provision of service in a specific country or countries?
- money transfer services for remitting funds?
- specialised institution services?

Do potential suppliers differ in:
- efficiency?
- service?
- prices?

Selection of a treasury workstation supplier:

What are the main functions the workstation should perform?
- spreadsheet analysis?
- foreign exchange exposure management?
- cash forecasting?
- debt management?
- automation of document production and management?
- interfacing with bank services?
- autodialling balance reporting services?
- reconciliation?
- other?

What requirements need to be defined?
- outputs required
- data sources
- calculations regularly undertaken
- volumes of data handled

Is a package or a bespoke system required?

If a bespoke system is required, should it be developed in-house or should a third party be commissioned?

What are the prices and fee structure (eg additional ongoing maintenance and support fees) for equipment and software?

What support is available?
- level of customisation
- training
- assistance during early stages of use
- program servicing and development

Will the system be modifiable in the light of experience or with changing requirements?

To what extent is the workstation compatible with on-line services used?

Should the system be integrated with the systems of other departments, eg accounting?

electronic banking services themselves are the deciding factor, either because they are of major importance to the customer, or because such services are seen as a separable commodity. In these cases, price and the nature of the different service components offered are key factors in determining supplier selection. The most sophisticated customers may look at the quality of information services (immediacy, depth of reporting, flexibility), while for those with overseas subsidiaries or trading contacts, geographic coverage is usually the determining factor. Other customers may need a specialised service for the delivery of specific kinds of instructions.

The services the treasurer requires are likely to include balance reporting. The obvious source of balance information is the bank, but if there is a need to track balances at a number of banks, problems may arise. Other banks may not be willing to feed account information through his lead bank, although if they belong to an exchange network there should be fewer problems. Alternatively, a bureau may be commissioned to collate the information from the banks, although if this is done on a bespoke basis the costs are likely to be high. Yet another alternative is to bring the collation process in-house; a treasury subscribing to on-line services from a number of banks can use facilities, often incorporated or added as a function on a treasury workstation, to call automatically a number of banks in succession to draw down account data.

Currently, a treasury workstation is only likely to be cost-justifiable for larger companies, or where a significant amount of analysis is undertaken, or where there is scope for substantial clerical savings, or where reconciliation is a major problem. Treasury workstations include a variety of different types of products (see page 68). Defining requirements and ensuring that they are met is therefore especially important. A bespoke solution may be the only satisfactory course, but the cost implications and demands on internal treasury resources should be weighed carefully in advance.

It is unlikely that the requirements will be identified initially with 100% accuracy and therefore that they will subsequently remain unchanged. Flexibility in design and implementation is therefore critical. The nature and cost of support provided by the supplier, and the likelihood of it continuing in future, are also critical.

Implementation planning

Below we review a number of issues concerned with planning the implementation of cash management systems, where these are implemented in the context of an existing treasury department. (The need to set up a treasury in the first place raises more complex issues, of course, and the organisational rationale for doing so lies outside the scope of this report.)

Development of in-house systems

The factors favouring the development of a bespoke system in-house rather than purchasing a bank solution were reviewed in the previous section. However, even once the decision to develop a system in-house has been taken, companies may prefer to build their systems out of available 'black-box' modules rather than from scratch. Some companies we have spoken to during our research waited until suitable modules were available before implementing their systems. 'We are not in the business of heroic solutions' was one system manager's comment.

Integration of external services with in-house systems

On-line cash management services are usually implemented standalone initially, even within the treasury. With experience, however, major users develop advanced internal systems and aim to link these with their external information providers and banks. Balance and transaction data and other information such as foreign exchange rates can then be downloaded directly for manipulation in the treasury system.

In some countries, such as Finland, companies emphasise the importance of linking on-line services with their accounting systems, in particular to update accounts receivable. In other countries, it is normal practice to keep cash management and accounting systems separate. In the US, some direct links between banks and mainframe computers of large corporate customers have been set up. Such links are heavily audited. In practice, little use is made of data transfers between microcomputers and corporate systems. Most clients are reluctant to transmit data stored on treasury systems to corporate accounting systems for security reasons. In addition, equipment incompatibility, inadequate network architectures, or simple lack of knowhow may prevent many companies from implementing the downloading of data to treasury microcomputers.

In a few leading-edge corporate systems cash management systems are linked with systems in other operational units, such as sales, manufacturing, central purchasing or warehousing departments, to allow better forecasting of cash requirements.

Timescales

Standalone on-line payment terminals can be installed relatively rapidly. Where an additional telephone line is needed, its provision may be the critical factor determining the timescale. More sophisticated on-line services take somewhat longer, depending on the complexity of the system. For example, one major

Scandinavian bank covered in our research quoted a time period of between three months and a year from first demonstration to full operation.

Hardware choice

Treasury software packages are typically written for the hardware of one or perhaps a small number of suppliers.

Problems can arise where the hardware required for the chosen package conflicts with company preferred-supplier guidelines. Frequently, the treasury-preferred software and hardware are purchased, and separate arrangements are made for support and maintenance with the treasury system supplier.

Support and training

Providers of electronic cash management services differ substantially in the degree of support they provide for their products, especially treasury workstations. The nature and extent of the support provided can be a major factor in the effectiveness of the product. Three aspects in particular are important:

—Level of customisation available.

—Degree of 'handholding'.

—Program servicing and development.

Treasury workstation suppliers differ in the extent to which their products can be adapted to the specific requirements of the client. They also vary in the extent to which they are prepared to undertake this work themselves. Indeed, some expect the client to undertake a considerable proportion of the work. They also differ in the extent to which they are prepared and able to give advice on identifying suitable applications, on implementing these on the workstation and on problem-solving during the early days of system use.

Not all suppliers recognise fully the need for support of this kind; one we interviewed complained: 'We design systems for customers who don't know what to use them for.' The commitment of the supplier to continued servicing and updating of the software is also an important factor to consider, especially where the product is obtained merely from a distributor and not from the original supplier.

These factors are often reflected in the fees suppliers charge for workstation support. Thus, some of those who expect the customer to carry the maintenance burden do not charge a maintenance fee.

The training requirements for simple on-line account reporting and payment services are relatively minor. An afternoon's training can be fully adequate for staff using a simple payment terminal. However, treasury workstations require more comprehensive user training and skills, and the degree of sophistication required is not always appreciated by either users or suppliers. The initial training provided by the supplier may last 2-3 days, but a greater degree of sophistication in the use of personal computers and spreadsheet packages is normally needed to exploit the workstation fully. Basic programming skills, a knowledge of spreadsheet manipulation, an understanding of operating systems and preferably also some diagnostic capabilities are often required for the customer to make full and effective use of his workstation. There is an obvious trade-off between the level of existing skills and the support required and purchased from the supplier as part of the package.

Security

Security is a vital consideration for any financial system. The nature and extent of security measures required will vary widely ranging from those for a simple balance enquiry system to those for a system handling high-value funds transfers. The security of on-line cash management and payment services requires the following to be considered:

—General security requirements appropriate to any financial service.

—Security aspects concerning the technical implementation of the service.

Security at terminals, communication links and central computers and databases all need to be provided for.

Security at the terminal or microcomputer accessing the system is achieved by:

—Authentication of the user.

—Control of the facilities he is allowed to use.

—Obtaining the necessary authority for instructions.

—Logging the usage of the terminal and the transactions made.

These procedures are implemented by facilities such as passwords, multiple authorisation, limit controls and audit trails.

Terminals may also be physically locked, or they may house magnetic card readers to help restrict usage to only certain individuals. Secure communications may be assisted by the use of encryption of data. Security of the central computer systems and databases, whether operated by the company, a bank or a third party are assisted by the use of appropriate passwords to allow users to gain access to limited areas of the databases and to use only certain facilities.

Security requirements can be reduced if, by careful definition of needs, high-risk services can be avoided. In particular, account monitoring requires less security than funds transfer to any third party, and transfers to pre-authorised recipients require less security than transfers to recipients defined only at the time the transfer is made.

Security requirements common to all financial activities will also apply, including:

—Physical security, ie control of access to the area where financial information is accessible and funds transfers are initiated.

—Vetting of personnel.

—Multiple authorisation of payments.

In addition, action in the event of a loss should be considered. Risks should be assessed, responsibilities established, insurance considered and contingency plans formulated where appropriate.

THE MARKET FOR ON-LINE CASH MANAGEMENT SERVICES

In the previous sections we have considered user needs, the kinds of services available, and their suppliers. All three aspects are relevant in defining the current market for these services, and to predict how it is likely to develop. We describe the market in this section and present our assessment of likely future trends.

Market segmentation

An increasing range of on-line cash management services for organisations of all sizes is being offered on the market. The services offer variations of the same facilities:

—Account monitoring.

—Transfers between accounts.

—Payments to third parties.

They represent a continuum across all sizes of organisation.

The priorities and detailed requirements of different market segments differ, however, so that products targeted at specific segments will need to differ in detail specification, packaging, pricing and mode of delivery. For example, on-line foreign exchange information is still primarily a requirement of large companies.

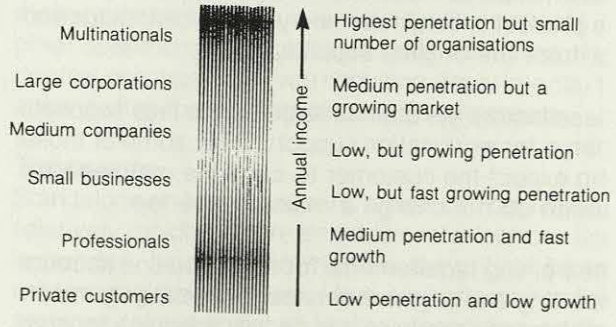
In addition, the market in different market segments has developed to varying degrees. Corporate cash management services for multinational and very large companies (eg in the US, those with annual revenues in excess of $250M) are well developed in many countries, and service suppliers are now attempting to open up the 'middle market' (companies with annual revenues of $25-250M). At the other end of the scale, there are 'home banking' services relying on established delivery technologies (such as videotex or personal computers). These are beginning to take off in a few countries, notably France and the US, and are proving of greatest interest to professional users and small businesses. Although demand is proportionately much lower than among large corporations, the numbers of customers are high because of the large number of small businesses. Figure 6.9 shows the pattern of demand for on-line cash management services across different market segments.

On-line cash management services in Europe

The very largest multinationals, notably some of the oil companies, have developed their own internal cash management services some of which are at least as sophisticated as those offered by the banks. As a consequence, these organisations tend to place relatively little reliance on cash management services provided by banks. Smaller multinationals, and companies with widespread trading links, tend to rely on the services of US international banks, which provide relatively uniform services in most European countries. As an example, Figure 6.10 shows the services offered by seven major international banks in the UK. The column 'Interaccount transfers, simple and multicurrency payments' covers all funds transfers, between accounts of the same legal entity and to different legal entities, in sterling and other currencies. 'Other transactions' covers other instruction delivery services. There are minor differences in the services offered in other countries as some banks do not provide a complete service in all Western European countries.

The market for cash management services within each country varies markedly from one to another.

Figure 6.9 Relative volume of demand for on-line cash-management services today



Variations in the maturity of the market, the nature of demand, and the services offered depend on a number of local factors:

—Banking practices and the structure of the banking market.

—The nature of bank-corporate relationships.

—The regulatory environment.

—The national communications and IT infrastructure.

—Sophistication of local companies in office automation.

We review, therefore, the market for on-line cash management services by country, covering the major markets.

The UK

The most authoritative estimates put the number of users of on-line cash management services in the UK at 1500, although this figure may include some double counting where companies take services from more than one bank. Expert opinions differ on the extent to which the market among the largest (eg the top 500 of the 'Times 1000') companies is saturated, but penetration among medium-sized and smaller companies is still low.

The major international US banks and the four major English clearing banks all offer on-line cash management services. The main products offered by the English banks are shown in Figure 6.11. In addition, companies can have direct access to CHAPS, a fully automated payments system for amounts in excess of £10,000 ($14,000), guaranteeing same day clearing and operated jointly by the banks. However, a powerful microprocessor is required to give the appropriate level of security for a CHAPS terminal (the IBM XT and PC microcomputers are not considered suitable), and the banks have only just begun to integrate cash management facilities into CHAPS terminals.

France

The drive to promote videotex services in France has had its impact in the corporate sector, and a substantial number of banks now offer videotex-based

Figure 6.10 Electronic cash management services offered by major international banks in the UK[1]

	Account information reporting	Transaction initiation		Decision aids	Treasury workstation	Other information services
		Interaccount transfers, simple and multicurrency payments	Other transactions			
Bank of America	✓	✓		✓	✓	
Citibank	✓	✓	✓	✓	✓	✓
Chase	✓	✓	✓	✓	✓	✓
Chemical	✓	✓	Eurobond dealing	✓		✓
First Chicago	✓	✓	✓	✓	✓	
Manufacturers Hanover	✓	✓	Commercial paper management service	✓	✓	
Morgan Guaranty	✓	✓				

Note: 1. As in June 1985, based on information supplied by the banks

Figure 6.11 Major electronic cash management services offered by UK banks[1]

	Account information reporting	Transaction initiation interaccount transfers simple and multicurrency payments	Decision aids	Treasury workstation	Other information services
Barclays	✓	✓	✓	✓	
Midland	✓	✓	✓		✓
National Westminster	✓	✓			✓
Lloyds	✓	Separate CHAPS terminal, UK only			

Note:
1. As in June 1985, based on information supplied by the banks

cash management services for corporate clients (see Figure 6.12). There are now some 15,000 business users of these services. The technology does not, however, lend itself to highly secure applications, although developments are under way to use smart cards to achieve better security. So far, few French banks offer transaction services over videotex and most applications involve information retrieval only, which limits their usefulness for large corporate users.

However, the market for treasury workstations is well developed, and by October 1984 some 650 had been installed.

West Germany
The corporate electronic banking market in Germany has been slow to develop. However, the US banks have marketed their services aggressively, and Citibank claimed 150 corporate customers by the end of May 1985. Three major German banks, Dresdner Bank, Commerzbank and Deutsche Bank, now also offer their own on-line cash management services. In addition, the banks are beginning to offer simple services on Bildschirmtext, the public videotex service; these are generating much interest. By mid 1985 over 130 treasury workstations had been installed.

Italy
There is a large number of small local banks in Italy (some 1100) so that there is a greater requirement for domestic balance reporting than in most other European countries. In addition, local banking practices cause particular problems and delays in reconciliation. Over 120 companies have already installed treasury workstations. However, the on-line banking services market as a whole is only beginning to develop.

Scandinavia
The market for electronic cash management services in Scandinavia is one of the most advanced in Europe. The market leaders are Skandinaviska Enskilda Banken (SEB) in Sweden, and Suomen Yhdyspankki (Union Bank of Finland) in Finland. There are some 600 companies using on-line cash management services in Finland where the Union Bank has developed a dial-up service for smaller companies, some 200 in Sweden and perhaps 100 in Norway. Local banks are very strong in providing both domestic and international services, and US banks have so far made little headway.

Benelux
There is a marked contrast between the markets for electronic cash management services in Belgium and the Netherlands. The market in Belgium is well developed, with Banque Bruxelles Lambert, the market leader, claiming over 1,500 users of its Telelink service in early 1985. Users include small companies as well as multinationals. In the Netherlands, the market is less advanced and is beginning to develop only now.

Switzerland
The market for electronic banking in Switzerland has started to develop in the last year, but still numbers less than 100 customers for on-line cash management services. The US international banks dominate the market among multinationals and international institutions, but the major domestic banks are beginning to open up the national market. A number of Swiss multinationals have developed their own automated treasury systems, but the number of treasury workstations is still very low.

FUTURE DEVELOPMENT OF THE MARKET

The nature and structure of the market for on-line cash management services will evolve markedly over the next few years. There will be changes in user services. Services will evolve reflecting changes in the supply side of the market. There will be new business opportunities for suppliers, and new alliances will be formed. The structure of the market will therefore alter as it matures.

Changes in user services

As users of on-line services gain confidence and experience with the services currently available, they are likely to extend their use to meet other needs such as:

- Extension of on-line services to cover more traditional areas of banking.
- Access to more comprehensive international services, including a broader range of currencies handled and more locations served.
- On-line delivery of an increasing range of instructions, eg opening letters of credit or securities trading.
- An increasing range of decision aids and information services.
- Real-time reporting.
- Access to services via a wider range of terminals and networks, including in particular lower cost access media such as videotex.

Hence, demand on the workstation front will be for more flexible access to bank services, to include those of banks other than the one supplying the workstation. A wider range of software and facilities is likely to become available, and a market for multi-user systems for treasuries of large corporations is likely to develop.

Figure 6.12 Bank videotex services for corporate customers in France

Nature of service	*Service provider*	*Description*
Acces	Banque Populaire Centre Atlantique	Account information, payments in clearing, loans, securities and share portfolios, foreign exchange rates, internal and external transfers, salary payments.
Acces-NMB	Nederlandsche Midderstand Bank	Account information.
Aigle	Credit Industriel et Commercial	Account information, treasury management, foreign exchange rates, interest rates.
Banque Nicolet Lafanechere et de l'Isere	Banque Nicolet Lafanechere et de l'Isere	Account information, transaction details, discount rates.
Banque Marze	Banque Marze	Account information, loan repayment modelling, cheque book ordering.
Banque Populaire de Côte-d'Or	Banque Populaire de Côte-d'Or	General information, account information, treasury management, financial information.
Banque Populaire de Franche-Comte	Banque Populaire de Franche-Comte	General information, account information, loan repayment modelling, electronic mail.
Banque Populaire de la Nievre	Banque Populaire de la Nievre	General information, account information, loan repayment modelling, electronic mail.
Banque Populaire de la Region Sud de Paris	Banque Populaire de la Region Sud de Paris	Account and cash and foreign currency transaction management.
B.C.C.M.	Banque Centrale des Cooperatives et des Mutuelles	General and account information.
Bonnasse Infobanque	Banque Bonnasse	Account information, cheque book ordering.
BP Tel	Banque Populaire du Centre	General and account information, electronic mail.
B.R.E.D.	B.R.E.D.	Account and foreign exchange transaction listings, currency balances, currency transfers, exchange rates, maturity listings, search facility.
B.U.E. Teletel	Banque de l'Union Europeenne	Account information, funds transfer, commercial exchange rates, share listings, news, introduction to the B.U.E., financial news and asset management.
Chase Infocash	Chase Manhattan Bank	General information, account information, leasing management, financial information.
Clef	Banque Courtois	Extel II: general and account information, financial information, electronic mail, account balances over the last 18 transactions. Extel III: as above, with account balances and transactions over the last 6 weeks.
C.R.C.A. Isere	Credit Agricole de l'Isere	General information, account information, treasury management, loan repayment modelling.
Credit Agricole Mutuel du Sud-Est	Credit Agricole du Sud-Est	Account information, bills of exchange credited in clearing, maturity dates, defaults, foreign exchange, electronic mail.
Credit Agricole de l'Yonne	Credit Agricole de l'Yonne	General information, account information, lease modelling, financial information.
Credit Mutuel Ille-et-Vilaine	Credit Mutuel Ille-et-Vilaine	Account information, transactions over the past 5 weeks, enquiry listing, cheque book ordering.
Hervetel	Banque Hervet	General information, account information, currency balances.
Madic	Banque Nationale de Paris	Account information.
Norestel	Credit du Nord	General and account information.
Prism	Banque Paribas	Treasury management.
Progestel	Societe Generale	Account information, news, loan modelling, internal tranfers, value dates.
Siegfried	Banque Tarneaud	General and account information, electronic mail.
Sogenal Terminal d'Entreprise	Sogenal	Account information, treasury management.
Sogestel	Societe Generale	Account information, recent transactions, financial and stock exchange information.
Telelion	Credit Lyonnais	General and account information.
Telematique S.N.V.B.	Societe Nanceenne de Credit Industriel et Varin Bernier	Account information, leasing management.
Teleservice Cam	Credit Agricole du Gers	General and account information, funds transfer, financial information.
Triton	Banque Worms	Account and financial information.
Videobanque CCF Entreprises	Credit Commercial de France	Account information, treasury management, financial information.
Videotex Cash Management	Barclays Bank	Account information, treasury management.

Source: Videotex Guide (April 1985)

Developments in the provision of on-line services

In all Western European countries major banks that cater for the corporate market are likely to move towards offering on-line account information and, later, funds transfer services. The timescale over which this occurs, and the precise nature of the services, however, will vary from one country to another, and will also depend on who provides the services.

The US international banks will aim to offer their services in areas dictated by their broader market strategies; in one or two cases this may mean wider geographic coverage. Where local factors are favourable, they will tend to use electronic services to compete with national banks for the large corporate and, subsequently, the medium-sized corporate market.

Some of the most interesting questions in terms of the future development of the market concern the role of the third-party computing service and network suppliers. The costs of using computing bureaux to run account information services significantly undermine their benefits to the banks, who are increasingly likely to wish to operate such services in-house. However, in many cases the bureaux also provide systems to the banks, and a proportion of the many new banks entering the market will wish their services to be run initially by a bureau. Similarly, the banks are increasingly expanding their own networks, both national and international, or are using improved and new facilities provided by PTTs.

A major opportunity for third-party vendors is the collation of account information for the customer from a number of banks. As we have discussed, banks are extremely unwilling to release account details to other banks, even at the customer's request, but they tend to have fewer qualms about releasing them to a third party for collation.

Increasingly, treasurers require funds transfer capabilities allied to balance and transaction reporting and this may favour yet another alternative solution to the problem of collating account information — the use of bank exchange networks, which are associations of banks which have agreed to exchange account information (see Figure 6.13). These need telecommunications networks to support them and here, too, there is an opportunity for the third-party supplier. In the absence of positive action from third-party suppliers, customer demand, however, is likely to force the banks in the direction of data exchange.

Changes in market structure

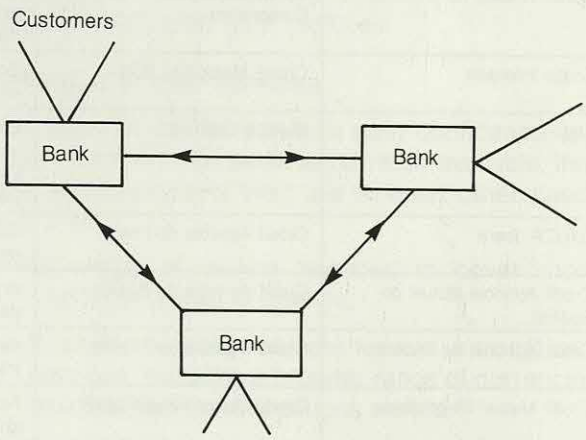
The structure of the market for on-line cash management services is likely to change in a number of ways. Some segments will soon reach maturity and saturation, while others will only begin to open up.

In the UK, for example, some industry observers believe that the large corporate market for on-line cash management services will have reached maturity in five years. As a consequence, the banks are beginning to target their services to the middle-sized market sectors. The smaller business market may start to become attractive in about two years' time. The increasing maturity of the market will lead to changes in pricing and competitive differentiation between the services offered by the various vendors, and to alliances between them.

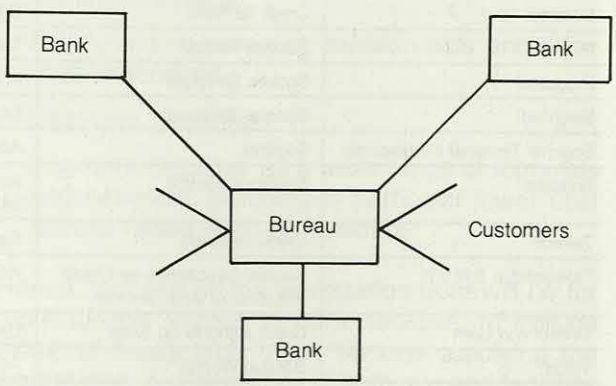
Pricing

At present, the costs of service provision are high because of the costs associated with the use of timesharing bureaux and equipment. As the banks view the services partly as a marketing tool designed to attract or help retain corporate customers, the costs of providing them are not always passed on fully

Figure 6.13 A bank-exchange network and a bureau as alternative means of collecting account information for the customer



A bank-exchange network for account information



A bureau collating account information on behalf of customers

to the customer. Bringing the operation of the services in-house should help banks to reduce costs. Coupled with increasing competition and the availability of a wider range of services, this is likely to lead to charges being more closely aligned to costs, and a greater unbundling of products.

Competition

The advantages conveyed by electronic banking services to corporate customers are already proving important enough in some cases to determine which bank is selected. At present, banks compete in the on-line cash management market by their ability to provide a few simple services such as account information reporting and funds transfer services at a number of locations. As the market develops, the basis for competition is likely to shift to price, quality of service (in particular the extent to which it matches customer needs) and, where relevant to a customer, the availability of more specialised services.

We also believe that the market is likely to standardise on a range of commonly used services, and that as it does so other factors (in particular those traditionally determining bank selection) will return to the forefront. In the meantime, however, customers may well have changed their allegiances.

Service differentiation

The roles of providers of on-line cash management services are likely to become increasingly differentiated. We have already reviewed the role of third-party vendors in this respect. As a broader range of services becomes available together with more cost-related charges for each, the need to compete on price and quality will become more acute, and most banks are therefore likely to specialise in only some types of corporate electronic banking services. For example, some banks are already choosing not to compete in the market for treasury workstations.

But developments in bank systems, and in particular increasing integration of back-office systems and greater compatibility with SWIFT, will enhance some of the services which can be offered and provide clients with better access to information. Banks will begin to offer services, such as foreign exchange deal confirmation, which match these new back-office capabilities to the facilities which can be offered by treasury workstations.

The increasing differentiation of electronic banking products and services, and the readiness of treasurers who need treasury workstations to shop around, is likely to make providing workstations increasingly unattractive to banks. The economics of providing them do not even now appear to be attractive for them and they are likely to do so even less once workstations become a more familiar product, suppliers' margins shrink, and their effectiveness as a marketing tool declines. However, we anticipate that there will be an increasing demand for software to front-end specific bank services and to interface these with standard personal computer software.

Formation of supplier alliances

As well as more specialised services, we are likely to see more partnerships between suppliers to provide mutually complementary services. Bank exchange networks are an early example of the process of forming associations and partnerships. Logic and logistics favour cooperation over account information exchange. Interbank cooperation on balance reporting is likely to increase, driven by customer demand and competition from third-party vendors. This cooperation is likely to be accompanied by greater standardisation of balance reporting and also transaction formats, a process which has already begun.

Market forecasts

We present forecasts for the market for on-line cash management services and for treasury workstations.

On-line cash management

Our forecast for on-line cash management services in Europe covers on-line balance reporting and funds transfer services and is presented in Figure 6.14. The forecasts are for organisations of all sizes, including small businesses.

We expect the market to grow fastest where banks use videotex services to deliver cash management

Figure 6.14 Market forecast for on-line cash management services in Europe

Country	*Number of organisations using on-line cash management services*	
	1985	*1990*
Austria	<50	500
Belgium	1,500	3,500
Denmark	500	1,500
Finland	550	3,000
France	15,000	150,000
Germany	1,250	15,000
Italy	<50	1,000
Netherlands	<50	1,000
Norway	75	1,000
Spain	<50	500
Sweden	100	3,000
Switzerland	<50	1,000
UK	1,200	12,000

Note: The figures refer to all users, including small businesses using videotex services for simple cash management. Figures are for the beginning of each year.

services, notably in France, West Germany and, to a much lesser extent, in the UK. In all countries, but particularly in France, we expect an increasing proportion of small businesses to use on-line cash management.

Treasury workstations

Our forecasts are for treasury workstations with some analytic capability. Simple balance collection packages are excluded.

We assume the market is segmented into large corporations, with a turnover in excess of $250M per annum, and medium-sized companies with turnovers between $25M and $250M.

Large corporations in all European countries have treasury operations of sufficient complexity to be potential customers for treasury workstations. The banking systems in France, Italy and Spain are such that medium-sized companies will also have a requirement for treasury workstations, but this is not the case in the other countries. The market among medium-sized companies will take longer to develop, and we assume that it will take twice as long to reach a given level of penetration as in the equivalent large corporate market.

Figure 6.15 shows our forecast for the treasury workstation market in Europe, while Figure 6.16 shows the proportions of the market accounted for by different countries in 1985 and 1990.

Figure 6.15 Forecast of the installed base of treasury workstations in Europe to 1990

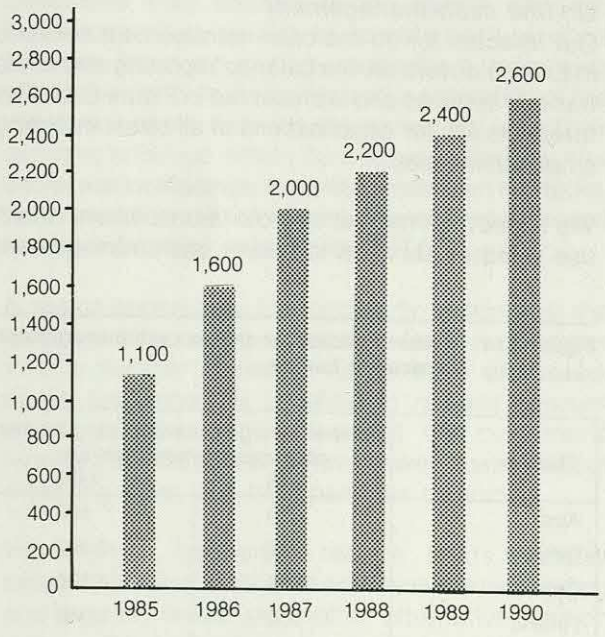
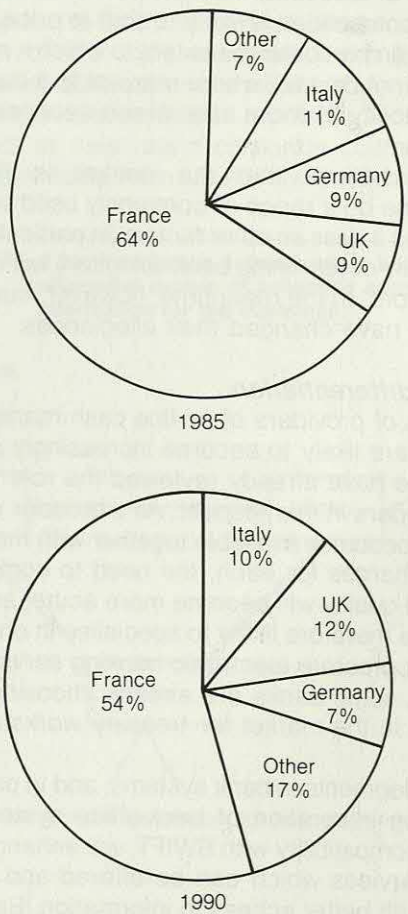


Figure 6.16 Geographic breakdown of the installed base of treasury workstations in Europe



CHAPTER 7

CASH MANAGEMENT: REMOTE BANKING SERVICES FOR INDIVIDUALS

The spread of the information revolution from businesses to the home has been heralded by technology prophets for many years. Services would be supplied remotely over electronic links, allowing people in the home to work, shop and be informed and entertained without needing to travel. Reality is taking time to catch up, and many of today's predictions are little different from those made ten years ago, despite many setbacks experienced since.

Nevertheless, there have been some developments which have made such remote services more feasible now. Increased penetration of the telephone and the spread of cable TV have ensured that major elements of the necessary infrastructure are now in place in many countries. Greater familiarity with information technology products such as home computers also means that there is now much greater awareness and some of the skills needed to permit more widespread use of these technologies by residential users. Moreover, in most industrialised countries, a number of remote information and transaction services are now available to the public. In many cases, these are still either trials or are services that have so far attracted only relatively small numbers of customers. However, they provide interesting 'test-beds' for such services.

Home banking, and other services involving payments, such as home shopping, are the kind of services that have aroused the most interest, as they perhaps offer the greatest commercial potential.

Banks and other financial institutions, such as building societies, see very significant threats and opportunities associated with home banking. Firstly, it might become an essential element of retail banking, altering the way in which banks offer services to their customers. In addition, it is a service most likely to appeal to the banks' most coveted sector among private customers, namely young professionals with high future income potential and high bank usage ahead, and also their wealthy older counterparts. Early home banking services have demonstrated the ability to lure a proportion of such customers from other banks. Indeed, current estimates suggest that at least 15% of customers who subscribe to home banking services are new to the bank concerned. Conversely, banks not offering such services risk losing a proportional percentage of their prime customers. However, the cost and complexity of developing home banking systems are still a significant deterrent and the degree to which users will accept — and pay for — such services is still highly uncertain.

Our research indicates that, in most countries, home banking services are of appeal only to a narrow segment of the residential sector. By contrast, the relatively basic services now available are of considerable appeal to small businesses, who use them for simple cash management. The market for such simple cash management services for small businesses has arisen out of a genuine, and previously not recognised or catered for, market need.

Home banking will only succeed if it meets customer needs. This is perhaps the most important, but it is not the only prerequisite for success: the technology must be right for the purpose, the necessary infrastructure must be in place and the commercial case for such services must be clear to their providers. We discuss these issues in this chapter and present relevant experience from current services. We also present our market forecasts.

CHOOSING THE RIGHT TECHNOLOGY

Home banking services are services designed for individuals who can use a terminal to access a financial institution's computer centre over a telecommunications link to enquire about the status of their accounts or to transfer funds.

The most common alternative technologies used are the telephone for voice response systems, videotex, communicating personal computers, and televisions connected to cable television networks. We discuss these technologies and their relative merits in this section.

Voice response services

Voice response services are based on voice response systems; these are systems which generate messages in the form of speech. The messages are generated from a data bank of voice messages, in

which either whole words or their sound components (called phonemes) are stored for synthesis into words, phrases or sentences.

Voice response systems are usually accessed over the telephone network by push-button (multi-frequency — mf-signalling) telephones, or ordinary rotary dial (pulse signalling) telephones using an adaptor (see Figure 7.1). The data are entered in numeric form by the customer from his telephone. The system accesses the appropriate information in the bank computer and registers details of any transaction required. The interchange typically takes the form of a dialogue, where the customer enters successive items of information and the system responds by confirming the data entered, or by giving guidance messages and prompts for the next item to be input. The sequence normally ends with the system giving the information requested or confirming the transaction.

In principle, voice response systems are an attractive means of delivering home banking services as there is a huge base of telephone users, and even if they do not have mf pushbutton telephones, adaptors are cheap, typically costing less than $30. Also, even though in many countries residential users use rotary dial telephones based on pulse signalling, most large PABX systems now installed in businesses use mf-signalling. Individual users could use home banking services from their offices, much as many of them now use their office telephones for personal calls.

However, voice response systems suffer from some handicaps, which make them less attractive to consumers than other kinds of home banking terminals such as videotex terminals or personal computers. Firstly, the amount of information that can be conveyed with voice response is rather limited and it is serial in fashion. By contrast, information presented on a screen can be much more comprehensive and can be presented in parallel, helping the user to understand the information entered and received, by providing better feedback. Secondly, there are no local storage capabilities in the telephone, whereas with personal computers and some videotex terminals information can be stored locally for later analysis or perusal or simply as a record.

Videotex

Videotex is a generic term for a type of on-line information service that is able to use adapted televisions as terminals (although other kinds of terminal, including microcomputers, can also access videotex services). It is generally distinguished from other on-line computer services by its low cost, ease of use, and the possibility to use colour and graphics in the display.

Current home banking services that rely on information distribution via videotex typically include descriptions of the range of bank services, interest rate quotations and, once the identity of the customer has been satisfactorily verified, account balance information and statements of recent transactions. Most current home banking services are limited to providing these kinds of facilities.

But videotex can also be used for data collection in applications such as remote ordering or reservations,

Figure 7.1 Multi-frequency tone terminals for accessing voice response systems

and in the context of home banking, the transfer of funds. Transferring funds, although essential for a comprehensive home banking service, is not yet offered on most videotex-based home banking services, as it involves more complex system design and security requirements than information retrieval.

Problem solving computations can also be carried out on a videotex system. This type of service involves processing information, in addition to entering and retrieving it. Parameters (for example, for a tax or payroll calculation) are entered by the subscriber on his terminal. The processing software may either be executed at a service computer or it may be downloaded to the subscriber's intelligent terminal. (Software for downloading in this way is called telesoftware.) Home banking services of this type include facilities for home budgeting, calculating loan repayments and evaluating savings plans.

Videotex home banking services can be provided either independently or as part of a more comprehensive videotex service operated by another organisation, such as a national service operated by a PTT. In both cases, however, information about customers' accounts will normally be kept, and the service hosted, on bank computers because of security and confidentiality requirements. If the videotex service is operated by a non-banking organisation (eg a PTT or a bureau), the bank computers will therefore need to be accessed via a gateway from the service.

One advantage of using videotex for home banking is that in many countries (and in particular in France) there is a ready base of videotex users who can use home banking as one of a number of services. Figure 7.2 gives the number of subscribers to videotex systems in European countries, and the proportion of residential subscribers in each. Offering home banking as part of a more general public service may convey a number of advantages compared with a stand-alone service:

- —There is an existing market of videotex customers and home banking services can benefit from the synergy of being marketed with other services.
- —Additional network facilities to allow access at local call rates over a wide area may not need to be provided.
- —The general service may provide capabilities such as billing, security and communications handling and management which would not need to be duplicated on bank systems.

Home computers and personal computers

Home computers are usually distinguished from personal computers, although the distinction is largely arbitrary as both are based on microcomputer technology. The most obvious distinction is price (which reflects facilities and processing power). Home computers typically cost under $1,000 and personal computers typically cost $1,000 upwards. The penetration of home computers in some European countries is high. For example, some 20-25 per cent of homes in the United Kingdom are expected to have a home computer by the end of 1985.

Figure 7.2 Number of subscribers to videotex services in Western Europe

Country	*Total number of subscribers*	*Approximate proportion residential subscribers*
Austria	3,500	40%
Belgium	400	negligible
Denmark	750	10%
Finland	2,500	5%
France	900,000	75-80%
Germany	35,000	40-50%
Italy	1,800	15%
Netherlands	17,000	30-40%
Norway	500	5-10%
Spain	600	negligible
Sweden	25,000	5-10%
Switzerland	1,700	10-15%
UK	60,000	45%

Note: Figures apply to August 1985.

The significance of home and personal computers to home banking is that they can provide a ready base of users. In particular, the same kind of user (higher income and technologically aware) that has a home computer is likely to be attracted to other IT services, such as home banking and shopping.

For personal computers to be used for home banking they must have a communication capability. A small but rapidly growing percentage of home computers (5-10 per cent in the UK, at least 25 per cent in the United States) have communication facilities (usually ASCII or videotex interfaces) and we estimate that by 1990 some 50 per cent of home computers will have communication facilities. The number of personal computer owners who could potentially access home banking services is therefore increasing rapidly.

Cable TV

Cable television originated in the United States in the 1930s and 1940s to provide television reception to remote settlements and other areas inadequately served by over-the-air transmission. However, cable television has proved to be a medium that can provide a wide range of entertainment, communications and

information services. This trend towards the commercial exploitation of services other than television is at an early stage, both in North America and in Europe. Very few cable networks now support such services, and few cable TV users have so far shown evidence of a desire for any services other than entertainment.

Most cable systems carry only one-way broadcast signals. But interactive, two-way cable services are necessary for such services as home banking and shopping. They are possible with the addition of a back channel to carry signals from the subscriber to the head-end. The back channel can be provided either over the same cable or via the telephone network. Two-way systems that use both cable and telephone lines are called hybrid systems. Interactive cable systems allow operators to provide not only home banking or shopping but also such facilities as videotex, remote polling and subscriber participation during the transmission of TV programmes.

Since 1972 all new US cable systems have had to be convertible to two-way capability, though very few cable systems yet exploit their interactive potential. One of the earliest two-way services was the Qube service in Columbus, Ohio. Qube offers interactive TV and a range of other communications and information services, including home banking as well as home shopping and remote security services, to some 55,000 homes.

In the US, the number of homes subscribing to cable TV systems has grown rapidly to some 35 million in mid 1985. In Europe the extent to which cable TV services have developed varies considerably from one country to another (see Figure 7.3) depending on regulations in force and local demand, but the number of cable systems with the interactive capability to support home banking services is extremely small. In the UK, for example, new systems now being licensed must have the potential to deliver interactive services but are not obliged to do so initially, and no system yet offers interactive services on a commercial basis, although there are a few trials.

Figure 7.3 Number of households subscribing to cable television services in Western Europe

Country	*Number of subscribers (thousands)*
Austria	250
Belgium	2,667
Denmark	62
Finland	158
France	175
Germany	1,240
Italy	0
Netherlands	1,700
Norway	260
Spain	0
Sweden	55
Switzerland	1,200
UK	2,300
Total	10,067

Note: Figures apply to August 1985.

Cable TV could, however, become an attractive delivery medium for home banking and other interactive services for two reasons. Firstly, its ability to carry still and moving pictures makes it possible to deliver a more comprehensive and visually appealing range of interactive services than over the telephone line. In addition, the interface unit needed for the customer to be able to receive cable TV will provide some of the facilities required for interactive services, so the marginal cost to the customer of the equipment needed to access home banking or other interactive services would be low.

Relative merits of alternative delivery methods

The relative merits of the alternative ways of delivering home banking services are summarised in Figure 7.4. In countries where the national telephone network supports mf signalling input from push-button telephones, voice response offers a perhaps unrivalled capability for delivering a cheap service to a very broad base of customers, but the services which can be offered are restricted by the lack of processing power in the telephone and the lack of visual feedback. Videotex services enable home banking to be marketed as part of a package of services, but the cost of terminals is still too high for many residential users (except in France where videotex terminals are provided free of charge to residential customers). Personal computers make an ideal terminal and their owners may find the cost of adapting them to receive home banking services acceptable, but currently only a small, though increasing, proportion of bank customers own personal computers with a communications capability.

Technological convergence is beginning to break down the differences between alternative delivery methods, a trend likely to continue. For example:

- Personal computers as well as bespoke videotex terminals are already used to access videotex services.
- A system using telephone input and voice response to set up a connection for a personal computer has been developed by Periphonics, a US company specialising in voice response technology. Information input includes the type of computer and customer identification numbers.
- Suppliers are also beginning to build videotex chips into personal computers.

Figure 7.4 Relative merits of alternative technologies for delivering home banking services

Technology	*Advantages*	*Disadvantages*
Voice response using MF-signalling telephones or adaptors	Cheap. Easy to use. Where the telephone network supports MF signalling, the potential customer base is larger than for other technologies. The technology is relatively familiar to customers.	Only a very restricted range of services can be delivered. Lack of visual feedback means overload on user's memory. Security may be inadequate for some services. No local storage.
Videotex, videotex adaptor	Ease of use. Home banking can be marketed with a range of other services and take advantage of a common infrastructure.	Cost of terminals high. If home banking is offered as part of a more general videotex service, security may be inadequate for some home banking services, especially those involving the transfer of funds.
Personal computers (PCs)	More attractive and sophisticated services can be offered as local storage and processing power available. Home banking can be marketed with a range of other services. Starting costs low for existing PC owners.	Only a minority of potential customers have communicating PCs.
Cable TV	Potentially able to deliver the widest and most attractive range of home services. Marginal initial cost to the customer of accessing interactive services less than for most other approaches.	Few cable systems have interactive (two-way) capability needed for home banking.

THE STATUS OF THE MARKET

The market for home banking has developed much more slowly in most countries than many early forecasts anticipated and many service providers would have liked. The reasons are many, but perhaps the most important are that the kind of services now available are not yet sufficiently attractive to customers, that customers themselves have not been ready, that costs have been too high and that service providers have not understood the market correctly.

We discuss these issues in this section, beginning with a review of the current status of home banking trials and services.

Major trials and services

A considerable number of home banking services are now in operation in many countries. Some of the largest and most advanced home banking services in the world are listed in Figure 7.5 overleaf. These services differ in a number of respects:

- —Some are trial services, unlike others which are fully commercial.
- —Some services only offer account balance information, whereas others enable customers to transfer money between accounts, make payments, order cheque books and convey other instructions to banks.
- —Some services accept input from push-button multi-frequency (mf) signalling telephones and provide a synthesised voice response, others provide a visual display using either videotex or conventional data communications to a personal computer.
- —Some services are offered independently, others are part of a package including other services.

Overall, home banking is still in its emerging phase in many countries. For many systems, the current growth rate per year is reasonable (between 15 and 30%), but not large enough for service providers to achieve payback on their investment fast enough. As an example, the Chemical Bank has so far spent some $20 million to attract some 21,000 home banking customers, which represents only about 2% of its total customer base of over 1 million.

However, in France banks have been able to increase the number of subscribers to their home banking services very fast, due to the policy of the French PTT to distribute free terminals to residential users. These are the 'Minitel' terminals, which are cheap black and white videotex terminals, designed to use France's videotex service, Teletel, and the PTT's electronic telephone directory.

Facilities available on home banking services

Figure 7.6, on page 93, shows individual facilities that may be available on home banking services. None of the home banking services we described under the previous heading offers all, although some, eg Chemical Bank's Pronto, offer most. Many of the

Figure 7.5 Major home banking services

Country	*Operator and service name*	*Technology*	*Approximate number of users*
Canada	Bank of Montreal: Grassroots	Videotex	500
Finland	Union Bank of Finland: Kotisyp	Voice response	5,000
France	Crédit Commercial de France	Videotex (Minitel terminals)	75,000 private customers (6,000 + businesses)
	Banque Nationale de Paris	Videotex (Minitel terminals)	30,000
	Over 50 other French banks offer some banking services over Teletel, the PTT's videotex service	Videotex (Minitel terminals)	Several tens of thousands
Germany	Verbraucherbank	Videotex	7,800
	Bundespost (Post office giro bank)	Videotex	7,500
	Several hundred other banks, most via bureau services, some using their own computer	Videotex	Several thousand
Singapore	United Overseas Bank and others	Voice response and home computer	Undisclosed
Spain	Banco de Santander	Voice response	90,000
UK	Nottingham Building Society: Homelink	Videotex	Several thousand
	Bank of Scotland	Videotex	Undisclosed
USA	Bank of America: Home Banking	ASCII/ Home computers	17,500
	Chemical Bank: Pronto	ASCII/ Home computers	21,000 private customers 4,000 small businesses
	Home Banking Interchange	Videotex (NAPLPS)	1,200
	Citibank: Banking Direct Access	Home computers	1,000
	Video Financial Services: Applause, on Viewtron videotex	Videotex (NAPLPS)	850

Notes:
1. Most countries in Western Europe now offer some banking services over videotex. Only major services are listed above.
2. The data applies to the status in August 1985.

services delivered over videotex offer balance and other information but no funds transfer. Those using telephone input and voice-response technologies are typically limited to balance and transaction information and pre-authorised funds transfer. Attempts have been made to offer more complex service packages via voice response, but without visual feedback many customers found them too complicated to operate.

Services in some countries would not be feasible in others, depending on local regulations. Perhaps the most extreme example of this is Austria, where home banking and home shopping are currently illegal, due to local consumer protection laws.

The target customers

Customer reaction and acceptance will be what determines whether, how and when home banking can be a success. Experience so far sheds light on the kind of customer to whom home banking appeals most, including not only individual customers but also small businesses who have become enthusiastic users of services designed originally for individuals.

Individual customers

A fairly consistent picture of potential home banking customers is beginning to emerge with considerable similarities between one country and another. Typically, such customers are younger professional people, well educated and in higher income brackets. However, they may not be the only target groups. One US study, for example, identified the prime customer groups as being not only high-flying young professionals, but also high-earning more mature professionals, and also the elderly and disabled. Yet another study of users found that most users were in the 35 to 49 age range.

The financial affairs of typical home-banking users tend to be more complex than average. For example,

Figure 7.6 Individual services available on home banking services

Balance information (for a number of accounts, and held at different branches of the bank).
Statement display and details of recent transactions.
Money transfer between accounts.
Bill payments to pre-authorised recipients.
Creation, review and amendment of standing orders and direct debits.
Messaging to the bank.
Request for cash delivery by post.
Applications for personal loans, credit cards and other credit facilities.
Credit and account enquiries.
Cheque book and printed statement requests.
Request to stop a cheque.
Cheque recording and monitoring facility.
Home budgeting facility.
Modelling and calculation programs, eg. for hire purchase costs, loan repayments, and savings plan evaluation.
Information on bank services.
Other financial information: — interest rates — foreign exchange rates — banking terminology — tax guide — economic and business briefs — 'Consumer Reports' articles.
Stockbroking services.

it has been reported that the average retail account holder with Chemical Bank in the US has 1.6 accounts, and the average user of the Pronto service has 3.9.

Although home banking services are designed for use by individuals at home, current experience suggests that there is also significant use by individuals using the services from their place of work (where suitable terminals tend to be readily available) rather than from home.

Typically, the customer's motivation to use home-banking services are convenience (although the laborious operating procedures of some systems are said to militate against this) and the ability to keep better track of their finances. It also allows precise timing of funds transfers (where this is available), which is not possible with most conventional media such as cheques and credit cards.

Small businesses

Although home banking products tend to be targeted at private customers, current evidence suggests that the most enthusiastic customers for simple on-line banking services may actually be small businesses. Also, some sectors termed 'residential' that have embraced home banking most enthusiastically, are those that are really in the small business sector, for example independent professionals working from home or mail order agents.

The most substantial population of small businesses subscribing to home banking sevices has been achieved by the French Minitel-based videotex services. For example, in early 1985 the CCF and Credit du Nord home banking services had 23% and 27% small business customers, respectively. Although many of the banks who provide home banking service for Minitel terminals offer a relatively restricted service (eg displaying account information only) others also provide at least some services specifically tailored to the needs of business customers, for example displaying the balances in all the customer's accounts with a given bank, even where they are scattered between different branches.

In the US, the leading current provider of small business banking services is Chemical Bank. Its 'Business Banker' pilot service serves an initial base of 4,000 customers. Citibank and First Interstate also offer services targeted at small businesses.

In the UK, the Bank of Scotland has specifically tailored its 'Home and Office Banking' service to the needs of business as well as private customers. It offers an additional cash management module for business customers, which enables the value of cleared funds to be identified and projects overall and cleared balances forward for three working days. Subscription to the service costs business customers approximately $7 per month and the cash management module costs a further $28 per month.

In Canada, a service aimed specifically at farmers has been developed. The Bank of Montreal offers banking services via a gateway to 'Grassroots', an agribusiness information service to which 1,000 Manitoba farmers subscribe at a cost of some $100 ($70 US) per month.

Bespoke small-business banking services that have been recently launched have been well received, and market research, such as that conducted by Chemical Bank in the US, indicates enthusiasm even among the smallest of businesses with only one or two bank accounts. The benefits of on-line banking services may be more appreciable to a small business than to an individual because of the greater complexity of company finances, and the greater likelihood of businesses already possessing a personal computer to act as a suitable terminal. For example, the Chemical Bank research, reported in 1985, found that 32% of US small businesses had a personal computer at the time of the survey, and 44% expected to have one by the end of 1985.

Costs to the user

The costs of home banking for the user include service costs, communications costs and terminal costs.

Service costs

Bank charges for the actual home banking service vary depending on the type of service offered and the bank offering it. Thus, the Union Bank of Finland makes no charge for its voice-response services except for an annual charge of 20 Finmarks ($3.5) for registering a list of pre-authorised payment recipients. Many of the French banks offer their Teletel balance enquiry services free; others charge 25F ($3.0) per month.

In the US, fees for personal-computer-based banking services range from $5-15 per month. Chemical Bank charges $12 per month for residential customers, Bank of America $8 per month. Chemical Bank market research has suggested that demand is relatively insensitive to price, up to tariffs of about $16 per month, but declines sharply at higher levels.

In the UK, the Bank of Scotland charges its home banking customers £2.50 ($3.5) per month. Bank charges are calculated on home banking transactions in the same way as for conventional ones. The Nottingham Building Society operates a very complex charging schedule for its Homelink home banking service, depending on: the type of terminal used to access the service; whether the terminal has been acquired from the Building Society or elsewhere; whether it has been loaned or purchased; and on the balance in the account. Interest rates paid on deposit accounts also vary depending on how the terminal has been acquired. Excluding the interest rate, charges range from free service to £5.20 ($7.5) per month.

Communications costs

Telephone call charges have to be paid separately for most home banking services. Customers accessing home banking over a videotex service also have to pay videotex connect-time charges in most countries.

Terminal costs

Where customers already possess push-button telephones, communicating personal computers or videotex terminals they incur no additional terminal-related costs, assuming of course that the home-banking service they wish to use is designed for their kind of terminal.

Voice response systems may require upgrading from a rotary-dial telephone to a push-button one: in Finland, for example, this adds about $2 per month to the cost of the telephone.

In the UK, Prestel adaptors suitable for home banking services are being offered at £95 ($140) by the Bank of Scotland and £180 ($260) (including installation) by the Nottingham Building Society.

Personal computers without communications capability will need additional communications software and a modem. The Nottingham Building Society also offers an adaptor for interfacing the more common home computers to Prestel. In the US, Microperipheral Corp. is offering an ASCII autodial/autoanswer modem interfacing to any personal computer for $175, or $250 for a more sophisticated version.

However, customers in many countries have shown reluctance to acquire videotex or other terminals specifically and only to access home banking services. For nearly all customers the costs of home banking outweigh any savings that may be achieved, eg bank charges. For those who are far from their banks, savings on personal transport or mailing costs may offset the charges. However, most home banking customers tend to justify their expenditure in terms of more intangible benefits such as greater convenience and better ability to manage their accounts, rather than direct cost savings.

SECURITY

Security is one of the major factors that now limit the range of home banking services. Security is an issue for both the users of home banking services and the banks who provide them. Users are concerned that they have no paper record of transactions (attaching printers to home terminals would add prohibitively to their cost). Banks are concerned about possible fraud or accidental misuse.

For security reasons, many services are limited to the provision of information only. Of those services now available that permit funds transfers, virtually all require that users should be restricted to those specified in advance to the bank. Some services restrict recipients to a 'closed' list of organisations specified by the bank; for example a transfer of funds may be made to utility companies or local authorities only.

The main reasons for the banks' concern about security are the need to verify the customer's identity reliably and the vulnerability of the communications to unauthorised interception. Ideally, home banking applications should be designed to allow the customer to access the service from wherever he wishes and has a terminal available, and not just from his home. However, this makes identity verification more difficult, and secure communications near impossible. There are a number of approaches to improving the certainty with which the identity of the

customer can be authenticated to reduce the risks of fraudulent use and we describe these below.

Passwords

If access to the home banking service is via videotex, the customer is normally required to log on to the service by entering a videotex account number, a personal identification number (PIN) and one or more passwords. These may be hardwired into his terminal and entered automatically or they may be input manually. A further level of security may be provided by requiring the customer to be a designated member of a Closed User Group. However, password security measures are vulnerable to misuse and they place great reliance on the user's ability to memorise or keep safe the passwords.

PIN changes

Problems of PIN disclosure can be avoided by changing the PIN after every transaction. This is the principle followed by, for example, Verbraucherbank (a German bank which pioneered home banking services) for securing funds transfer instructions. The customer is issued with a list of 'money transaction numbers' (MTNs), each of which can be used once only. In the case of Verbraucherbank the MTNs are 10-digit random numbers. These numbers are issued in lists of 100 which the customer needs to collect in person from the bank.

Smart cards

Smart cards can solve the authentication problem and keep an independent record of transactions. Smart-card readers which interface with a Minitel videotex terminal for accessing home banking services have been developed in France and should be publicly available by early 1986. French industry expects rental tariffs to be as low as 40F ($5) per month.

Restricted recipient list

Restrictions on the recipients of funds transfers are another means to reduce the security risk of home banking services. In particular, restricting the beneficiaries of funds transfers to those named in a 'closed' list provided to the bank in advance, prevents anyone not on that list who discovers a customer's account and PIN numbers from transferring money to his own account.

As PINs are highly vulnerable to being disclosed, PINs used for home banking should differ from those used by the same customer for ATM and EFTPOS transactions. However, the sheer number of PINs customers already need to remember is likely to become an intolerable burden as the number of PINs increases.

SELLING HOME BANKING AS A PACKAGE WITH OTHER SERVICES

Suppliers of information and transaction services for the home are increasingly thinking in terms of marketing a whole package of services to customers, rather than just an individual service such as home banking. To this end, a number of joint ventures between service providers with differing areas of expertise have been formed in many countries. The most notable examples in the US are those between:

- —Chemical Bank, Bank of America, Time Inc. and AT&T.
- —IBM, Sears Roebuck, and CBS.
- —Video Financial Services, a venture including Honeywell, Centel, Viewdata Corporation of Miami Beach, Security Pacific and a number of others.
- —Integrated Communication Service, which includes Control Data, Southern Bell, GTE, NCR, The Southern Company (concerned with utilities), and others.

In countries with national PTT-provided videotex services the PTTs tend to take the lead in service marketing and attempt to assemble as attractive a range of information and transaction services as possible, although not all PTTs have been entirely successful in achieving this aim.

In environments of joint-service provision, payment services developed in the context of home banking are likely to be readily applied to other services involving payment, for example home shopping, ticket booking and betting. They also provide an opportunity for service providers whose primary area of business is not banking to provide financial services and to compete with established banks and other financial institutions.

THE EXPERIENCE OF BANKS AND OTHER FINANCIAL SERVICE PROVIDERS

The earliest home banking services were mostly provided by smaller banks and other financial institutions who pioneered these services as part of a strategy designed to increase their market share. Examples are the Verbraucherbank in West Germany, the Bank of Scotland and the Nottingham Building Society in the UK. The larger banks tend to be more conservative and are mostly latecomers to home banking, with some exceptions, eg in the US, where the Bank of America and the Chemical Bank are among the pioneers. In France, both small and large banks are attracted by the large and rapidly increasing base of Minitel terminals; because of this base, banks can penetrate the market more easily than where banks need to create their own base of

customers with suitable terminals, which is the case in most other countries.

Banks and other financial institutions expect a number of advantages from offering home banking:

Externalising costs. Home banking is one aspect of 'self-help' banking, which the banks seek to exploit in order to reduce costs, especially costs associated with keeping their network of branches.

Coping with competition. In particular, smaller banking and financial organisations need new marketing tools, of which home banking can be one, to keep afloat in the face of growing competition from the giants in the banking world.

Selling other services. Home banking can be a vehicle for selling banking services to the customer.

In practice, none of the home banking services we have researched have so far shown any evidence of real tangible benefits being achieved, although claims of greater marketing advantage and substantial (though nonquantifiable) intangible benefits abound.

To illustrate the range of issues that banks and other home banking service providers face, we have chosen three home banking services to feature as case histories*.They illustrate different approaches taken and different marketing and technical solutions adopted. They are:

—The Union Bank of Finland.

—CCF in France.

—The Commonwealth Bank of Australia.

Union Bank of Finland

The Finnish banking market is highly competitive. For a number of years the use of technology to improve the range of services available to the customer and to externalise costs by increasing the element of self service has been an important dimension of competition. Largely as a result of these competitive pressures the Union Bank of Finland (the country's second largest commercial bank with 353 branches) has adopted a 'technology leader' strategy in the delivery of new services, including home banking.

The Union Bank's home banking service uses voice-response technology, but at the time of our research it announced that it will also offer access via home computers.

The voice response system offers real-time balance enquiries, transaction enquiries and payments to pre-authorised recipients on the day the instruction is given or any subsequent date specified. The customer dials his local branch and inputs instructions using a push-button multi-frequency signalling telephone. After each input he receives spoken information and guidance messages generated by a voice synthesiser.

The service is very cheap for customers. The bank levies no charges except 20 Finmarks ($3.5) per year for registering the customer's list of pre-authorised payment recipients. Communication is at local-call rates, and if the subscriber does not already have a push-button telephone the additional rental for upgrading from rotary dial is about $2 per month.

The service was first introduced in 1982. A development period followed, during which the service was not heavily marketed. The majority of the 5000 current users have in fact joined only during the last year. The expansion of the service has been a consequence of the recent extension by the telecommunications administration of the availability of push-button telephones and mf signalling throughout Finland.

The service is delivered via one or more voice synthesisers linked to the branch computer, drawing on its standard real-time teller support functions and access to the central bank computer. Incoming calls are queued until they can be routed to the next available synthesiser. A local branch service was chosen to keep communication costs for the customer low.

The Union Bank chose this simple approach to home banking, based on voice response, for several reasons:

—The range of services that can be provided with the technology is limited, but it provides those facilities the Union Bank felt were most important to the residential customer, namely information retrieval and basic funds transfer.

—The bank already has satisfactory products for both large and small organisations, so the need to cater for business requirements was not a consideration.

— Voice response is much cheaper for the customer than other alternatives.

However, the bank has just announced the extension of the service to accept input from home computers.

*Case studies of Home Banking services have appeared in earlier Butler Cox Public Reports, namely:

Chemical Bank's Pronto Service in 'Videotex services and the market response'

The Verbraucherbank's Home Banking System in 'Private Videotex Systems'

The Nottingham Building Society Homelink service in 'Information Technology: Its Impact on Marketing and Selling'

This will enable a wider range of services to be offered, including on-line provision of statements, flexibility in payment listings, pooling of information from different accounts and round-the-clock availability. The system will also enable other payment-related services such as theatre booking to be provided, but this is only a longer-term possibility. Access over videotex may also be offered.

Some important conclusions can be drawn from the Union Bank home banking service:

— A limited home banking service can be offered very cheaply, yet widely. It does not, however, lend itself easily to developing a broader range of services.

— The Union Bank have a clearly developed concept of the segmentation of the market for remote banking services. Their home banking service is designed purely for residential customers and is just one of a wider range of products and differs substantially from products designed for other types of customer.

— Expanding the service depended on the upgrading of the telephone service, and more specifically, on the introduction of mf signalling in the network and the marketing of push-button telephones by the telecommunications administration.

— By making the home banking service available through a range of delivery mechanisms, including home computers and, longer term, videotex, the services can be offered to a wider base of customers.

Crédit Commercial de France

Crédit Commercial de France is a medium-sized French bank with 470,000 customers, of whom 75,000 are business clients. Its 'Vidéocompte CCF' Service is probably the largest home banking service in the world, serving 75,000 private customers as well as over 6,000 business customers, mostly small businesses.

The service is offered via Teletel, the French videotex service, and is available to all CCF customers who have a Minitel videotex terminal. It offers account enquiries, funds transfer between accounts, bill paying, cheque book ordering and a facility for searching for records of specific transactions. Customers pay no charges for service usage to the bank, but they pay for communications costs. The DGT (the French telecommunications authority) provides Minitels free to residential customers in many areas, but rental has to be paid in those regions not yet included in the distribution programme. In areas where the Minitel is distributed free, 60% of the bank's customers have joined the home banking service within six months, but elsewhere penetration is much lower.

In September 1985, 222,000 calls were made to the CCF home banking service, an average of three calls per subscriber. This compares with an average of one visit to the bank per customer per month, but the number of such visits has not been noticeably affected by the availability of home banking. People often make use of a number of services when they visit the bank, whereas the home banking service takes care of only the more routine services.

CCF's objectives in providing the service are to offer a better service for its customers and to develop its existing customer base. Restrictions on the expansion of the branch network have forced it to seek new ways of serving the customer, of which home banking is one. In addition to achieving these benefits, CCF has also gained new customers, and found that existing customers have increased the average amount held in their deposit accounts.

CCF attributes the success of its service to two factors:

— The existence of the videotex infrastructure provided by the DGT, and the free Minitels, which has made it possible to offer a home banking service at low cost.

— Effective marketing. In particular, CCF took great care to tailor their service to the needs of their customers and to market it widely.

Also, CCF believes that the future success of its service will depend on other banks also offering home banking services to generate popular acceptance for services of this kind.

Commonwealth Bank of Australia

We have already described the current changes occurring in the Australian banking market in our case history of the Westpac EFTPOS service on page 55. It is in this context of competition and deregulation that the Commonwealth Bank of Australia decided to launch its home banking service. The Commonwealth Bank is one of the three largest Australian banks and the largest retail bank, with 1200 branches and some 7 million accounts. The service, called Telebank, is offered on Viatel, Australia's videotex service. Viatel was launched in April 1985 and now has some 7000 users. Dedicated videotex terminals are available on the market, but the majority of customers use adapted personal computers for videotex. Conversion packages for many common makes of personal computer are readily available from $300 (US $210).

Telebank offers the following services:

— Account balance information.

— Statement details valid for the previous night.

—Funds transfer to other Commonwealth Bank accounts.

—Bill payment to organisations on the bank's bill-paying register.

—Statement and cheque-book ordering.

In addition, the bank provides a range of other information services, including:

—Foreign exchange rates.

—Money market rates.

—Economic commentaries.

—Information about bank services.

—Investment information.

For the bill payment service, the customer selects the organisation to be paid from the bank register and quotes its reference number and appropriate security codes. The customer's account is debited, and payments initiated during the day are credited to the receiving organisation in bulk overnight.

A number of levels of security protect the Telebank service. To access Viatel, the customer must enter his subscriber number and password, which he can alter as often as he wishes. To use the bank service, he must also register as a member of a closed user group. For each access, he needs to enter his Telebank number and password, the latter a 4-10 digit code which can also be changed as desired. For funds transfer and bill payment transactions, an additional level of security is enforced: the customer must enter a transaction number, one of a list of randomly-generated 4-digit numbers supplied by the bank, each of which can be used only once.

Telebank is based on software developed originally by the Nottingham Building Society in the UK for its home banking service. The software needed to be substantially modified to suit the Australian market and to cope with the considerably larger scale of Commonwealth Bank operations and computer systems.

At present, while the service is still being introduced, it is offered free of charge, but from January 1986 customers will be charged a flat fee of A$4 (US $2.7) per month. In addition, customers pay for communication charges. Subscription to the Viatel service currently costs A$12.50 (US $9), but from March 1986 it will cost A$2.50 (US $1.7) per month for residential subscribers. Viatel also charges for connect time at 8 cents (5 US cents) per minute during business hours and 5 cents (3.5 US cents) per minute at other times. In addition, there is a local telephone call charge of 16 cents (11 US cents) per minute.

Customers who do not already have terminals, can rent a dedicated videotex terminal from the bank for A$10 (US $7) per month. The terminal used is a Tandata 1416.

Six months after launch, Telebank is still the only banking service on Viatel and has over 2,000 customers drawn from a broad cross-section. In common with other Viatel users, the majority are personal-computer owners. Further services are to be added. For example, from November 1985 a sharebroking service offered by broker Domingues Berry Samuel Montague will be available, with payments handled through Telebank.

Commonwealth Bank see home banking as a trigger service, a key service to attract customers to videotex and their banking services. They are the largest service provider on Viatel and once customers use their service, customers will also try other available services. The payments mechanism is also the core around which future home-shopping services can be built. The shopping service providers would be included on the bank's bill payment register, and payment would be authorised by entering the security identification when the order is placed.

The addition of such related payment services is attractive to the bank. Once other banks start to offer competing home banking services, it will be these other services that will differentiate the Commonwealth Bank product.

Several important lessons emerge from Commonwealth Bank's approach to home banking:

—In a highly competitive banking environment with a sizeable population of personal computer users, a home banking service can be launched as soon as a suitable network infrastructure for its delivery becomes available.

—The Commonwealth Bank identified home banking as a trigger service, one which would attract customers to a more comprehensive range of services, standing by itself if necessary, but benefiting from being offered with other services.

—Home banking can play a core role in a broader videotex service package, as it provides the payments mechanism needed to support home shopping and other transaction services.

MARKET TRENDS AND FORECASTS

We believe that home banking will be slow in penetrating the potential market for the following reasons:

—From the point of view of the customer the benefits are dubious. A business may be willing to pay for

such facilities as greater convenience and speed. But most individuals do not place a cost on their time in the same way as businesses do.

— The full advantages to the customer of using such services will only be realised if a comprehensive service is offered, including funds transfer. However, funds transfer requires better security than is available on most current systems. Improving security to the levels required will add significantly to the cost of providing services.

— The commercial case for providing home banking is not clear. The mass market is unwilling to pay and it is only once mass usage is achieved that banks can achieve a return on their investment. In addition, several banks have made the point to us that a service that encourages individuals to manage their financial affairs more efficiently is not necessarily in the interests of the banks!

— The banking and financial world faces considerable uncertainty on many fronts and home banking is simply not a high priority now for many banks.

There are however some exceptions to these general statements:

— The spread of 'home' banking among small businesses is likely to be more rapid than for

Figure 7.7 Forecast of the number of households subscribing to home banking services in 1990

Country	*Number of households (millions)*	*Proportion of households subscribing to home banking[1] (1990)*	*Number of households subscribing to home banking[1] (1990)*	*Comments*
Austria	2.7	1 in 500	5,400	Home banking is currently not permitted in Austria, but we expect restrictions to be lifted by 1988. Videotex will be the predominant delivery technology.
Belgium	3.4	Negligible	Negligible	No ready delivery infrastructure and lack of interest among service suppliers. The videotex system is only now being implemented.
Denmark	2.2	1 in 500	4,400	A new videotex system is being installed, delaying availability of infrastructure and terminal base.
Finland	1.7	1 in 50	34,000	Both voice response and videotex will be used. A highly competitive banking environment encourages home banking.
France	19.2	1 in 25	768,000	The wide availability of Minitel terminals enables home banking to be provided cheaply.
Germany	24.3	1 in 250	97,200	Videotex will be the primary means of delivery but voice response will also be used.
Italy	18.1	1 in 750	24,100	The videotex infrastructure will only become available in the late 1980s, but banks are keenly interested in providing services.
Netherlands	4.7	1 in 500	9,400	Although banks were interested in home banking when videotex became available, most have lost their enthusiasm.
Norway	1.4	1 in 500	2,800	Although some experimental services exist, banks are not confident of success.
Spain	13.0	1 in 100	130,000	Practically all home banking will be over voice response systems, as videotex will not be marketed to the residential sector until the 1990s. Interest among banks is high.
Sweden	3.6	1 in 250	14,400	Relatively little interest among customers, but the PTT is encouraging banks to participate in its videotex service.
Switzerland	2.1	1 in 250	8,400	Interest among banks is high but videotex is not yet widespread.
UK	19.8	1 in 250	79,000	Services will be based primarily on videotex, but some voice response services will also be used.

Note: 1) Households may subscribe to more than one home banking service. More than one household member may subscribe.

residential users. Business users will be more likely to have communicating personal computers or videotex terminals already, and demand for the service is likely to be greater, as it can be more easily cost-justified.

— Growth will be faster where a ready base of suitable terminals and a cheap and efficient infrastructure already exists. This is particularly the case in France, where banks can take advantage of the large number of Minitels installed, and where the future use of smart card readers attached to Minitel terminals will help reduce the security risks involved.

— Growth will also be higher where the banking market is highly competitive, as in Finland, or where many banks serve purely local markets, as is the case with many smaller German banks.

We present our forecasts for subscribers to home banking services by 1990 in Figure 7.7 on the previous page. Because home banking is a service that is only just beginning to emerge, the degree of penetration that may be achieved in the next five years varies widely from country to country. France will continue to lead in terms of the number of subscribers, and in Finland and Spain the outlook is quite promising, too. In the other countries, however, penetration will still be low by 1990 and we believe that it will be the end of this century before home banking will be commonplace in Europe.

CHAPTER 8

IMPLICATIONS OF NEW ELECTRONIC PAYMENT AND CASH MANAGEMENT SYSTEMS

As with any technologically-based change, the truly crucial question concerning the revolution in cash is whether it will actually happen. The short history of IT is already littered with the wreckage of over-confident forecasts based on an over-estimate of the appeal of technology and an under-estimate of the powers of social, economic and attitudinal inertia. These errors are particularly common, and the margins very wide, when the proposed change depends upon the creation of a mass market. It is relatively much easier to persuade a thousand companies to use a new software package than to persuade a million people to subscribe to a new service. Traditionally, Butler Cox has placed itself at the conservative end of the spectrum of forecasters.

However, despite our predilection for caution, we conclude in the light of all the evidence that significant changes in the field of IT and cash will occur.

In reaching this conclusion, we place more importance upon the economic factors than upon the purely technical. In a sense, the hard part of the task of creating a new regime has already been achieved, since much of personal and corporate credit management has already been computerised. The reader might profitably examine his or her own personal finances. How much of the total inflow and outflow of funds is already being handled electronically? Tax and social security contributions are deducted, often electronically, at source. Major and regular payments such as mortgage repayments, insurance premiums and subscriptions are made by standing order or direct debit. A major block of other transactions are aggregated electronically by credit card. Cash payments are already becoming a relatively minor source of outflow, at least in value terms. Many people, especially those in the professional and administrative classes, never receive cash payments at all — save in drawings from their own accounts. If we are right, the introduction of EFTPOS (though rightly regarded in some ways as a major change) really amounts to the setting up of a network of data capture points for data processing and communication systems that already largely exist and that already handle the bulk of our money transactions.

The impact of the new payment and cash management systems will be felt by nations, by individuals, and by organisations of most types, most sizes and in most sectors. They will affect not only current payment and funds transfer methods but will lead to whole new business practices, different organisational structures and changed industry relationships.

We assess these implications in this chapter. We first discuss the impact on retailers, large corporate users, banks and network service suppliers. We also discuss the regulatory implications and the broader impact on nations as a whole and on individuals.

IMPLICATIONS FOR RETAILERS

Trends that are already occuring in the retail world will be encouraged by the advent of EFTPOS. In particular, EFTPOS technology will fuel the move towards larger retail units:

— To introduce EFTPOS, high initial investment and know-how are needed. These are barriers for small outlets and small organisations, which do not have the necessary volume of business and buying power.

— Cost savings through EFTPOS are less accessible for small retailers. Small businesses will normally not be in a position to negotiate discounts on bank and credit card company charges effectively, or to undertake their own networking. They are also less likely to benefit from savings in staff, as a small saving in staff time would not necessarily enable an actual reduction in staff numbers to be made.

— Also, in-house card systems do not normally make sense for small retailers. The usefulness of such cards to the customer depends on how much shopping he can use them for, and on whether he can use them to buy one product at a number of locations (eg petrol) or many different products at a single location (eg department stores). None of this applies to small retailers.

However, *groups* of small retailers (whether voluntary chains or businesses served by a single wholesaler)

could join forces and thereby gain access to some of the benefits of EFTPOS, which are otherwise available only to larger organisations.

EFT technology can make payment handling and other financial services more profitable for retailers and could therefore be an attractive service to provide as part of a wider portfolio. We believe that the trend for organisations such as supermarkets and department stores to offer such services is therefore likely to continue. To this end we are likely to see more alliances between retailers and financial services providers, whether banks or others.

EFTPOS is likely to be the next major development for retail organisations whose market strategy is based on technological leadership. The initial market advantages of offering EFTPOS services are unlikely to be retained in full once competitors also offer the service, as was the case with credit cards. However, gains in market share attained by retailers offering the new payment services in advance of others may be retained, at least to some extent, even once others follow suit.

IMPLICATIONS FOR LARGE COMPANIES

The developments in electronic funds transfer and cash management services we have discussed in this report will have some far-reaching consequences:

- Companies will increasingly regard effective cash management as an additional source of profit. The increased speed and precision brought by EFT to payments systems is likely to encourage this trend.
- EFT is likely to favour multinational operations. Companies will be able to exercise better financial control over foreign subsidiaries and their financial affairs and they may be better placed to take advantage of business opportunities at remote locations. Therefore financial control is likely to become more centralised.
- Credit and payment terms are likely to become even more specific than at present, and play an even more important role in the negotiation of deals, with precision in payment timing a significant element.

  Many organisations now rely on the 'credit game': deferring payment to their suppliers for goods received on credit, while receiving payment for the same goods from their customers. The new payment systems will provide an opportunity to question the continuation of such practices.
- The relationship between companies and their banks will continue to change. As the importance of cash management increases, companies will become more sophisticated. They will undertake more financial activities themselves, be more specific in their demands and shop around more for individual services. Banks, too, are likely to contribute to the decline in the 'total' banking relationship, responding to both internal pressures and market demand by unbundling services and by bringing charges for individual services more in line with costs. At the same time, organisations other than banks will be better placed than they are to fulfil and exploit some market needs, especially those that do not require a network of branches.

IMPLICATIONS FOR BANKS

The development of the wholesale and retail EFT services we have described will have some significant consequences for banks. In particular, two key issues arise for banks: Will they achieve the anticipated benefits from EFT services? And what will be the impact of EFT on the structure of banking markets?

Will banks achieve anticipated benefits?

Banks see an opportunity with EFT services to reduce costs, in particular staff costs and costs associated with operating branch networks, and to gain a market advantage. The new banking services vary in the nature and extent of the benefits they are likely to deliver.

ATMs have the potential to reduce branch costs, replacing small branches and staff (or freeing them for new tasks) and favouring a strategy of concentrating the provision of more complex services in larger branches. These savings have not been universally achieved to date, partly because of the high cost of ATMs and their installation. Just as retailers move into the management of cash resources, it is possible that banks will seek to exploit their expensive, high-street locations by offering new financial services and perhaps even other kinds of services and products.

We believe that home banking is unlikely to have any impact on the branch network for the foreseeable future, except perhaps in France where the videotex network and the large number of terminals provide a cheap enabling infrastructure. However, home banking may assist the banks pioneering it to capture a desirable segment of the domestic and small business market.

EFTPOS and bulk payment services offer banks the prime opportunities for reducing the costs of handling paper payments. Bulk payment services have undoubtedly been successful in achieving this objective, although they have not replaced as much paper as had been hoped. EFTPOS, once introduced on a wider scale, will help relieve the pressure from

increasing volumes of paper arising from credit card transactions. However, volumes of cheque payments to retailers are likely to continue to rise in most countries, at least in the short term, as the rate of increase in the proportion of the population with bank accounts is likely to outweigh initial usage of debit EFTPOS services.

Corporate cash management services offer the banks some scope for staff savings, for example in the handling of telephone balance enquiries and manually processed funds transfer or dealing instructions. The main motivation for providing them, however, is to win new or retain existing corporate accounts which otherwise might well go elsewhere.

What will be the impact on the structure of banking markets?

EFT is affecting the structure of banking markets in a number of ways:

- It increases competition for providing payment-related services.
- It encourages the formation of partnerships and joint ventures.
- It changes the way bank products and services are marketed, and the nature of those products.

EFT removes some of the barriers which prevent organisations other than banks from operating payment-related services, by reducing the need for a network of city centre branches and a labour-intensive payments processing operation. Foreign banks, other financial institutions such as credit card companies and building societies, retailers and network and computing services providers are all entering the market. But entering EFT markets will not be easy for such organisations, as developing and providing EFT services requires not only high initial costs and expertise but also credibility in the marketplace, which the banks have, but which others will need to build.

Although traditionally banks are organisations that value their independence, EFT is forcing them into partnerships of new kinds. The wider the portfolio of services they wish to provide, the greater the need to cooperate with others. Network sharing or interworking for ATMs or EFTPOS provides a compromise between the cost of providing systems on the one hand and convenient access for the customer and national coverage for the retailer on the other. It also ensures a larger card base and avoids duplication of equipment at the point of sale. Reciprocal arrangements, whereby banks in different markets use the same systems, can be of mutual benefit by, for example, facilitating the exchange of balance information on bank exchange networks. Partnerships between banks and other service providers can provide banks with resources and expertise they lack. Banks also need to rely on retailers to market EFTPOS to the customers. Already many banks use bureaux to provide cash management services. Greater cooperation with others, such as information providers, retailers and PTTs is also beginning.

Increasingly, bank services will be sold individually rather than as a package, and the trend towards charging for services on a basis which more directly reflects actual costs is likely to continue. Cash management services are also encouraging companies to reduce the number of banks they deal with and to concentrate on developing closer relations with fewer banks.

How services are grouped for marketing purposes is also changing. Greater sophistication, a more differentiated demand for services and the need to sell and charge for individual services is leading even large banks to specialise. But within market segments, the trend is to integrate all the services required for a transaction, for example currency exchange rate information and dealing services.

Some banking markets are being eroded or lost to competition, but at the same time new opportunities are appearing. In this changing environment, new applications for traditional banking skills continue to appear, especially through the capabilities of new technology (eg the treasury workstation). Products developed initially for the wholesale banking market (for example cash management) can then be transferred to the retail market. These new opportunities will lead banks to re-examine the nature of their business. Should they be, for example, in electronic publishing, or network or terminal equipment provision?

IMPLICATIONS FOR OTHER FINANCIAL INSTITUTIONS

Many financial institutions other than banks have, or can acquire, the financial and systems expertise to compete with banks in providing funds transfer services, especially for services where an extensive branch network is no longer required. In particular, the credit card companies are well placed to offer debit as well as credit EFTPOS. Other organisations, for example the smaller building societies, could also participate in EFTPOS by sharing networks.

Whether such organisations can actually obtain the 'entry ticket' to participate in the payments handling business depends very much on local regulation. For example in the US, bank activities have been highly regulated, but potential competition from outside the banking sector is less restricted. In the UK, building societies have so far been constrained in their

activities. They are still unable to participate in the clearing process but, as we have discussed in Chapter 1, this will change shortly as a result of deregulation. By contrast, in Germany all organisations providing payment services are regulated as banks and there is little sign of this changing.

IMPLICATIONS FOR SYSTEMS AND NETWORK SERVICES SUPPLIERS

Electronic payment and cash management services present some significant opportunities to software and systems houses, computer service bureaux, network suppliers and value added network service providers. They may adopt a number of different roles:

—Service retailer.

—Service provider as agent for a bank or other financial institution.

—System, software or network service supplier.

In addition there are related opportunities for user support training, maintenance etc, and also opportunities to act as a broker between banks in circumstances where banks will not deal directly with other banks, for example in the exchange of account information.

However, in most of these markets suppliers will face competition from the banks themselves. Banks which lead in the technology can market their systems and services to other banks, and set up 'arms-length' subsidiaries to compete with service bureaux in markets where the banks themselves are at a disadvantage. The activities of technology services suppliers may also be restricted by lack of banking expertise and by regulation. In many countries, some elements of the payment handling process (notably account holding and clearing) are restricted by law to defined and regulated categories of financial institution. This is not the case everywhere, however; for example in California, GEISCO, the computer service bureau, has recently won the contract to provide an automated clearing house service.

Electronic funds transfer services are only viable if an appropriate telecommunications infrastructure is available. All on-line funds transfer systems — be they EFTPOS, home banking or cash management — will increase traffic volumes over telecommunications systems. Although in principle the telecommunications services providers stand to gain from such increases in traffic volumes, current systems will need to be upgraded to provide the quality, reliability and security required.

IMPLICATIONS FOR WORKSTATION AND TERMINAL EQUIPMENT SUPPLIERS

The three services we have reviewed in detail (EFTPOS, cash management and home banking) differ in their implications for terminal suppliers.

By far the most significant market for terminal equipment arising out of the services we have reviewed is that for EFTPOS terminals. In terms of product lifecycles this market is still mostly in the emergent phase, but it has reached the growth phase in some countries (notably in France) and in some sectors (notably the fuel retailing sector in Belgium, Scandinavia and perhaps the UK). At present, product specifications vary considerably. Standardisation may occur earlier than usual in the product lifecycle, due to coordination between banks, but in most countries this is unlikely to occur before the market enters its growth phase. Therefore suppliers' wisest course of action will be to adopt product strategies which expose them to least risk in the face of the current uncertainty. In view of the uncertainties involved, we expect the most successful suppliers to be those who respond well to emergent demand rather than those who seek to pre-empt demand.

Treasury systems are standardising on common brands of personal computer, in particular IBM. This reflects the dominance of this supplier in financial applications and it will be extremely difficult for other suppliers to make major inroads into this market.

Home banking and other payment-related applications for the home will increase the usefulness of home computers or videotex terminals. In most cases they are unlikely to trigger the acquisition of terminals by the end customer. Such terminals may, however, be acquired by the banks offering home banking services for subsequent distribution to their customers. Therefore, a strategy for home equipment suppliers to sell such terminals to banks instead of to their customers makes sense.

Once the market takes off for all these systems and enters the growth phase, market conditions will be better suited to, and are likely to encourage the participation of, large IT suppliers and especially those with particular interests in the banking and retailing sectors. The ability to deliver high volumes of equipment at low cost and to provide national and international support and maintenance facilities are likely to militate against some of the small suppliers currently active in the market. To survive, they will need to identify and exploit a specialised niche (as some have already done in fuel retailing) and exploit their ability to react faster to changing market requirements than larger suppliers.

REGULATORY IMPLICATIONS

Developments in electronic funds transfer affect a number of domains now subject to regulation in many countries, notably banking and telecommunications. At the most basic level, they make banking regulations drafted in terms of the existence of branch networks obsolete, by providing the means for the delivery of banking services without branches. But they also raise other issues, namely the regulation of payment services, risks due to technical failure and the regulation of competition in providing network services.

Regulation of payment services

Until recently, payment services have been the preserve of banks, and they have therefore fallen within the ambit of general banking regulations. EFT allows individual elements of the payment process to be separated and handled by different organisations. For example, EFTPOS requires data capture, networking, account holding, authorisation, and settlement functions to be performed. Laws need to be reassessed to ensure that, for example, regulations debarring non-bank organisations from account holding do not effectively prevent these from networking, or conversely, that regulations designed to ensure the security of banks as deposit-taking institutions do not impair their ability to compete for other elements of electronic payment services. The corollary of this argument is that the advent of EFT need not necessarily alter the criteria of suitability for participating in those aspects of the payment system which will continue to need regulation, for example settlement.

Technical risks

EFT may greatly increase risks in the payment system. Technical failures could potentially be far more disruptive than failures in a manual system, payment data may be much more concentrated physically in only a few communications links or computer systems, and the speed of EFT transactions is such that a crisis might develop in minutes rather than days. New regulations may be required to protect against such eventualities. If expensive back-up systems are required, this will add to the initial costs of providing EFT. The consequent issue of who bears the cost in case of system failure is one that will need to be resolved either by agreement between the parties involved or by regulation.

There is also the issue of how disputes involving payments will be resolved between the banks and their customers. Current ATM networks have achieved very high levels of reliability and security. However, there have been cases of unresolved disputes between banks and their customers on whether withdrawals were correctly debited. EFTPOS carries the risk of making such problems more acute, given the much greater potential numbers of terminals and transactions, and the involvement of three parties (bank, retailer and customer) rather than two.

Regulation on competing network services

In many ways the development of national EFTPOS networks runs counter to current thinking in many countries on the importance of competition and the trend to deregulate the provision of network services.

Two types of argument are advanced in support of a single national network. One is the need to avoid duplication of equipment at the point of sale, while at the same time allowing the widest possible range of cards to be used. However, if standards for data encoding on cards and communication protocols can be agreed, interworking between separate networks would achieve similar results.

The second argument relates to economy and efficiency in the provision of the telecommunications infrastructure. In the UK, arguments of this kind have been rejected in favour of the benefits of competition in providing the telephone service. In addition, the history of telecommunications services suggests that developments in technology reduce the costs of providing the service infrastructure. Therefore the economic arguments that now favour the view that a monopoly should provide these services can be expected to weaken. Regardless of the merits of the case, however, the key issue is that EFT networks will need to conform to telecommunications regulation in their respective countries; changing such regulations will be a slow process.

IMPLICATION FOR NATIONS

We depict developments such as EFTPOS as a natural and inevitable development of systems already in place. Nevertheless the implications for nations are considerable. In his introduction to *Arlidge & Parry on Fraud* (The Criminal Law Library, Waterlow, London, 1985) Lord Roskill writes: "The modern fraudster can and does use modern technology to aid his wits, and how does our system of criminal justice intend to deal with frauds facilitated by switching millions of pounds or dollars around the world through several countries in succession all in a matter of seconds?" There is little doubt that in many jurisdictions there will be important changes in investigatory techniques, legal procedures, rules of evidence and trial conduct to deal with electronic frauds.

One of the tools of economic management to which governments sometimes resort is the control of

foreign exchange. When banks were almost the sole vehicles for the exchange of funds, such controls were a feasible proposition. Are they today? Will they be in ten years from now? Countries have been accustomed to control — to some extent — the flow of liquid funds within their shores. The significance of money supply as a barometer of economic health or as a tool of national economic management is fiercely debated by economists and politicians: but few would claim it to be of no significance at all. In the future, could offshore financial institutions, either for reasons of straightforward self-enrichment or for more sinister purposes, decide to drain a country of its liquidity — a sort of financial vampirism — or worse, perhaps, decide to flood it with unlimited liquidity? When sources of international liquidity become so varied and uncontrolled, will the runs and ramps on currency we have seen in the past seem like mere dress-rehearsals for all-out monetary war? Are international accords such as the European Monetary System robust enough to withstand such assaults? We cannot answer these questions. They require careful and prolonged examination at the level of governments, national financial institutions and supranational bodies. But they are questions of overriding significance for us all.

IMPLICATIONS FOR THE INDIVIDUAL

If and when electronic media become the norm for money payments and receipts, what of the individual? What of those who live, some claim in increasing numbers, in the cash or 'black economy', such as restaurant and hotel staff who draw nugatory wages but prosper on gratuities? What of the growing army of those who provide services — decorating, minor building works, gardening, cleaning — on a basis of 'cash in hand, no questions asked'. We do not necessarily commend or approve such practices. But anyone who denies that the black economy plays a significant role in the economic life of developed, high-tax countries is walking about with closed eyes. How will the cash economy work when fewer and fewer people have any cash?

What of street crime? Will street robbery ('mugging') disappear when only the poorest carry cash? Or will the pattern of crime change?

In the world's most violent cities, the police are gradually adapting the advice they give to the victims of street violence. Their advice now is to hand over cash, credit cards, cheque book and valuables without hesitation. To resist, or even to complain, is to invite injury or death as well as robbery. A victim who shouted abuse after his robbers in New York recently, when the robbery was complete and the criminals were making off, found that they were willing to risk arrest to return and kill him. Will street robbery disappear when no-one has cash, and when the use of stolen cards can be instantaneously prevented over credit networks? Or, more chillingly, will every victim be either hijacked or murdered?

What of the privacy implications for individuals? Both EFTPOS and home banking are tools by which a customer's purchases are recorded and these records may be used for other purposes. They may reveal his whole style of and priorities in life. The possibility of unauthorised use of such information will be deeply disturbing to many individuals.

IS THERE A FUTURE FOR CASH?

Any forecasts of 'the cashless society' are liable to falter on the remarkable resilience of cash. It has survived cheques, it has survived credit cards, and it will survive electronic systems for many years yet. However, it will gradually become a less important way in which to pay.

Of the electronic funds transfer systems we have discussed in this report only EFTPOS has the potential to replace cash to a significant extent. Home banking and, to an even greater extent, corporate cash management services replace transactions which do not rely on cash to a significant extent.

Even as far as EFTPOS is concerned, customers already have similar non-cash alternatives — cheques and credit cards. It is, of course, of no particular advantage to a purchaser to have the charge registered instantaneously to his or her account, while a cheque might take days to clear and while a credit card account may not need to be settled for weeks. EFT services will need to slow down their clearance procedure artificially to compete with cheques and credit cards.

In the long term, three trends are likely to affect the importance of cash. Firstly, more people will have bank accounts and will therefore be able to consider any of the alternatives to cash, including EFT. Secondly, people will become more familiar with using plastic cards in EFT equipment. (At present still less than half the population of cardholders use their cards in ATMs.) Finally, a trend towards 'single-stop' shopping will lead to fewer but higher value transactions, for which cash is less suitable. We believe that these trends will lead to a gradual decline in cash transactions as a proportion of all payments. But the 'cashless society' is still a very long way off.

APPENDIX 1

EFTPOS TECHNOLOGY

Two technical choices must be made at the earliest stages of specifying an EFTPOS system: what card technology is to be used, and whether terminals should operate on-line or off-line. There are also other payment-related devices which are not strictly speaking EFTPOS, but which merit consideration and are therefore described in this appendix.

CARD TECHNOLOGY

Two main types of card are available, magnetic stripe cards such as those currently used for credit cards and the more recently developed 'smart' card, which has an electronic microcircuit embedded in the thickness of the card (see Figure A1.1). Hybrid cards combining the two technologies have also been developed.

Magnetic stripe cards

Magnetic stripe cards are plastic cards with a strip of magnetic material on one side onto which data can be magnetically encoded. ISO standards define three tracks, or lines of magnetically encoded data bits, on the magnetic stripe, distinguished by their distance from the top of the card. In banking applications, the data encoded on the card identifies the card and, in conjunction with a Personal Identification Number (PIN) entered by the user, verifies the user's identity. Magnetic stripe cards are used widely as credit cards and bank cards for use in ATMs and cash dispensers. Thus a base of cards and card users already exists that may be used for EFTPOS applications.

The cards themselves are very cheap, costing only a few cents each. They are, however, vulnerable to fraudulent use. Credit card companies usually rely on the user's signature for verification, and in automated transactions, whether debit or credit, they require the entry by the user of a PIN. Users have proved careless in concealing their PINs, so that card thieves have often been able to use stolen cards. Ensuring that the PIN verification process is secure greatly increases the cost of equipment for which these cards are used.

Smart cards

There are three main types of smart card:

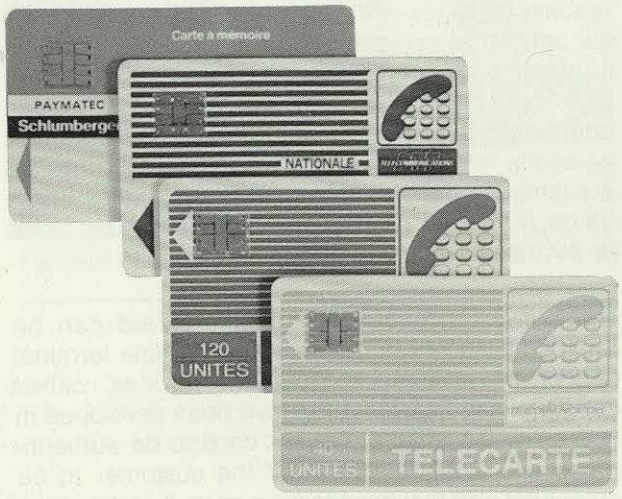
—Memory only.

—Wired-logic.

—Microprocessor.

Memory cards have 512 bits of memory and no processing capability. They are disposable and cannot be recharged and are suitable for simple prepayment applications such as use at public telephones. They have no verification capability, so that loss of a card implies loss of any residual value. Their cost is relatively low, about 65 cents per card. Their advantage to the customer is that he would no longer need to carry change for public telephones, parking meters, ticket vending machines and other similar uses. They can also save the provider of unmanned vending equipment the problem of coin storage, with its attendant risk of theft and the inconvenience of coin collection. Although credit card-operated ticket-vending machines have been introduced for some applications (for example at railway stations), the cost of the security necessary

Figure A1.1 Examples of smart cards



for magnetic-stripe card operation makes these cards unsuitable for low-value vending machine and similar unmanned payment applications.

Wired-logic cards incorporate a chip with some logic controlling access to the memory. The logic provides for PIN verification to control use of the card, but is not programmable and therefore can only be used for a single application. The card is preprogrammed with the customer's authorised expenditure limit, and keeps a record of numbers and values of transactions. At a predefined point, for example when the expenditure limit is reached, the card has to be recharged or re-authorised on-line at an appropriate terminal connected to the bank before it can be used again.

Microprocessor cards contain up to 8 Kbits of memory and a programmable microprocessor which enables them to handle a wider range of applications and provide a greater level of security. Costs are expected to range from $2.30 to $6.50 per card, even in volume production quantities.

In principle, smart cards have a number of advantages over magnetic stripe cards:

—They are more secure.

—Since PIN verification takes place within the card itself, EFTPOS terminals can be cheaper, as one costly security requirement is eliminated.

—Unlike magnetic stripe cards, they permit off-line working even when used in debit mode, allowing savings in communications cost and transaction time. But off-line working requires extra facilities in the terminal which may more than offset these savings.

PIN verification within the card itself provides greater security since the PIN cannot be intercepted in transmission. Additional security features prevent the reading out of the PIN from the card and enhance security for specific applications. For example, the card can encrypt and decrypt messages. However, if a card thief also has access to information concerning the PIN (and card users are notoriously careless in this respect), misuse can only be prevented in the same ways as for magnetic stripe cards, ie by distribution of lists of unauthorised cards or by means of on-line authorisation.

The convenience of using a smart card can be retained even where the cost of an on-line terminal cannot be justified. Inexpensive devices, called certifiers (see Figure A1.2), have been developed in France which enable a smart card to be authenticated and a PIN keyed in by the customer to be compared with that encoded in a card. A certifier has a keypad and a visual display. Once the transaction

Figure A1.2 A certifier

details and the PIN have been keyed in, a certification number is displayed. The retailer records this number on the payment voucher to enable the bank to check the authenticity of the transaction. A record of the transaction is also retained in the smart card.

Although communication from the EFTPOS terminal can be reduced, the smart card cannot eliminate it entirely. Transaction details will need to be downloaded to the bank if the handling of paper records or physical delivery of magnetic media are to be avoided. In addition, if a daily update of lists of cards whose use is no longer authorised (the hot card list) is considered insufficient, transactions will need to be authorised on-line, or as a minimum, authorisation will have to be re-issued after a pre-set number of transactions. Finally, if the value of the desired purchase exceeds the prescribed limit, special authorisation will need to be obtained.

Hybrid stripe/smart cards

One of the main disadvantages of the smart card is its cost, even in volume production quantities, which are only now being achieved. The other is that there is as yet no significant base of smart cards in circulation. In addition, introducing smart cards would require the replacement of existing magnetic stripe technology equipment such as ATMs and point-of-sale terminals. For this reason, hybrid stripe/smart cards have been developed so that existing equipment need not be replaced before the end of its natural life.

MODES OF EFTPOS OPERATION

Two modes of EFTPOS operation are feasible, on-line and off-line.

On-line operation implies communication with the bank for every transaction, for authorisation and

perhaps for user identity verification and transaction data capture as well.

With off-line operation, verification is performed locally. Authorisation is granted automatically for transactions below a certain value, once the card number has been checked against a locally held list of stolen cards. Specific authorisation may still be required for transactions above this 'floor limit'. Transaction data is stored and downloaded to the central computer in batches, usually overnight to take advantage of cheaper communications rates or the absence of sales activity.

On-line operation provides greater security against fraud because it prevents thieves making numerous credit card purchases immediately after stealing a card, secure in the knowledge that locally held hot lists will not be updated until perhaps the next day. It also ensures that sufficient funds or unused credit remain in the account. With communication to the central computer required for every transaction, communications costs will, however, be higher than for off-line working, especially where the latter takes account of cheap overnight communication rates. Also, delays in the communications network and bank system response times will increase the time taken for each transaction, compared with the off-line alternative. However, on-line operation is preferred where unit sales value or the incidence of fraud is high.

Compared with on-line operations, off-line working requires additional capabilities in the terminal, which could make an off-line terminal $125-$225 more expensive than an on-line one, depending on quantities purchased.

A compromise between on- and off-line operation may offer some of the advantages of both. Off-line systems often require specific authorisation for a transaction to be obtained if its value exceeds a designated 'floor limit'. Other regular or random on-line checks for authorising transactions during operations which are otherwise off-line, can enable security to be improved while keeping communications costs low.

OTHER PAYMENT-RELATED TECHNOLOGIES

Other payment-related technologies that merit a description are authorisation telephones and point-of-sale cheque printing and data capture terminals.

Authorisation telephones, also called transaction telephones, may be regarded as predecessors of EFTPOS. They enable a retailer to obtain authorisation for a transaction from the credit card company, but do not provide for the capture of the transaction data. An authorisation telephone is a telephone with an alphanumeric display, card wipe, autodialler and modem. For a transaction to be authorised, the credit card is wiped through the card reader and the amount of the transaction keyed in. The card company's host computer is dialled up to send the data. If the transaction is authorised, an authorisation code is returned and displayed on the alphanumeric display. Authorisation telephones are in quite widespread use throughout the world, including the US and most European countries. Figure A1.3 shows a typical authorisation telephone.

Point of sale cheque printing and data capture terminals enable the data on a cheque to be captured electronically and forwarded to the bank, as for an EFTPOS transaction. The terminal reads the magnetic characters on the cheque which give the bank number, account number and cheque number. It also prints on the cheque the name of the payee, value of the transaction, date and place. The customer signs the cheque to authorise it. The transaction details are stored in the terminal for transmission to the bank in batch overnight. The terminals can capture data for credit card transactions. The technology has been developed for use in France, where the problems arising from the volumes of cheques handled are particularly acute.

Figure A1.3 An authorisation telephone

APPENDIX 2

BULK PAYMENT SERVICES

In many European countries bulk payment services accepting electronic inputs are now available, provided either by an automated clearing house or a bank giro service. The way the service is implemented, the precise nature of the facilities available and practice in their use vary somewhat from one country to another. One of the most advanced bulk payment services in Europe is the Bankers' Automated Clearing Services (BACS) in the UK. It is representative of how such services operate, and we therefore review the services it provides in this appendix.

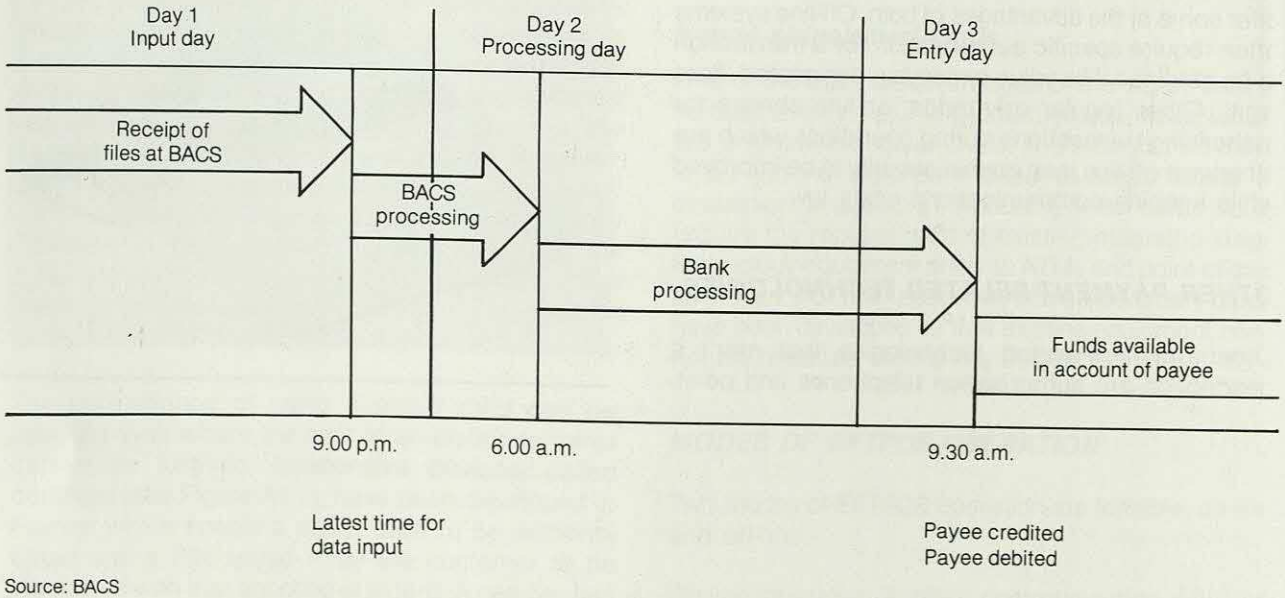
BACS is jointly owned by five of the major English clearing banks, but provides a service for all banks in the UK. It was started in 1969, and has grown steadily ever since: in 1985 it expects to process more than 820 million items, an increase of 17% over the previous year and accounting for 23% by volume of clearing in the UK. It aims to account for 40% by volume of UK clearing by 1990. User numbers increased by between 30 and 40% in 1984, reflecting the increasing attraction of the service to customers for smaller volumes of payments.

SERVICES PROVIDED

BACS operates on a 36.5 hour clearing cycle, as shown in Figure A2.1. Payment instructions input up to 9 pm will result in a simultaneous credit to the payee and debit to the payer when the bank branches open at 9.30 am two days later. A telephone call to the user's bank can stop payment almost up to the last moment. Payment instructions can however be submitted in advance and in batches containing payments to be made on different dates spanning a period of up to 40 days. Payment instructions may be submitted on-line or on magnetic media.

Customers submitting data on-line are notified of its acceptance or rejection immediately the transmission is completed. Similarly, magnetic media submitted in advance of their input day are checked on receipt and an 'Acceptance Report' is posted to the sender. For all inputs an 'Input Report' is sent by post on the input day, to be received in most areas on the processing day by a designated representative of the client organisation. This report is an important element in ensuring the security of BACS. It specifies the number

Figure A2.1 BACS clearing cycle



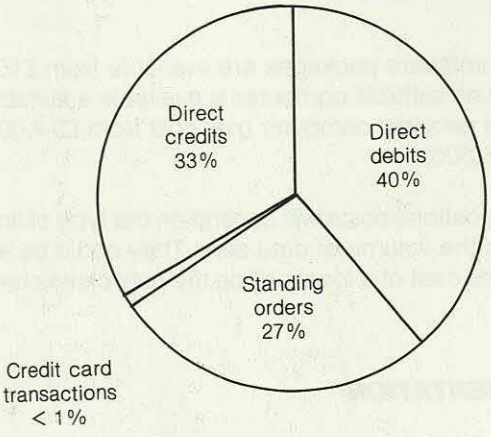
Source: BACS

and total value of payments input and lists items that are exceptional according to criteria designated in advance, items not accepted as transmitted and, if desired, a sample of other items to enable further security checks. Encryption is available for on-line input but is not considered necessary in most cases. Submission of input reports via BT Gold, an electronic message service offered by British Telecom, has recently been piloted.

BACS handles four main types of payment service: credit instructions input directly by organisations, standing orders by private bank customers to make regular payments, direct debits and credit card payments. We show the relative proportions of the traffic accounted for by these services in Figure A2.2. Payrolls were originally the major application of direct credits, and 65% of UK monthly salaries are currently paid in this way. Other important applications include occupational pensions and payments to suppliers. Indeed the latter, purchase ledger settlements, are the fastest growing credit application, having grown by 30% or over in volume in each of the last three years.

Direct debits have become increasingly popular as a means for organisations to collect regular payments from private individuals where the amount of the payment is likely to vary fairly frequently. The organisation notifies the individual of the amount to be debited and then intitiates the debit instruction. Direct debits overcome the major disadvantage of the standing order that the payer has to be persuaded to amend the order every time a change in the amount is required. Life insurance companies are particularly heavy users of direct debits: the Prudential Insurance Company in the UK, for example, initiates some 2 million per month. One of the fastest growing applications of direct debits is their use by large corporations for the sales ledger.

Figure A2.2 Proportions of BACS traffic by service type



Suppliers in a position of strength in their industries, in particular oil, car manufacture, brewing and chemicals, specify to the small distributing companies as part of their terms of business that bills should be settled by direct debit.

BACS is just beginning to handle credit card transaction data. As discussed in Chapter 2, retailers are beginning to capture credit-card transaction data electronically. The card companies can also make refunds to the customer via BACS. The data are transmitted to BACS who then distribute them to the credit card companies concerned. At the time of writing, only Barclaycard (Visa) and Access are participating, but we understand that American Express and Diners Club are studying the possibility.

ACCESS

The potential user of BACS must apply through one of the 14 main UK banks and obtain their sponsorship. This is necessary because the payment of BACS-initiated credits must be guaranteed.

Some 65% of users do not access BACS directly, but submit their inputs via a bureau. This proportion has remained stable over the past five years. Bureaux are used particularly by smaller volume users for direct credit applications (eg payroll) and many bespoke packages are available. The bureaux can collate information and calculate inputs as well as submitting these on behalf of their clients. Data can be submitted to the bureau on paper (where it may be input manually or by OCR*) or, with suitable precautions to maintain security and confidentiality, by telephone.

The policy of BACS is to allow access to its services through as wide a range of media as possible. Users can currently submit data on magnetic tape, 8″ and 5¼″ diskette, or tape cassette. In addition, since 1983 it has been possible to submit data on-line, and a range of connections is now supported, including 2.4 and 4.8 kbits-per-second links over the public switched network, leased lines from 2.4 to 9.6 kbits-per-second, and X25 packet switching. On-line access has a number of advantages:

- It avoids the inconvenience of the delivery of the data to BACS' London premises.
- Acceptance or rejection of the data is notified immediately.
- It becomes feasible to input a much smaller number of transactions in a batch.

*OCR (Optical Character Recognition): a technology enabling written or printed characters to be 'read' by machines, for further processing or storage.

The last point is particularly significant, since it greatly broadens the applicability of the service. Once a BACS link has been set up, it can in principle be used to handle any payment, provided the recipient has a UK bank account. It is, however, likely to be less suitable for high value payments which cannot be predicted with certainty in advance, because of the delay in clearing. However, magnetic media may still be more economic where very large volumes of input need to be sent.

BENEFITS

Payment via BACS or any equivalent Automated Clearing House (ACH) or Giro accepting electronic inputs can bring a number of potential benefits:

Precision. The date on which accounts are debited and credited for a given payment is known precisely. Payments do not therefore have to be initiated several additional days in advance in order to guarantee clearance by the desired date. For example, it is not unusual for paper giro credits for monthly salary payments to be submitted 6 days in advance. With an ACH the date of clearing is known precisely and interest can be earned on the sum concerned until that time, giving as much as 6 extra days interest per month. The guarantee of payment on a precise date can also be used to negotiate better terms from the payee.

Savings on float. In addition to savings on float due to precise knowledge of the timing of payments, payment via BACS in the UK saves two days' float compared with payment by cheque. In the former case, the relevant accounts are debited and credited on the same day, whereas when a cheque is cleared the payer is debited on day one of the clearing process and the payee credited on day three.

Accuracy. Where payments are handled electronically there is less scope for human error in transcription or rekeying.

Certainty. Paper payment instruments, in particular cheques and credit card vouchers, can easily be lost.

Confidentiality. Direct input of payment instructions by the individual responsible for authorising them can ensure greater confidentiality than transmitting them in paper form. For this reason, some companies use BACS to pay directors' salaries.

Reduced bank charges. BACS input can reduce costs of payment processing for the banks by as much as 85% compared with paper-based payments. These savings are usually reflected in reduced bank charges.

Savings on administration costs, for example staff costs, overtime payments, and other costs associated with paper handling. The need for cheque reconciliation is eliminated, and so are other manual tasks connected with paper-based payments such as cheque signing. The advantages are likely to be particularly marked where other aspects of payment handling are automated, for example payrolls. The payment data will then be available in electronic form already. The in-house cost of making a paper-based payment has been estimated to be up to £2 ($2.8); with full automation and input to BACS this could be dramatically reduced.

Initially, BACS was used mostly for high-volume low-value payments, say below the floor limit at which two signatures are normally required. The precision and certainty of payment which it ensures is now encouraging its use for high-value payments which can be predicted in advance. For example, it is being used for VAT payments by large companies and by the UK Government to distribute the Rate Support Grant, a payment to Local Authorities to contribute to the running of their services.

COSTS

The cost to BACS of processing each payment is 3.1 pence (4.3 cents). The cost is passed on to the banks on a cost recovery basis. The way costs are then passed on to the customer varies between banks and is a matter for the judgement of the individual branch manager, but typical charges for large organisations would be 3-3.5 pence (3.4-4.9 cents) per payment.

Equipment costs will depend on what equipment is already being used. If the data is being prepared on a computer, it may well already have a suitable communications interface, in which case the only additional costs will be communications charges. If a personal computer is available, as it is in many accounts departments, but is not equipped for communications, then communications software, a communications interface and a modem will be required.

Suitable software packages are available from £150 ($210). If no suitable computer is available a suitably equipped personal computer may cost from £3-4,000 ($4,000-5,500).

Communications costs will depend on the type of link used and the volume of data sent. They could be as little as the cost of a local call on the public switched network.

IMPLEMENTATION

The technical aspects of the implementation of a

BACS connection or magnetic tape or diskette production will vary widely depending on how the payment data is produced and on what equipment is already installed. However, it may simply be a question of using available output from an existing system.

In all cases, if an on-line BACS connection is to be established the data transmission equipment to be used must be tested to ensure data cannot be corrupted. The sponsoring bank will supply test data for transmission which are returned by BACS to the bank for checking.

APPENDIX 3

GLOSSARY OF ABBREVIATIONS

ACH	Automated Clearing House
APCS	Association of Payment Clearing Services (UK)
ASCII	American Standard Code for Information Interchange
ATM	Automated Teller Machine
BACS	Bankers' Automated Clearing Services (UK)
CD	Cash Dispenser
CHAPS	Clearing House Automated Payment System (UK)
CHIPS	Clearing House Interbank Payment System (US)
CLCB	Committee of London Clearing Bankers
ECR	Electronic Cash Register
EFT	Electronic Funds Transfer
EFTPOS	Electronic Funds Transfer at the Point of Sale
EPOS	Electronic Point of Sale System
IDA	The Norwegian commercial banks' computer centre
ISDN	Integrated Services Digital Network
MAPS	Midland Advisory and Payment Services (UK)
mf	multi-frequency
MTN	Money Transaction Number
PIN	Personal Identification Number
PKK	The Danish financial institutions' debit and credit card company
POS	Point of Sale
SWIFT	Society for Worldwide Interbank Financial Telecommunication

CURRENT REPORTS IN THE BUTLER COX REPORT SERIES

Information Technology and Cash.
Issued January 1986
Rising costs and payment volumes and increasing competition have encouraged organisations such as banks and retailers to look to information technology to cut the costs of handling payments, improve service levels and deliver new cash management services. Electronic payment and cash management services present opportunities to all potential players — banks, retailers of goods and services, hardware suppliers and network services providers.

This report reviews the opportunities offered by the new electronic payment and cash management services. Retailers will be put under pressure by the banks to adopt electronic funds transfer systems at the point of sale (EFTPOS), but could harness it to cut costs or even diversify into financial services themselves. Indeed, an increasing number of organisations involved in retailing are now moving into the banking services arena, thus effectively competing with established banking and credit card services. Half the retailers we surveyed for this study plan to introduce electronic fund transfer systems at the point of sale (EFTPOS) within the next five years.

Corporations can also take advantage of new cash management services and systems to optimise cash utilisation and reduce borrowing and transaction costs, and small companies and private investors can use on-line 'home banking' services to manage their financial affairs more efficiently. The report describes and discusses the impact of these new systems.

New Opportunities in Office Systems:
A Practical Guide.
Issued October 1985
Advanced office systems have been regarded for many years as offering great potiential. In the 1970s there was a false dawn of interest in such applications, with many forecasters anticipating a 'revolution in the office'. But the office revolution proved much easier to write about than to achieve. Those actually responsible for planning and implementing systems found many obstacles confronting them. Not least of these was the difficulty of building systems that were clearly relevant to the needs of those who would use them and the development of satisfactory criteria for investment.

A decade of experience has now been acquired, sometimes painfully. Throughout Europe and North America, advanced office systems are in use. The opportunities are better understood. A body of expertise has been developed. It is now possible to identify in a *practical* way policies and procedures that lead to successful systems.

This report is a guide to the unfolding opportunities in office systems. It provides a new perspective on the issue of assessing benefits, and supplies detailed guidelines for planning and monitoring office systems. It discusses the impact of office systems on the role of MIS departments. It analyses implications for both users and suppliers and provides a guide to the state-of-the-art of office system technologies and applications.

Videotex in Europe.
Issued January 1985
This report provides

— A review of the current status and likely future outlook for videotex in Europe on a country-by-country basis

— An examination of the main developments in the North American videotex market, and their likely impact upon Europe

— A complete review of the videotex product and service supply industry in Europe, including product reviews and supplier market shares

— An analysis of the state of the industry in 1984, including shipments and installed-base statistics; the results of a major 'barometer' survey amongst users, to determine their attitudes, future plans and perception of key issues, and nine selected case histories

— Forecasts by product and country, for the period 1984 to 1988

The report, which is based on extensive and new research amongst suppliers, users and European PTTs, complements and extends the factual information and geographic coverage of Butler Cox's earlier report 'Private Videotex Systems — their Selection, Use and Future Prospects'.

Information Technology: Its Impact on Marketing and Selling.
Issued December 1984
By 1995, sales and marketing teams will be fighting the competitive battle with new tools. Information technology — using computers, communications and screens — will present the value and utility of products to a wider yet more carefully selected customer base. We face the most important developments in sales and marketing since the advent of TV advertising. Companies who ignore these developments, whose sales and marketing strategies remain embedded in the pre-electronic past, face dwindling market share, rising costs and eventual eclipse. The most knowledgeable companies are planning now, asking themselves this simple but profound question: how do we sell to the institutions and citizens of the information society?

This report examines both current and likly applications for information technology products and services, and identifies the key threats and new business opportunities likely to emerge in the future.

Private Videotex Systems — Their Selection, Use and Future Prospects.
Issued October 1983
This report is a definitive analysis of the European private videotex system market. It surveys the offerings from 62 system suppliers, 60 videotex bureaux and 127 terminal manufacturers and distributors. It describes product and service features, and offers potential buyers guidelines on key selection criteria. It examines how private videotex systems are being applied, and offers a proven application selection and evaluation methodology. It describes 10 representative case histories, from four European countries, and identifies the strengths and weaknesses of videotex, compared with other media and technologies. It analyses the costs of hardware, software, terminals, and application implementation, operation and support. It also reviews the sources of revenue and benefit that are needed to justify investments in service provision. Finally, the report analyses the factors which are resulting in evolutionary product changes and to the growth of the market. It identifies and describes the main product generations likely to evolve over the next 10 years, and projects the size of the market for them. The market forecasts are broken down by the main country-market groups, and cover most products and services, by value and volume for shipments and installations.

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