THE AUDIOTEX INFORMATION SERVICES MARKET IN EUROPE

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SUMMARY AND CONCLUSIONS

This survey was carried out on behalf of DGXIII of the European Commission as part of the work of the European Information Market Observatory. The purpose of the survey was to investigate the current market for audiotex services in Europe and the opportunities that audiotex applications may offer for the development of the information services market.

For the purposes of this survey, audiotex services have been defined as those where the information is supplied through online access to a database using voice or tone recognition. Audiotex services are interactive and may be free to the caller or paid for. Services which are intended purely for entertainment purposes have not been covered by this survey, nor have purely passive message services except in so far as they represent precursors of true audiotex services.

This survey was carried out by postal questionnaire, desk research, telephone and personal interviews with individuals and observers active in the emerging audiotex industry in Europe, Japan and the USA.

The main points of this survey can be summarised as follows:

Audiotex is very much an emerging industry in Europe, with few interactive services in operation at present. The industry is growing out of the market in passive, ie recorded, information services, as Service Providers add voice and tone/rotary pulse recognition equipment and software to their services.

The European market is somewhat fragmented at the moment because interactive and/or premium rate services are only allowed by certain PTTs and this necessarily inhibits the market. Activity is currently strongly concentrated in the UK with a number of services in France and with some activity in the Netherlands, Belgium and Denmark. Premium rate services have recently started in Spain and although the first services to emerge are entertainment oriented, an interactive information market may develop.

Statistics about the audiotex industry are hard to establish, partly because interactive, free or paid-for services are not usually distinguishable in PTT revenue figures (where given) from paid-for entertainment services or free-phone revenues. In addition, the players in the market are reluctant to give estimates or other information about the market because they consider this detail to be commercial sensitive.

As a result of this survey, the audiotex market has been estimated, as a total of revenues for Service Providers, Information Providers and Manufacturers (software and hardware), at approximately ECU300m. This is somewhat less than estimates given by other (commercial) studies which use a much wider definition of audiotex which includes all voice processing services such as messaging. Revenues per country have been estimated at UK - ECU250m, France - ECU30m, Germany ECU1.5m, Denmark - ECU7, Belgium and Netherlands - ECU9m. Within the narrow definition of audiotex used in this study, the US market is estimated at ECU102m, about half of the European market. The US market for voice services in general, ie including non-interactive services, is considerably larger than this figure, but was not estimated as part of this study. The audiotex market in Japan is estimated at ECU20m at present.

The industry is very optimistic about the growth rate for the audiotex market although individual estimates vary widely. Likely growth within the next 5 years inclusive would appear to be in the range of 300-400%, giving a European market of ECU700 - 1200m (average ECU950m) by 1993. Respondents to this survey expect the US market in audiotex services to overtake the European market by 1993; they estimated the US market to be ECU1,000 by 1992. The growth in the US market will probably be largely due to improved awareness of the use of audiotex by both Service Providers and Information Providers as a medium for information dissemination.

Although there are relatively few true audiotex services available in Europe, applications cover banking and financial services, company information, travel information and reservation systems, hospital patient information, cable subscriber information and mail order entry. In addition there are a number of general information services including weather and tide details, and leisure services such as betting. Audiotex versions of electronic telephone directories have not made an impression on the European market yet.

Factors which will promote the growth of the audiotex market include

- the full digitisation of PTT networks;
- the relaxation of telecommunications regulations concerning interactive, premium rate calls and concerning equipment approvals;
- greater penetration of DTMF telephones;
- the introduction of variable call tariffs;
- the ability of users to control call costs;
- the introduction of European international premium rate call services.

The market is restrained by the lack of awareness by Information Providers and users about the potential of audiotex as a medium for information transfer. The linkage of audiotex to videotex and fax delivery services are expected to enhance the market for business information services. In the UK and France, there is some concern about the conflicting or overlapping interests of the relevant PTT in audiotex (UK) and videotex (France) services.

Graph: Growth Projections in Audiotex Markets in ECUM (including revenues for Service Providers, Manufacturers of hardware/software and information Providers) 1989/1993

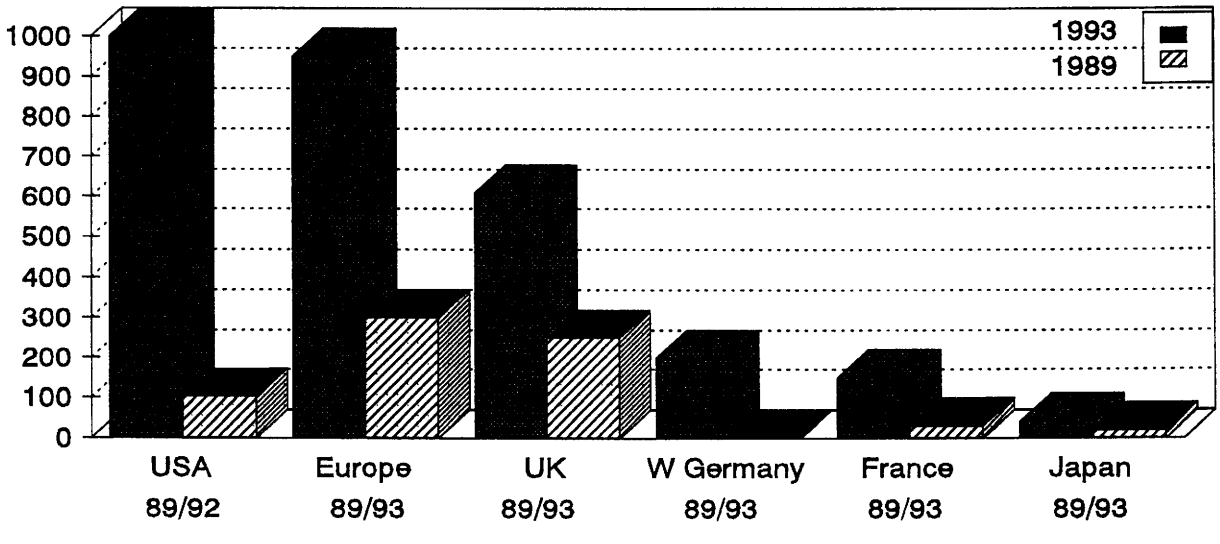


Table: Growth Projections 1989/1993 ECUM

		1989 ECUm	5 years incl (1993)
1.	USA	102m	1,000m (1992)
2.	UK	200-300m (av. 250m)	320-900m (av. 610m)
3.	Germany	1-3m (av. 1.5m)	200m
4.	France	30m	150m
5.	Japan	20m	40m
6.	Denmark	7m	?
7.	Belgium) Netherlands)	5-13m (av. 9m)	?

Europe 1989 = approx ECU300m

Europe 1993 = increase to approx ECU700-1200m (average ECU 950m)

A. INTRODUCTION

The word 'audiotex' is understood in a variety of different ways both within national markets and within specific sectors of national markets. For example, 'audiotex' may be interpreted very widely by one company or individual to mean any information service provided over the telephone. Another company may understand the term in a very selective way to mean only those information services, delivered over the telephone which involve voice interaction between a user and text database, using sophisticated voice recognition and voice synthesis software.

The situation is further complicated by the various definitions of 'information services' (including free or paid-for enquiry and entertainment services), voice recognition (which may include recognition of tones produced by special DTMF phones) and voice synthesis (which may include recorded messages, jerky voice concatenation, or highly advanced word and sentence synthesis).

In carrying out this survey, some particular definitions were used to identify the types of services available. The basic service definitions are given below.

Audiotex Services

For this survey, audiotex services have been defined as those where the information is supplied through online access to a database using voice or tone recognition. The information retrieved is delivered back over the telephone in voice form, although some services may provide information in another medium, such as fax or videotex. These services are usually paid-for, by way of premium rate call charges, or are offered as part of a service, eg banking.

The important characteristic about audiotex services as defined by this survey, is that they are INTERACTIVE. Simple dial-up recorded message services are not strictly regarded as audiotex services, unless the caller has the opportunity to select the messages over the telephone. These simple or passive message services do form a significant market in Europe and can justifiably be regarded as forerunners of true interactive audiotex services. This survey does therefore provide some coverage of passive information services.

Telephone information services may be either free to the caller, or paid for by the caller. These are respectively:

a) **Enquiry Services**

The supply of free of charge information through online access to a database. These may also include transactional facilities such as banking services, or credit card payments.

b) **Information Services**

The supply of information against payment through online access to a database. These may also include transactional facilities such as banking services, or credit card payments.

In each of the above, a database may be taken to be a voice bank (containing pre-recorded words or messages) or, unusually, a text or numerical database. 'Online access' refers to the fact that retrieval from database is done in immediate response to the user's question.

The purpose of this survey is to investigate the market for audiotex services in Europe and the opportunities that audiotex applications may offer for the development of the information industry in Europe. This survey identifies the types of services available, the limitations and potential of audiotex equipment and the factors which will influence the growth of the audiotex market. For comparison purposes, this survey also includes brief overviews of the audiotex market in USA and Japan.

This survey is primarily concerned with audiotex information services, ie interactive, paid-for voice information services.

Note that lists and descriptions of services available in each country surveyed are intended to be illustrative only; they should not be taken as exhaustive listings.

B. METHODOLOGY

This survey was carried out between April and September 1989 using a combination of research techniques: desk research, postal questionnaires, and personal and telephone interviews with key industry figures and observers.

Following desk research and online research, a postal questionnaire was sent to suitable participants in the survey which included industry organisations, Service Providers, Information Providers, Manufacturers and Suppliers of audiotex equipment (hardware and software) and some research organisations.

Five different questionnaires and appropriate covering letters were sent out to a total of over 140 organisations - more than the initial estimate of 80. It became apparent during desk research that the market was difficult to pinpoint accurately and the precaution of sending more questionnaires was taken. The five questionnaires were customised slightly according to the nature of the business of the recipient:

- current service suppliers (Service Providers/Information Providers)
- hardware/software suppliers
- industry associations (Europe, US, Japan)
- US based suppliers of services, hardware and software

The questionnaire was devised to separate out those companies providing simple dial-up (recorded) information services fromthose providing DTMF or tone-pad or voice recognition services. Respondents were invited to give information about their own products and services, their view of who are market leaders in equipment and their view of the size of the audiotex market in their country. They were also asked for their view of which factors would affect the growth of the audiotex market in Europe.

Replies to questionnaires were received at a slow rate, and it was decided to phone many individuals to whom questionnaires had been sent to elicit replies and discuss any issues arising either in person, or on the telephone. During the course of these many discussions, respondents made it clear that they did not wish their comments or views to be credited to them in this report. Indeed

some individuals would only give their views if they could be assured that this was the case. As a result of this, this report does not generally ascribe viewpoints to particular individuals or organisations.

The views of 60 individuals and organisations have been taken into account for this survey. EPS would like to acknowledge the assistance of the following organisations in carrying out this survey: ATIEP (Association of Telephone Information and Entertainment Providers, UK), ICSTIS (Independent Committee for Standards in Telephone Information Services, UK) and AFTEL (Association Francaise de Telematique, France). In addition, EPS would like to thank numerous other individuals who consented to be interviewed and who kindly allowed us to take up their time.

C. DETAILS BY COUNTRY

Details of the audiotex market where it exists in Europe, Japan and USA are given country-by-country below. The first section on the UK includes a great deal of description and explanation of audiotex services that is common to all markets and is not repeated for each country.

1. UNITED KINGDOM

The development of audiotex services

Telephone based information services were introduced to the UK as simple recorded message services, under the British Telecom service called Guidelines. These services included the speaking clock and sports information. A full national premium rate service (PRS) which enabled telephone calls to be charged above the usual rates, was introduced in January 1986 and it became known as British Telecom Callstream in mid 1987.

As the main network operator, British Telecom adds PRS charges to the callers' telephone bill where it appears as any normal call charge, (telephone bills are not itemised in the UK). Calls made to a nationally available PRS are charged at 38p per minute peak time and 25p per minute off peak; BT passes on 18.5p per minutes to the companies operating the information/entertainment services, Service Providers (SPs), for both peak and off-peak usage.

Mercury Communications

Has the right to run PRS services also, and BT is obliged to pass on these calls under the Interconnect Agreement which forms part of the regulations under the duopoly. Mercury started its own PRS services in September 1989 - the delay in setting up the service was caused by lengthy negotiations with BT over what should be the correct split in call charges between BT and Mercury to be shared with Mercury's Service Providers. The first service being offered is a betting information service, through the Service Provider TIS.

Some PRS services are now being offered on the private mobile telephone service operated by Racal Vodaphone, eg AA road/traffic information. External callers are charged at the standard PRS rate (38p per minute) through British Telecom; mobile phone users are able to call the information services within the network by dialling a smaller number of digits. The provision of these services is considered by some to be outside the strict terms of the mobile phone operators licence.

UK Service Providers (SPs)

Premium Rate Services are all currently operated through British Telecom's Callstream which provides the network services and certain management services to Service Providers with whom they have a contract. Callstream is thought to have contracts with about 120 Service Providers, of these about 60 are probably in active business providing a variety of messaging services including some Chatline services.

One of the largest SPs, BT Spectrum, is operated by British Telecom and had a revenue of over £1m in 1987/88. It operates services such as Citycall, Supercall Sport and Livelines. BT are obliged to run BT Spectrum as a separate, independent business from its operations as PRS network provider through Callstream. However, there is a considerable amount of unease in the UK audiotex industry about the fact that BT is acting as both network provider and service provider. This situation seems unlikely to change in the short term.

Types of Services

There is quite a range of PRS services currently being provided in the UK. Many Service Providers operate more than one service, and the larger SPs may provide 40-50 different services on behalf of their own clients (Information Providers, IPs), or for themselves.

The services provided may include:

- simple message services: the caller dials a specific number for specific information eg weather information

- caller driven message services: the caller dials one number and then selects a specific message from a menu, using a touch tone telephone, or voice recognition eg Teleshare (share price information)

- simple interactive services: the caller dials a specific number for a specific service, listens to information and can leave a short (spoken) message eg voting services

- complex interactive services: the caller dials a service number, selects information or transaction requests from a menu, a database is searched and specific information is returned in spoken form, (fax output is now also being offered; videotex output is not offered in the UK).

Table: The variety of UK audiotex services

Service	Service Operation	Service Provider (examples)
Public Information		
a) General		
Weather	recorded message	TIC, TIS
Tides	recorded message	
Traffic	recorded message	Racal Vodata (AA) TIC (RAC)
Leisure (events)		TIS
b) Sport		
Racing (and other sports)	Live commentary & recorded results	TIC, TIS BT Spectrum William Hill
c) Health		
Personal Health	recorded message	AirCall, Self Helpline
Pet Health		AirCall (VetCall)

Table: The variety of UK audiotex services (Continued)

Service	Service Operation	Service Provider (examples)
Banking	(Account information (caller can order (transactions ((MF tone pads required)	TSB, Clydesdale Nationwide Anglia Building Society
Business Information		
a) Share prices Traded options Foreign Exchange	(recorded message ((some continually (updated) (MF tone pads may (be required.	TIS, TIC FT CityLine BT CityCall
b) Company details	Interactive Service (voice recognition)	Dun & Bradstreet Fax the Facts (now part of Mercury)
Fund Raising	recorded message plus caller leaves message	various SPs
Promotions	as above. Often include a competition. (Some services may be operator based PRS services and not true audiotex)	TIC, TIS
Entertainment		
a) Pop/celebrity	recorded messages, some menu services (voice tone recognition). May include c) voting	TIC
b) Games	interactive via menu, selection of pre-recorded messages, voice recognition	TIC
c) Voting	recorded message plus caller leaves message	BT Spectrum (Livelines)

The Size of the UK PRS Market

British Telecom Callstream who bills callers for all PRS services, have released some of their figures relating to the overall UK market. The number of phone lines being used for all PRS purposes was over 11,000 by mid 1988, from only a few hundred in mid 1986. BT Spectrum alone has some 700 of these lines for its own services. The number of PRS calls has also shown parallel growth, from 39 million calls in 86/87 to 107 million calls in 88/89. The figures for the first quarter of 1988/89 show an increase of nearly 80% from the same quarter 87/88 and so the pattern of strong growth appears to be continuing.

The revenue derived from PRS services is of course related to the number (length and time of call, peak or off-peak) of calls made and includes passive and interactive services, information and entertainment services. The table below indicates the gross revenues and includes a projected figures for 1988/89. BT have predicted an overall doubling of the PRS market in 5 years.

Table: PRS Revenues in the UK

	86/87	87/88	88/89
No. calls (local & national PRS)	39m	107m 1st Qtr: 24m 4th Qtr: 30m	1st Qtr: 43m
Gross Revenue (call cost less VAT)	£20m	£67m 4th Qtr: £19m	£131m projected 1st Qtr: £25m

Source: Monopolies & Mergers Commission

Note:

1 Local and national PRS call charges are different, so there is no direct link between no. calls and revenue.

2 Revenues are split approx 50:50 between BT Callstream and the SPs.

A further breakdown of the PRS market was provided by BT to the Monopolies and Mergers Commission on Chatlines and Message Services in early 1989. The distribution of PRS calls and therefore revenues amongst Service Providers clearly indicates that the business is concentrated amongst a small number of companies (between 15 and 20), who each provide a wide variety of services.

In 87/89, 10 SPs had revenues of over £1 million (ECU620K approx) and 26 companies had revenues of over £100,000. In the first quarter of 1988, some 43 million PRS calls were made - of these, over 70% per made to just 16 Service Providers indicating a concentration of market activity.

The MCC concluded that the more successful SPs were those who provided both entertainment and information services, ie public information or business services. BT itself made the statement that according to its own definition (not given), information services would account for over 40% of PRS revenues in 88/89. However, it is difficult categorise audiotex services precisely and the distinction between 'entertainment' and 'information' services is not always clear cut.

Table: Distribution of Revenue by Service Providers (1989/88)

Revenue (£)	No. of firms
5m or over	2
1-5 m	8
100,000-1m	16
10,000-100,000	10
less than 10,000	4

Further details about the revenue and profitability of SPs is very hard to trace, especially where company accounts may be merged with business activities other than audiotex.

Details about free services

The figures in this section of the report all related to revenues derived from PRS services. These revenues are quantifiable because of the direct involvement of the network supplier who logs calls for billing purposes. There is therefore a central collecting point for the information. Where information services are provided free (ie only call costs are charged), then the network supplier does not log any calls made to the service and therefore the market for enquiry services is difficult to quantify. Calls may also be made through Freephone or Linkline (local call charges only).

The Service Provider will almost certainly register the number of calls made to a service using in-house equipment, especially where it is being operated on behalf of a third party. However, this information is private and Service Providers will only rarely disclose these details. Calls made to free services are therefore not included in the above statistics.

Free services may include enquiry services, some promotional services and ordering services. One of the banks included in this survey who operate an audiotex banking service (Clydesdale) do not charge customers for their service.

Estimations of the Audiotex market as a whole

In estimating the size of the audiotex market as whole, wider aspects of the industry should be taken into account than just the revenues derived from call fees. The audiotex industry includes Service Providers, the Information Providers (IPs, who normally share part of the call fees at least) and the manufacturers and suppliers of audiotex equipment.

Replies from companies surveyed as part of this survey indicate that views within the industry about the size of the audiotex market vary considerably, and the estimations of market growth over the next year and next 5 years also vary. The replies received did not indicate clearly which sector of the industry (ie SPs, IPs or equipment suppliers and manufacturers) can be regarded as having the highest turnover. It is worth noting that there is no clear distinction

in the audiotex market between SPs and IPs since many SPs provide or at least collate information to be used on their own services.

It is interesting to note that the most optimistic views of the market were consistently provided by Service Providers who generally considered that the SP and IP market each have turnovers in excess of ECU420m. Estimates of over ECU200m for the total audiotex market were given by a leading SP and a leading equipment supplier. Given that the gross revenues for PRS services in 88/89 is projected by BT at £131m, (approx ECU200m) with SPs receiving half of this, an estimation of the audiotex market at ECU200-300m, ECU250m average (excluding BT's share) does not seem unreasonable.

However, it is important to weigh this estimation against the fact that this is a very young market. Firm estimates of turnover are rarely given by companies operating in this area and indeed a number of companies refused to provide estimates of market size on the grounds that even this generalised information was company confidential.

Growth in the audiotex market

Replies to the questionnaire indicated a clear view of substantial growth in the market in the next 1-5 years. The level of growth in the next year was estimated at between 20-25% by a number of companies. Growth estimates over 5 years varied from a modest 60%, to 2-300% (quoted several times) to 20 times the current turnover. BT has been quoted as expecting an increase in size of 100% in 10 years. Using a ECU200m estimate of current market size, then a 60% increase gives ECU320m by 1993; using a ECU300m estimate with a 300% increase gives ECU900m by 1993.

Many companies expect this growth to be partly related to technical improvements and greater familiarity with audiotex by both IPs and users. Where substantial growth was expected, then the introduction of new services, particularly in the business sector were thought to be important. Some SPs expressed the view that the number of users of telephone information services for entertainment and public information services had already reach a plateau.

Other factors which will make the market grow in the UK are similar to those cited as important elsewhere in Europe and are covered in more detail later in this report.

Voice recognition and messaging hardware/software

A surprisingly wide range of equipment is either in use or being supplied in the UK. There are three very clear market leaders in interactive systems, namely:

Marconi:	KeyCall (produced by Brite Systems, USA) Incall Marcall
Telsis:	Hi-Call (UK developed)
Ferranti:	Voice Messaging Director (VMD, VM600)

It is difficult to establish the precise market shares of each of these companies because full client lists are not available, and Service Providers were often unwilling to provide details of the equipment they use on the grounds that details of their technical capabilities constituted valuable information to their competitors. From the various interviews held during this survey, it appears that Telsis, a relative newcomer to the scene, are regarded as an important competitor due to their willingness to upgrade, support and customise equipment.

Simple messaging systems have been available in the UK since about 1980, whereas interactive audiotex equipment has only been available since 1987.

Other equipment/software in use includes:

Wang:	STEP (Speech and Telephony and Environment for Programmers) a DTMF ordering and information system (a US developed system currently installed in 40 sites in US and Australia)
Autophon:	front end processors, voice mail systems

Voicetek:	voice mail systems (US developed)
Global Communications:	Dialogic hardware and software
Tandem	
The Software Partnership:	customised applications
Teradyne:	voice response line testing system using DTMF
Intervoice Bankcall:	for DTMF banking applications, (US developed)
Note:	British Telecom is a network and Service Provider only and does not supply equipment or software for use by independent SPs.

Surprisingly the equipment market does not appear to be in a constant state of change as would be expected by the highly demanding Service Providers who form the customer base. Although equipment companies may be actively involved in developing their own voice applications other than for audiotex, there is no indication that overall, suppliers are expecting to extend their audiotex product range in the short term. This may be explained in part by the fact that many UK suppliers act as local agents for US equipment and have no control over, or knowledge about, product development.

Service Providers appear to be in the position of demanding particular developments from equipment suppliers and the technical developments are to a large extent being led by this demand. In the absence of suitable "off-the-shelf" equipment, a number of SPs have customised their own hardware/software to such an extent that they now regard the resulting system as being virtually a new product. It is these customisations that many SPs feel give them a particular market advantage over other SPs and they are therefore highly secretive about their technical capabilities.

Suppliers of hardware and software as well as Service Providers consider that a wide range of new opportunities will be presented by the further digitisation of the BT network and the more widespread use of DTMF or MF telephones in

companies and in the population as a whole. These network changes should stimulate many innovations in the hardware andsoftware field.

The relative penetration of voice recognition/voice synthesis

As can be seen from the analysis of Service Providers the majority of services currently in operation are simple messaging systems. Even if the caller is able to select a particular message during the course of the call, the response is generally a pre-recorded message of some kind.

The term 'voice synthesis' seems to be understood as including concatenated speech, where individual words are pre-recorded and pieced together as required, online. The result is a very stilted or jerky output that is very displeasing to the human ear. A number of Service Providers do provide concatenated speech services at present, eg DunnsVoice (Dun & Bradstreet) and Teleshare (TIS). Sophisti-cated text to voice systems capable of providing more natural speech are being developed but appear to be some years away from the marketplace.

The number of individual information services involving voice recognition is very limited so far, and in the UK, are more prevalent in the entertainment area rather than in the 'serious' information area. As far as audiotex services are concerned voice recognition is speaker independent, ie the system will recognise any human speech. Voice recognition applications which are voice dependent tend to be for in-house company purposes such as stock control, or for sophisticated defence systems.

The vocabulary of speech recognition software in the audiotex market is extremely limited. Systems will generally recognise numbers 0-9 and a few other words such as Yes and No. The level of accuracy is said to be about 90-95%, which is regarded as inadequate for widespread use, and insufficient for financial or banking services which require accurate recognition of sequences of numbers such as account numbers.

Systems which have much larger vocabularies (currently up to about 150-200 words) are usually voice dependent, and must be 'taught' by each user to recognise their voice characteristics.

Some so-called 'grunt recognition' systems merely recognise the fact that some noise has been made by the caller at an appropriate place in the menu. The menu system is carefully constructed so that the caller is under the impression that the audiotex service has understood the exact word being spoken, although in fact any word would be sufficient. These 'grunt recognition' services are used in polling or voting systems for example where the caller is asked for a response after the menu choice to be voted for, and to keep silent for those choices not being voted for. The caller may be asked to repeat the name of the product/TV programme/hit record at the appropriate moment, although the system would respond to any noise at that appropriate moment.

MF Tone Pads

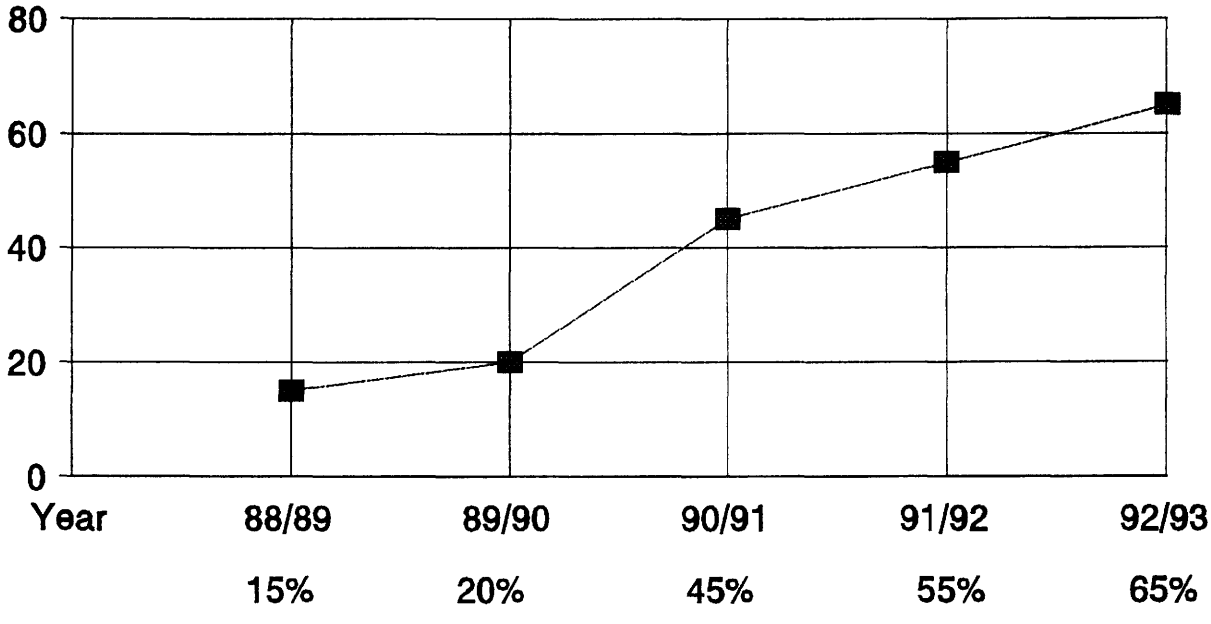
MF Tone Pads are small keypads with 12 buttons (0-9, *, #) which, when placed over a telephone mouthpiece, can be used to send digital tones that can be recognised by autiotex equipment. The same tones are produced by MF or DTMF telephones which are now being introduced in the UK.

This survey only identified one independent UK supplier of tone pads, Systems Connections Group plc. However, a number of Service Providers who offer information services that require the use of tone pads import them especially, usually from the Far East. The tone pads will be customised (ie branded with a name or trade mark) for a particular Service Provider or for a particular information service provided by the Service Provider. Bulk production of key pads means that they now cost approximately ECU5 at trade prices with a retail price of about ECU10.

The Pantel Zynergy Tonetalker imported by Systems Connections plc incorporates a tone pad and a voice system which enables a limited vocabulary of text on screen (ie ASCII files) to be converted to voice. A voice bank of pre-recorded words is used together with a bank of phonetic sounds for unknown words. The Tonetalker can be used in a limited way to translate text from ASCII files into spoken words in another language.

MF Touchtone telephone penetration

(BT estimates)



2. FRANCE

The development of audiotex services

Audiotex services were initially introduced in France in the form of simple message services and these still form the bulk of telephone information services that are available. These are sometimes known as 'Audiphone' services.

The caller to an Audiphone service only pays a normal telephone call charge, and is linked via France Telecom to the service provider who has a continuous line in operation. The link up is done in such a way that large numbers of callers (in theory an unlimited number) can use the same information service at any given time. This allows the service provider to be accessible to a much greater number of callers and therefore provide a better service. The service is not interactive.

In addition to Audiphone services, France Telecom also provides a free-phone service called Numero Vert, which allows callers to contact subscribers free. The subscribers pay for the call and for the provision of the service. Numero Vert services were introduced in 1983 and the Revenue from such services increased to approximately ECU48m in 1987 (339m FF incl VAT), based on a combination of initial connection fees, subscription charges and per minute charges.

The facility to charge premium rates for telephone calls is known as a kiosk service. Charges for Minitel services are operated through this system, with usage charges being shown as separate items on telephone bills. Telephone bills do not show the exact databases being accessed, only that Teletel has been dialled. Billing for Teletel purposes forms the bulk of revenue from the kiosk services; audiotex services are also charged at premium rates in a similar way to the Teletel kiosk concept. It is clear that the success and development of Minitel will have a profound effect on the development of audiotex services in France. Some services using Minitel and audiotex are already in operation.

Kiosk services were initially only available in Paris, and then in a number of major cities. Since late 1988, kiosk services have been available throughout

France and full regional services are available (9 areas) although there are still limitations on operating and advertising truly national services. Until recently, this was similar to the situation in the USA where Regional Bell telephone companies were not allowed to operate services accessible outside their areas. The 9 areas are based on the following cities: Paris, Lille, Nancy, Rouen, Nantes, Bordeaux, Toulouse, Lyon and Marseille.

One of the limitations on the development of audiotex services is that premium rate audiotex calls are limited to a maximum 140 seconds. (Minitel kiosk calls are not limited in length). Call charges are 5 times the normal call charge rate (F3,65) and France Telecom splits the revenue roughly equally with the Service Provider. This means that there is no element of distance dependent call charging within the audiotex kiosk service - callers who are remote from the kiosk call centre must pay five times the basic phone unit rate, ie kiosk services are flat rate. Minitel charges are also distance independent.

Voice information services are, of course, carried as normal voice traffic by France Telecom, at normal voice rates. The amount of information that can be provided to a caller by a voice service in a given length of time is much less information than can be provided via a data feed into a screen in the same time period. In addition, information provided in data form can be sent via Transpac (a packet switching service) over the telephone lines and so the cost of providing the information can be substantially less than if it were provided through a voice information service. Using these arguments, France Telecom have suggested that Minitel will remain a preferable method of providing information services. Note that 1988 France Telecom recorded over 73 million hours of Minitel use, over 4.2 million terminals.

Service providers are required to state the price of kiosk telephone charges in any advertising. This requirement is universal, ie all SPs must state the price, although there have been complaints in the French audiotex industry that this has been requirement has not been enforced against some large organisations.

A 'high level kiosk' facility for Minitel users was opened in March 1988 at approximately ECU50 per hour (3628) and ECU80 per hour (3629). The 'low level kiosk' rate of ECU7-10 an hour is used for general information service, while the high level is used by business information services and accounted

for 85,741 calls (7,951 hours) in April 1989, (10,000 hours in June 1989). This type of variable charge rate is now being asked for by the audiotex industry.

The operation of interactive information services is usually referred to as La Telematique Vocale, which applies to the interrogation of a database, via a telephone, using voice or tone telephones. Although there has been great interest, and much research into voice synthesis and voice recognition, it is only since 1985 that front end voice systems have been widely available eg Microdivaphone (FERMA), and pc cards have been available, (eg ELAN INFORMATIQUE). See below.

It is thought that the restriction on call length is a deterrent to many service providers; for some services this is simply not enough time for callers to select appropriate information and listen to a complete message. A telephone information service operated by Le Courrier du Meuble is said to have closed due to restrictions on call length as well as limitations on the number of simultaneous calls and geographical divisions on services imposed by France Telecom.

In the case of transactional services, and services provided as part of an overall service offered by a company, then audiotex services may be offered through non-kiosk methods. The cost of the service will then be recovered either through subscription charges or be carried as a an overhead. It is impossible to trace the number of calls or revenue derived from these subscription and free services. It is likely that a proportion of the Numero Vert revenue can be attributed to interactive audiotex services.

French Service Providers (SPs)

Premium rate services are all operated through the France Telecom kiosk service which provides both the network and management services to the information providers. France Telecom does not itself provide any audiotex services, although, since it operates Minitel, it earns the smallest revenue share from the kiosk system (66% of Teletex Kiosk revenue is passed on to information providers). As in the UK, there is a considerable amount of unease in the French information/telecommunications industry about the dual role of France Telecom and its interests in Minitel. The need to protect the

revenue from Minitel is thought to be making France Telecom unwilling to allow full development of audiotex services until the relationship between Minitel and audiotex services becomes clear.

Types of services

A number of audiotex services are now available, and these are generally considered to be somewhat experimental in nature - most have not been in operation for very long, and represent a wide variety of different applications.

The applications include the following:

- message services
- simple interactive services
- complex interactive services.

Table: The variety of French audiotex services

Service		Service Operation	Service Provider
Public Information			
a)	Weather Radio & Television Advertising (classified advertising)	recorded message	Provided as Audiphone services (ie non-premium rate) or Numero Vert
b)	Leisure	recorded message interactive (voice & DTMF) recorded message	Musee de La Villette Nouvel Observateur TF 1
c)	Special Interest Groups	recorded message interactive	Weight Watchers Canal + (cable subscriber codes)
d)	Travel	recorded message + interactive (DTMF)	STAB (bus timetables & ordering)
e)	Messaging	voice bank	SYTEM
f)	Televoting	interactive	La 5
Internal Organisation Information			
a)		recorded message	Air France
b)	Patient Location	interactive recorded message	Vannes Hospital
Audiovideotex			
a)	Home Shopping		Sysmark Fnac
b)	Message Services	text to voice	Nouvel Observateur, CTL
Promotions/Direct Marketing			SYTEM ('90) Credit Lyonnais
Entertainment			
Games			SJT

The size of the French Kiosk market

Figures for the overall kiosk market are made available by France Telecom; although the figures include the revenues for Minitel services. Separate figures for premium rate audiotex services are not available.

However, since many of the Minitel applications may be considered as potential audiotex applications, the potential size of the market may be similar. Due to the strong relationship between audiotex and videotex (Minitel) systems in France, it may be realistic to consider a combined, total, market.

The number of Audiphone (simple recorded messages) calls may provide a guide to the potential for the audiotex market. The table below indicates that there has been nearly a four fold increase in calls in the four year period 1984-1987. The average number of calls per subscriber (ie Service/Information Provider) has remained fairly static during the same period, which may indicate a service limitation (eg number of lines used, duration of calls), or a market limitation such as the size of a client base.

Table: Audiphone Usage 1984-1987

Year	calls (millions)	subscriptions (SP/IP)	average (000's)
1984	33	636	52
1985	74	1,316	56
1986	90	1,682	54
1987	112	-	-

Source: France Telecom

Table: Audiphone Services Provided in 1987

	% calls
Weather	33%
Others	67%

The charges to Service Providers for using Audiphone services are made up of a combination of a connection fee of approximately ECU48 in 1989, and a monthly subscription fee of ECU6 per exchange line plus an additional charge of ECU24 if less than 6,000 calls are received. There is no additional charge if over 12,000 calls are received.

In 1987, the turnover from Audiphone services was approximately ECU19.7m (138m FF, excluding tax). This represents the revenue to France Telecom - Service Providers do not receive any revenue from Audiphone services. In addition to this, France Telecom receive further revenue derived from the generation of extra calls on their network.

Table: Teletel Usage in France (Minitel)

Year	Hours of Use (000's)	No. Terminals (000's)
1984		413
1985	13,200	1,305
1986	37,499	2,237
1987	62,445	3,373
1988	73,748	4,045

Minitel compared with audiotex

Individual Service Providers are able to report usage figures for audiotex separately to Minitel usage. Canal Plus for example, reports usage of its experimental audiotex service (which allows cable viewers to find out their subscriber codes) during the first half of 1989 to be approximately 10,000 successful calls from subscribers per month. The actual number of calls received was much greater than this (approx 18,700 calls in August 1989) - more than half were abandoned calls due to telecommunications problems, 'curiosity calls' to see how the system worked, mistakes in callers giving their subscription number etc. This is a success rate of 49% which seems relatively low compared to what could be expected on the same service via Minitel.

During the first half of 1989, Canal Plus reports Minitel calls between 30 and 55,000, most of which were presumed 'successful'. Audiotex therefore accounted for about 15-25% of the Canal Plus service to subscribers. The number of subscriber requests on Minitel increased dramatically in the last quarter of 1988 (presumably due to the seasonality of viewing). The real test of the acceptance of the audiotex service will be if it also shows a similar dramatic increase in usage, and if the success rate increases.

There is some indication in France that the combination of audiotex and videotex could lead to the rapid development of business services. Using this so-called audiovideotex, or 'Le Minitel Qui Parle', the user of the service could order information using the voice service, and receive complicated information via a terminal. Written confirmation of information - whether on screen or on a printout - increases the amount of information that can be provided accurately. In practice there is thought to be a limitation on the amount of information that a user can accurately remember from a spoken telephone information service. In addition, the provision of information via a terminal allows the user to store the information for reference purposes.

Proponents of videotex consider that business information services are carried more effectively solely by videotex. Users can key in detailed information eg about a company, and correct mistakes as they make them. Videotex menu systems are also currently more user friendly than audiotex menus which frequently require the user to run through commands in a fixed sequence.

Estimations of the audiotex market as a whole

The audiotex market will include the only network Service Provider (France Telecom) and Information Providers and the manufacturers and suppliers of audiotex equipment. It can be difficult to assess this market in France due to the lack of detail about audiotex kiosk revenues (see above), and the overlap between audiotex equipment suppliers and suppliers of equipment used for messaging services.

Replies to questionnaires and telephone interviews did not provide very satisfactory information on this point and a number of organisations refused to supply their opinion - some said that the market was too underdeveloped and undefined to make an estimation possible.

Estimations of the market ranged from ECU1-10m for SPs, and ECU1-20m for manufacturers and Information Providers, a total of ECU30m. Interestingly, a major manufacturer considered that Information Providers had a larger share of the current market than manufacturers or Service Providers - SPs are generally considered to have the larger market share.

There was general agreement that there would be considerable growth in this sector in the next 1-5 years, with estimates in the ECU100-150m range, a growth rate of about 500% in 5 years. There is also clear agreement that the key factors affecting growth will be the relaxation of current restrictions on length of calls, introduction of variable tariffs and the introduction of distance independent services, (ie truly national). Hardware and software availability is generally not considered a barrier to growth and is considered to be adequate for current market needs.

Audiotex suppliers frequently point out that there is an installed base of 30 million telephones in France against 4 million installed Minitel terminals. If there was sufficient relaxation in regulations then the audiotex market would expand very quickly; and opportunities for audiovideotex would be created.

Voice recognition and mesaging hardware/software

There are a number of leading suppliers of audiotex equipment in France, who mainly supply French systems. EPS understand that US equipment such as that supplied by Brite Systems and Voicetek is just beginning to make an appearance in the French market which is otherwise dominated by domestic systems and services. As with the UK, market shares are difficult to establish, but the following were mentioned as market leaders by respondents to the questionnaire: Alcatel-TITIN, Ferma (who claim to have 90% of the French market with products such as Microdivaphone and Divaphone), Elan Informatique, CRIS (supplier) and XCOM. Also mentioned were, Thomson, CPB, Infotelecom, Logos, Sodetis

One of the key developments in France have been the introduction of low priced p.c. cards enabling the operation of limited voice recognition/response services. In the medium term, this is expected to enable more experiments with audiotex to take place, for smaller companies to open services and for more companies to begin in-house services independent of the France Telecom network (which means that the equipment does not need to be approved).

A second key development has been the introduction of audio-videotex services which can, for example, link spoken commands to a database providing screen based (or printed) output from an Information Provider. An audiotex link to Minitel was announced in September 1988 which enables messages input as text to Minitel to be output as spoken words. This facility was designed to be useful to people with visual impairments, although it may well have some wider applications including direct marketing.

Audio-videotex is now available from the major hardware/software suppliers. Alcatel-TITN have developed Transvox to provide a multi-media font-end, which can be linked to a Minitel terminal. Future developments will include 'audio-videotex photographique' using videotex to display images as well as text and sound. Microdivaphone, developed by Ferma, includes a V23 modem for audio-videotex applications.

Voice recognition products already exist which can identify up to 100 words, but in practice the vocabulary is limited to 10-15 words or sounds. Systems

used in-house can be 'trained' to recognise a much wider vocabulary and have a much higher recognition rate (99%) than systems used over the public network (96%). Research is now being carried out by CNET (Centre National D'Etudes des Telecommunications) to develop software with improved an recognition rate. A long term aim is to provide public telephones which will respond to voice commands, whether individual digits or groups of digits, eliminating the need for keypads or rotary dials. This know-how will undoubtedly benefit audiotex software products also.

CNET is also developing multi-lingual voice synthesis packages, and has so produced specialised voice dictionaries in French, Italian and German some of which it has licensed for commercial development.

Other factors affecting the audiotex market

MF Telephones/ Tone Pads

The telephone network in France is largely digitised, with 70% of network switches being digitised by 1987, and the process expected to be virtually complete by 1990. In spite of this however, the quality of the voice lines that are available are said not to be of sufficiently high quality for audiotex services which require speech recognition. To overcome the limitations of voice recognition, audiotex services in France tend to take advantage of MF telephones where interactive services are required. In addition, many audiotex systems such as Ferma's Divaphone offer rotatory/pulse detection as well as speaker independent speech recognition. The use of tone pads as a separate device to the telephone, does not appear to be widespread.

The overall digitisation of the telephone network should allow France Telecom to offer improved facilities for audiotex, such as efficient routing (leading to lower charges), time based charging (rather than unit based charging which tends to increase users' bills), and a full national audiotex service.

Table: The level of digitisation and penetration of MF Telephones in France

	% Approx Digitisation of the Network	% Approx MF Telephones
1983	37	-
1984	50	-
1985	56	34
1986	63	42.6
1987	70	51.8
1988	>70	56
1989	-	61

Source: France Telecom

3. GERMANY

The development of audiotex services

In West Germany, the use of free-phone services has been established for some time - they are the exact equivalent to the UK Freephone or French Numero Vert services. Charges for the use of the service are made by way of a monthly subscription (ECU280) plus a usage charge of ECU0.75 on a per minute basis. There is a minimum usage charge of ECU621, equivalent to over 800 minutes (roughly 330 calls at an average of 2.5 minutes). The minimum therefore appears to be set at quite a low threshold which would not discourage small companies or new users.

Interactive audiotex services in Germany are still very much in the development stages with a great deal of pre-market research activity being carried out both within commercial organisations and research establishments. A premium rate telephone service is not currently offered by the Deutsche Bundespost (DBP). Audiotex equipment is therefore not yet included within the approvals procedure of the DBP (which lays down rigorous standards for any equipment that is to be connected to the public network). Various messaging equipment and voice recognition systems are available for use on in-house networks or for voice controlled car telephones, for example, but audiotex equipment for operating commercial (network) systems is not available.

The size of the market

Since the German audiotex market is undeveloped, estimations of the market are necessarily limited to the manufacture of hardware and software, which are thought to be in the region of ECU1-3million. The market for in-house messaging services is much larger however. Many respondents refused to make any estimation of the market.

There is some indication that the German audiotex market will open up over the next 5 years, as regulations are gradually relaxed. Estimates provided as part of this survey indicated a market of ECU20m within 5 years - a high growth rate, but well behind the UK and France in size.

The main restraints on the German market include regulatory and market problems. Naturally, the first restraint is the lack of a premium rate service; information providers cannot use the network to collect revenue from users of their services. Free, non interactive information services are currently provided over free-phone numbers or over ordinary phone lines, but non of these are thought to be revenue generating services (eg subscription based).

Under current telecommunications rules, MF telephones are not allowed to be connected to the public network, although they are manufactured and sold for use as part of in-house networks. Although audiotex systems can recognise rotary telephone derived pulses, the lack of touch MF telephones reduces the user friendliness of an audiotex service and stunts market development.

There has been little incentive to develop user-friendly systems in the absence of a premium rate service. Consequently, the German audiotex market would probably be slow to develop using domestic systems even if premium rate services were made available immediately.

Another market restraint mentioned by respondents included a strong degree of unfamiliarity with telephones and answering machines in the business and consumer market. In contrast to the French situation, the experience with public videotex is thought to make information providers and users wary of a new, untested medium. The development of speech recognition software is considered to be particularly difficult in Germany where speech patterns (dialects and word structures) are thought to present particular difficulties.

Types of Service

This survey has identified two audiotex applications, both of which can be regarded as experimental.

'Karlchen' is operated by the Germany railway service (Deutsche Bundesbahn) but, due to telecommunications restrictions, is only available in Frankfurt. It was started in about 1980, to provide train timetable information. It is an interactive service, providing a spoken menu and information details; the user

interacts by using a rotary telephone dial to produce pulses recognised by the software. The system is not thought to be very user friendly.

The other service provided ordering facilities for a mail order company, Otto-Versand; it was run on a pilot basis by DBP and has now been withdrawn. The system was designed to accept bulk orders directly by phone, but the experiment appeared to indicate that audiotex was unsuitable for entering orders in bulk.

Voice recognition and mesasging hardware/software

Basic research and systems, (though not necessarily destined to be audiotex systems), are thought to be under development in a number of organisations including the following: Siemens, Nixdorf, Philips, GSP (supply DIAS), AEG, Daimler Benz GMD, and the Universities of Berlin, Bonn and Karlsruhe. Both Philips and AEG Olympia were involved in the experimental services described above.

Other organisations were mentioned by respondents to questionnaires and interviewees: PKI, Dornier, CATEL and Telenorma.

4. DENMARK, BELGIUM, NETHERLANDS

The development of audiotex services

Telephone information services have been available in these countries in the form of free-phone services for approximately 3 years, and there has been a significant growth in usage reported in each country. In Denmark, for example, the revenues were said to be in excess of ECU7m in 1988 within the largest telephone operating company KTAS. Freephone services in Belgium were started in 1987 and are offered on a national and international basis.

Premium rate calls are allowed in parts of Denmark (KTAS), but not in Belgium. Services have recently been introduced in the Netherlands, at 0.5 Guilders/min charges to users (0.23 Guilders passed on to the Service Provider). The market is currently dominated by 'pink' and other entertainment services. Most applications concentrate on the banking and insurance sectors although there are are also ordering systems for mail order companies and book shops.

In Belgium and the Netherlands, the market is very much in its early days, although there appears to be considerable activity in terms of research and product development - for private voice systems rather than public audiotex services. Applications include security, voice dictation, text-to-voice (spoken databases), automated telephone operators etc. Respondents and interviewees estimated the audiotex market to have a turnover in the ECU1-3m range for manufacturers and information suppliers; service suppliers are thought to have a turnover in the ECU4-10 million range, a total of approximately ECU5m-ECU13m. Considerable growth is predicted in the next few years, although few respondents would give more precise estimates.

Restraints on the growth of the market include the low penetration of MF telephones which is thought to be in the region of 20-30% in Belgium and the Netherlands. Improvements to speech recognition software are expected to assist the market development as services will then be more independent of MF telephones. Other key restraints include the lack of familiarity of users and information providers with the telephone as a source of information. Service providers say there are currently few interesting or user friendly applications available over the public network, and this exacerbates user scepticism.

Service Providers and Types of Services

There are a small number of service providers who are active in research and product development. The key service providers include Philips who supply PCc-based Dialogic (US) software, (also supplied by Digiline), and carry out their own research programmes. The Dialogic product was released in early 1989, and is being upgraded to include speech recognition - as with most services in Belgium and the Netherlands, interaction is currently done through MF telephones. Applications include mail ordering (for Wehkamp) and a product information service which allows users to order company and product information using codes entered via MF tones.

Other important providers include Lernhout Speech Products (Belgium) who specialise in multilingual applications for use in the European and US markets. Applications currently include a variety of in-house systems but the company foresees expansion into services available via public network such as credit and company information. Alcatel Bell STT (previously ACEC) has developed banking, teleshopping and messaging services. Once again, input is via MF telephones rather than voice recognition. Other service providers say that they will be entering the market in the next 1-2 years with products in the teleordering and banking fields.

5. SPAIN

Audiotex services are now beginning to develop in Spain. following trials which were started in November 1988, Telefonica Servicios began to offer premium rate calls and voice messaging from the late summer 1989. The initial audiotex services that came into operation were entertainment based and were only available directly through the PTT. It is understood that Telefonica intends to develop the market actively and has long term plans to introduce differential tariffs.

6. JAPAN

The use of audiotex is quite limited in Japan at the moment, but it is said by JICOA to be steadily expanding in certain application areas such as banking. Services are provided by companies such as NTT Data Communications Systems, JR Systems and the Japan Central Horse Racing Association, using equipment provided by NEC, Hitachi and Fujitsu. The audiotex equipment that is supplied includes both hardware and software (including voice/MF tone recognition).

In spite of the limited number of publicly available applications, the audiotex market is estimated at being over ECU20m in terms of the turnover of manufacturers, service suppliers and information suppliers, with an annual growth rate of 20% predicted for the next 5 years, reaching a total of ECU40m dollars.

The restrictions on the growth of this market are very similar to those cited by the European industry, namely the need for increased awareness by users of the existence and benefits of audiotex, more experience of service suppliers and higher penetration of MF telephones in business and in homes. The current penetration of MF or dial pulse telephones is thought to be in the region of 20%, although this is likely to increase as low priced tone telephones are now on the market. In contrast with some of the European markets, JICOA cites the cost of setting up of audiotex services as a restriction on growth, and doesn't appear to view telecommunications regulations as a barrier.

Typical services in operation in Japan include the ANSER banking service, which links 590 banks and financial organisations with 51 securities houses. Corporate or individual users can use voice recognition, dial phones, touch tone phones, PC links or videotex (CAPTAIN) to make account enquiries and carry out some transactions. A speech synthesised menu is used where the service is being used by telephone links operated by voice/tone/pulse recognition. The technology and know-how derived from ANSER is now being extended to private services for applications such as hospital bookings, reservations systems and ordering systems (eg loan companies and mail order).

The Japan Central Horse Racing Association uses an audiotex system to allow members with MF telephones to buy betting tickets, and order payment (and receipts) from their own bank accounts. This membership type service is being adopted by other organisations in the betting industry. The Japan Railway Companies Groups offers a public enquiry and reservation service via an audiotex operated by JR Systems.

7. USA

A brief overview of the US audiotex market is provided below to allow some comparison with the European experience so far.

The development of audiotex services

The audiotex industry has been developing in the USA since 1966 in some States and so the market is inevitably more advanced in some respects. The use of the term 'audiotex' is often used to include wider voice messaging services which form a different market to the definition of audiotex used in this survey. Voice messaging is a well established technique in the USA both within private company systems, and now on the public networks which are starting to offer services direct to home consumers in place of answering machines. The inclusion of voice messaging in market estimates naturally produces very high estimates of the market size, and these have been disregarded for the purposes of this survey.

Premium rate services are offered on a national or State basis; the introduction of the single number nationwide 900 service by AT & T in 1988 was regarded as a major step forward in the US industry because it allowed services to be advertised more economically across the US (eg on nationwide TV) and accessed by a much wider audience. Under the 900 system, the problem of RBOCs (telephone companies) collecting and passing on premium rate charges is overcome by the network operator carrying out this function.

State-based audiotex numbers (usually 976 or 800, 540 & 970 in New York for interactive services), can be free-phone or pay per connection/call duration. Many of these services have restrictions on them such as maximum call length (which can be as little as one minute), and non interactivity. Some services are offered on a flat rate 'per call' basis.

Estimates of market size

The use of free-phone services are estimated by Link Resources to be in the region of ECU4,620m in 1988 (ECU4,200m in 1987); premium rate or pay-per-

call revenues are estimated at ECU443m in 1988 (ECU377 in 1987). A growth rate in both areas of approximately 170% over the next 5 years is predicted giving free-phone revenues of ECU6,764 and premium rate service revenues of ECU750 in 1992. These estimates exclude substantial revenue estimates expected to be derived from Talking Phone Books (ECU363m) by 1992.

Industry estimates of audiotex services (SPs, IPs and manufacturers) tend to be lower than the above, but none the less still very optimistic. VOTRAX, for example, estimate the interactive (ie audiotex) market to have been ECU102m in 1988 and estimated 250% growth in the previous 3 years. A market of over ECU1,000m for all voice services is expected by 1990, 30% or ECU300m being attributed to audiotex, against a Link prediction of ECU525m.

Brite, a leading supplier of audiotex equipment in the USA,(and the UK), estimates the US market at ECU200m in 1990 and ECU1,000m by 1992.

Types of service

The range of audiotex services available in the US is now growing, although some observers (Financial Times 19.07.89) still consider that the UK market has a much wider range of (interactive) information services. The US market is considered, in common with certain European markets, to have been held back by the association with 'pink' entertainment services. The barring of premium rate call prefixes on US switchboards has therefore been very very common as a result. The restrictions on 976 and 800 numbers mentioned above were implemented to deal with problems arising from chatline and 'pink' services. In some States eg California, there is considerable consumer pressure to introduce subscriber only access to premium rate audiotex services.

Services currently include company information services eg DunnsVoice, information including weather, surf reports etc help services, games, voting etc. Colleges and universities are also using audiotex to provide information and student input for course selection, eg University of California at Los Angeles uses a Syntellect system which it hopes to expand to allow fee payment as well as course registration confirmation. The so-called Talking

Yellow Pages services are well advanced in the USA and these are offered on a free-phone basis. A number of banking services are in operation eg Bank of Chicago's Bank-By-Phone.

Market growth

The US market has been stimulated in the last 12 months by the introduction of nationwide premium rate services (see above), and the introduction of variable tariffs for audiotex and videotex services being offered by certain network operators such as Sprint, MCI and AT&T. The range of services being offered by SPs and IPs is expected to increase dramatically as a result of these changes.

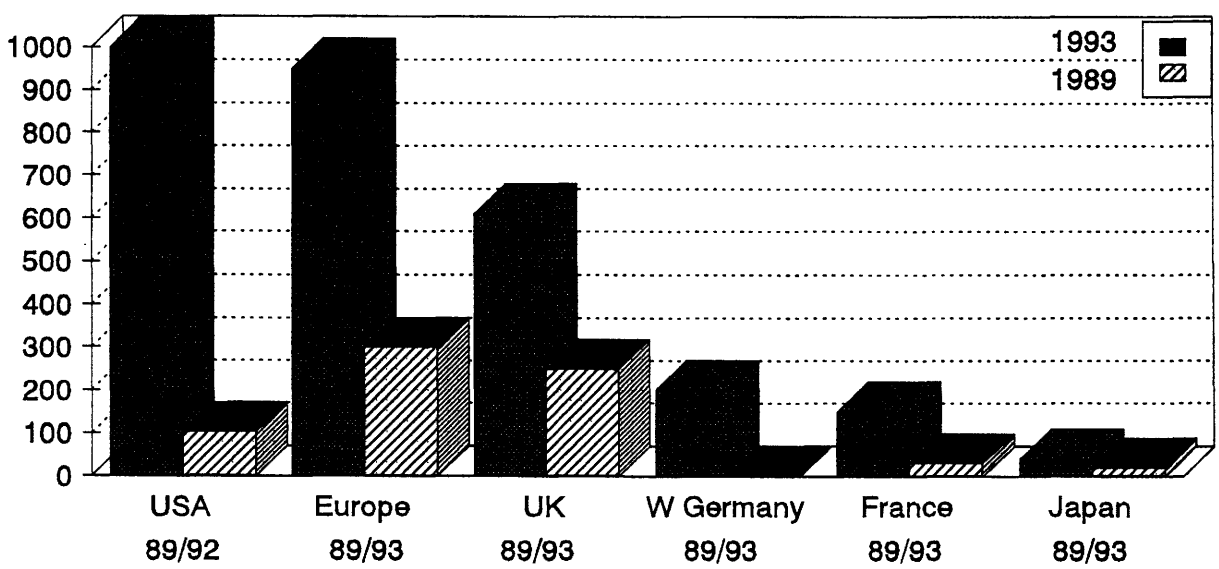
A further stimulus to the market is the very high penetration of MF phones in the US and the nearly fully digitised network which facilitates itemised billing, high quality voice and data transmission, Automatic Number (caller) Identification (ANI) etc. Over 65% of US homes have two telephones, and the majority of second telephones are tone phones. The audiotex market is taking advantage of this, as well as the number/alphabet connection on telephone equipment which enables easy number recognition, (2=ABC; 3=DEF etc). The interconnection of fax and audiotex services are also expected to further stimulate the business information market.

The network cost of setting up audiotex services in the US is quite cheap with nationwide prices ranging from ECU1,200 to ECU3,000 monthly, plus additional line leasing costs of ECU125-500. Charges to callers can be high, starting at ECU2-5 for the first minute with maximum per-call charges of ECU10 on some services and no maximum on others. The minimum rates offered by some network operators are calculated on the basis of minimum call volumes of 1 million per month, indicating the very high volumes indeed that can potentially be generated by IPs.

D. FACTORS WHICH WILL AFFECT THE GROWTH OF AUDIOTEX SERVICES IN EUROPE

It is clear from experience in countries such as the UK and the USA that audiotex has great potential as an information medium in the public and commercial sector. This survey indicates that the scale of the market in Europe is somewhat smaller than that in the USA, although growth predictions for the market are very optimistic as the graph below indicates (see also table on page iv). As part of this survey, respondents were asked about the factors which would affect the growth of audiotex services in Europe, indicating aspects of the market that would either make the market grow, or hold it back. An analysis of these factors will help in the assessment of the likely impact of audiotex on other delivery media and on the overall growth of the information market in Europe.

Graph: Growth Projections in Audiotex Markets in ECUM (including revenues for Service Providers, Manufacturers of hardware/software and information Providers) 1989/1993



A wide variety of influencing factors were mentioned by respondents which can be grouped together under some main headings as follows:

Telecommunications Regulations and Technical Ability

i) Digitisation of Networks

Various aspects of national regulations were thought to be holding the market back. Clearly in some countries audiotex services may not yet be available through the national PTT at all, because of the lack of a free-phone or premium rate call service. The absence of these services is often related to technical problems with the network which are gradually being eased by the introduc tion of digital switches and full ISDN. Most EEC countries are expected to have the ability to introduce international and national services within 2 years. The full implementation of digital networks is expected to encourage the introduction of more sophisticated audiotex services by allowing higher quality voice recognition (currently only 95% accurate), itemised customer billing, and perhaps, most important of all, more flexible charging systems available on the same telephone prefix.

ii) Approval of equipment

PTTs usually require that any equipment that interfaces with their network should be subject to their own approvals process and this includes equipment to be used for audiotex purposes. The approvals procedure varies from PTT to PTT and different requirements must be met for each one. In addition, the approvals procedure may take many months. The complicated approvals procedure is seen as a barrier to the development of audiotex services because each newly developed piece of equipment must go through the approvals process. Some Service Providers consider that they could develop their businesses much faster if they were able to use sophisticated equipment available in other countries, such as the USA. A common EEC approvals procedure would ease the situation considerably. Domestic European equipment manufacturers also consider that their opportunities for growth into other EC countries is inhibited by the slowness and

complexity of the approvals procedures. During the course of this survey, it became apparent that although USA derived audiotex equipment was widely in use in the UK, most audiotex equipment in use in Europe is domestically produced. The advanced equipment developed in France such as Divaphone, is not used elsewhere for applications via PTTs.

Penetration of DTMF Telephones

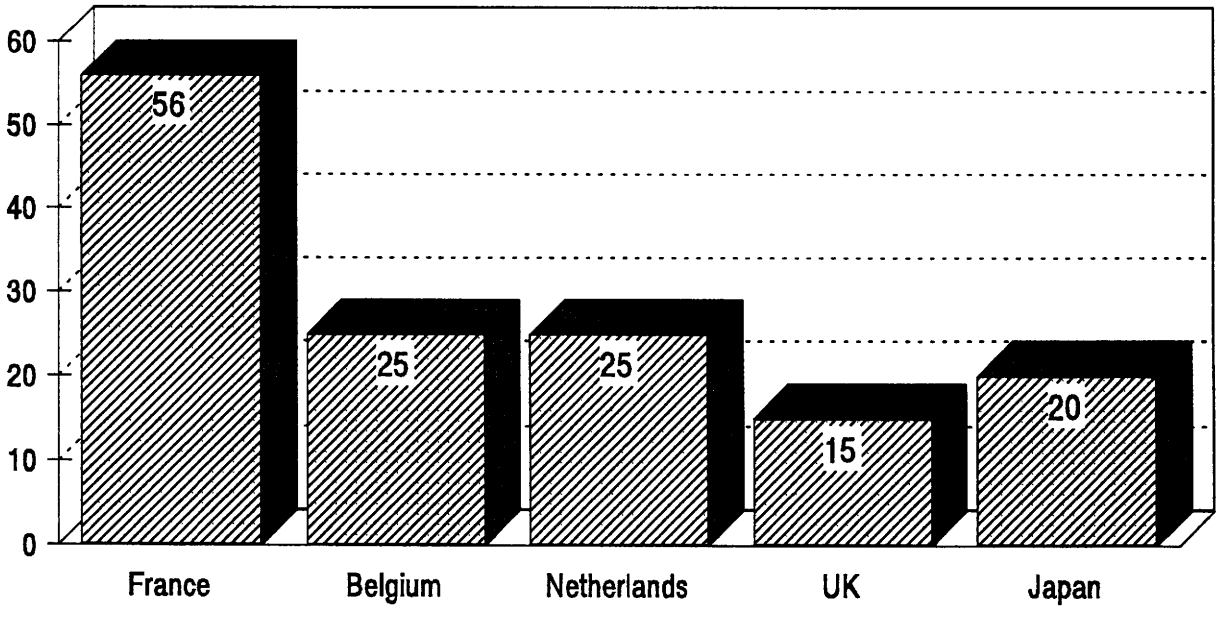
Many Service Providers consider that a key factor in the growth of audiotex services will be the increase in penetration of DTMF telephones. MF tone pads are only well used in the UK (where the penetration of DTMF telephones is low) and were not mentioned by Service Providers elsewhere in Europe.

The accuracy of current voice recognition (around 95%) is not felt to be sufficient high for financial and banking services for example. The use of DTMF phones enables much more accurate input of data by the user, especially of numbers eg credit card numbers, or bank account numbers. The use of tones also enables users to shortcut menu options once they are familiar with a system and to access the precise information they require very quickly.

The use of voice recognition systems is regarded by some in the audiotex industry as an interim measure until DTMF telephones are more widely used. In some markets, rotary pulse detection is widely used, and in countries such as Germany, voice recognition is not viewed with much optimism at all.

The penetration of DTMF telephone in Europe is shown in the following graph. As digitisation of networks progresses throughout Europe the rate of uptake of DTMF telephones is expected to increase substantially, although the attitude of PTTs will be important in encouraging this uptake, for example, by adopting DTMF telephones as standard equipment and in approving DTMF telephones for general sale.

Graph: 1988 % Penetration of DTMF Telephones



Variable Tariffs/Subscription Services

The need for variable call tariffs was one of the most frequently mentioned requirements for the expansion of the audiotex market. The current tariffs (in all EEC countries) are thought to be too low to encourage Information Providers to set up information services. The 'high level kiosk' rate introduced by Minitel for business services demonstrates the kind of tariff levels that are required; the flexibility offered by the US network operators, such as Sprint, is highly desirable.

In the interim, relaxation of PTT rules to allow different telephone prefixes to be charged at different rates is considered a solution by some in the audiotex industry. Others consider that this might confuse the users, especially in countries such as the UK where telephone bills are not itemised and would not indicate charges derived from different information services.

There were few European supporters of subscription based services, where users (perhaps a company using credit information services) could pay a standard charge for unlimited usage or where individual users could give a credit card number over the telephone to effect payment before usage. In the USA, subscription services authorised by credit card have been used as

means of helping to ensure that callers to 'pink' services are over 18 years old. This has helped to diffuse some of the criticisms over under-age use from the public.

In Europe however, Service Providers generally regard the main advantage of audiotex as being a pay-as-you go kiosk (ie non subscriber) service, with payment collected directly by the PTT. The kiosk type system encourages widespread access (consumers and business), ad hoc usage and low levels of usage per caller. Credit card companies in France are said to be worried by the lack of proof of service where information is received in spoken form over the telephone. In any event, the standard of automatic voice recognition is not yet sufficiently accurate to provide secure recording and interpretation of credit card numbers spoken over the telephone by subscribers.

In addition to allowing more flexibility in call tariffs, a number of respondents called for the PTTs to increase the proportion of call charge passed on to the Service Providers. The table below indicates the proportion of charges passed on by a variety of PTTs and network operators; the European norm is 50% and below, whereas the US operators pass on a minimum of 50%.

Graph: % Call Charges Passed On

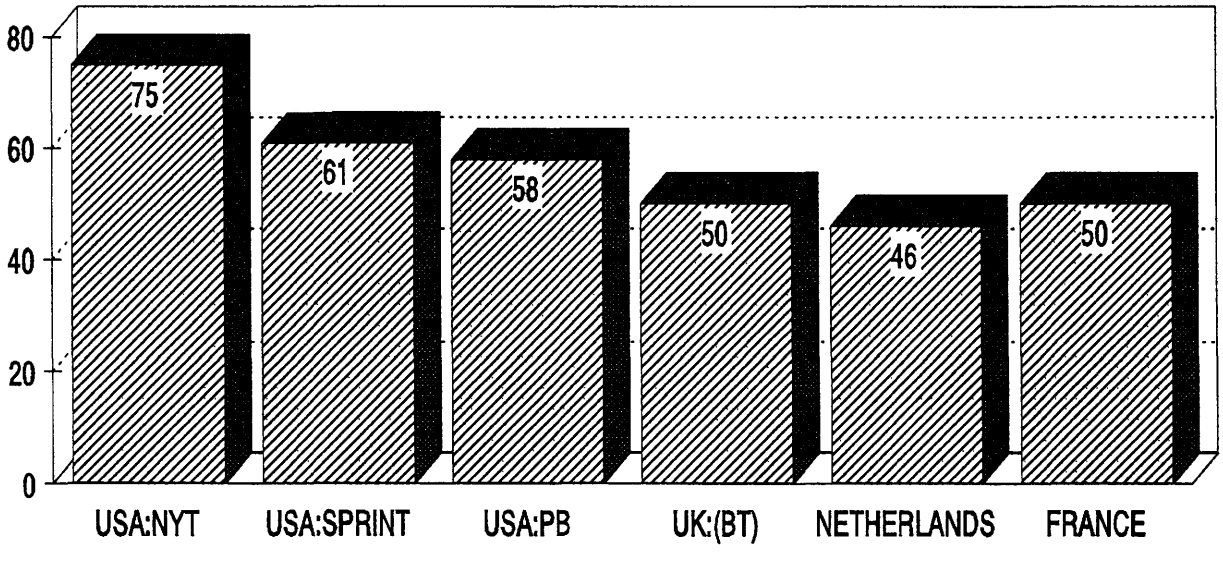


Table: Premium Rate Services: Call charges

	Charge to User	**Passed onto Svce Provider or Information Provider**	**%**
UK	£0.38 p/min (60c)	£0.185/min (30c)	50
France	FF 3.65 (incl tax) (60c)	FF 1.83 (incl tax) (30c)	50
Netherlands	0.5 Guilders/min (24c)	0.23 Guilders/min (11c)	46
USA			
eg- Pacific Bell	eg 95c/call	55c/call	58
- New York Telephone	eg 20c first min + 10c add'l min	15c first min 5c additional min	75
Sprint	ECU2/2 min (typical charge)	ECU1.23 (mthly recurring charges paid separately to Sprint)	61

Notes

1. Service Providers in the USA typically receive half of the call charges collected by the BOC or Network Operator, but often pay monthly subscription charges to maintain lines etc. US charges passed on to SPs usually favour high volumes of calls rather than a lower volume of calls of longer duration.

2. France Telecom usually distributes approximately 66% of revenues to IPs on its Minitel kiosk service.

Control of Costs by Users

i) *Itemised Telephone Bills*

It is widely considered by Service Providers and Information Providers that users of audiotex services are often discouraged by their lack of control over the costs of using the services. The introduction of itemised telephone bills would be helpful here. The backlash against chatline services in the UK was partly fuelled by the fact that telephone bills in the UK are not itemised. Business users of audiotex services are currently unable to locate call charges on telephone bills for allocation to particular cost centres or for passing on to clients. The introduction of subscription based services would allow businesses to identify their costs more accurately; the arguments against subscription services are described above. Ironically, although Service Providers see the benefits of itemised telephone bills, they also see the disadvantage that in some circumstances customers would then realise just how much their 'information' calls cost and would cut down the use of the services. This disadvantage of itemised billing is likely to affect the leisure and entertainment services rather more than business information services because, as many Service Providers report, a great deal of usage is thought to be during the daytime, from callers using business telephones. Itemised telephone billing would make this illicit use of business telephones very obvious.

ii) Call Barring

One way of controlling costs would be to allow telephone users (business or domestic) to bar (ie prevent) calls to telephone numbers with premium rate prefixes. At the moment, this would bar access to all premium rate services whether leisure or business oriented. Many companies already do bar these calls through their own telephone system, but domestic users cannot do so. As European PTTs digitise their networks it will be technically feasible for all telephone subscribers to bar calls with any particular prefixes, providing that the PTTs decide to offer this facility to their users. However, comprehensive call barring would seriously limit the audiotex market for business information services since call barring by companies to prevent misuse of their

telephones would affect leisure and business services equally. This has lead the industry to suggest that business services, or at least information services, should be allocated different prefixes so that some services can be barred and access to others allowed.

iii) Move to Call Charging on a Strict Time Basis

In countries where telephone charges are calculated in on a unit basis (rather than on a strict time basis), Service Providers often feel that users are being charged a disproportionate amount for their use of an audiotex service. This happens when a caller accesses a service just long enough for the PTT billing system to register a further whole charged unit, even though only a second or so of the unit has been used. Under the split-cost system of premium rate services, both the PTT and the Service Provider benefit financially under the unit based system, but Service Providers feel that it has a negative effect on their clients. Once again, the full digitisation of telephone networks will enable PTTs to move to a time based charging system if they wish to do so. It is interesting that in the UK a unit based system is in operation - although international free-phone calls are charged on a time basis (by seconds).

Separation of Information and Entertainment Services

The audiotex industry is concerned that the public image of its services has been tainted by the connection with 'pink' entertainment services. It considers that the connection has made it more difficult to establish the idea of serious information services (especially business services) on a medium associated with pornography. Clearly this is not only a problem in countries where premium rate services are already in operation, but is a potential problem for countries intending to start premium rate services.

In order to help stimulate the growth of information services, it has been suggested that different telephone prefixes (and possibly tariffs) should be made available for information and entertainment services. The different prefixes would then be used in all promotional material and would soon be

recognised as 'an information number' or 'an entertainment number'. The problem with this suggestion is who should allocate the different numbers - the Service Providers, the Information Provider or the PTT/network operator - and how should the difference between an information service and an entertainment be defined and how should overlapping services be categorised. These difficulties may confuse rather than clarify the market.

Acceptance and Awareness of Audiotex as a Medium

i) User Acceptance

The issue of general user acceptance of telephone based information services is clearly very important to the success of the audiotex market in Europe. The European market perceives that the growth rate in Europe will be much slower than in the USA because of cultural differences with respect to using the telephone. Europeans generally are regarded as being much less familiar with using the telephone for communication and are thought to be reticent about using it to receive spoken information such as credit details.

ii) Market Awareness

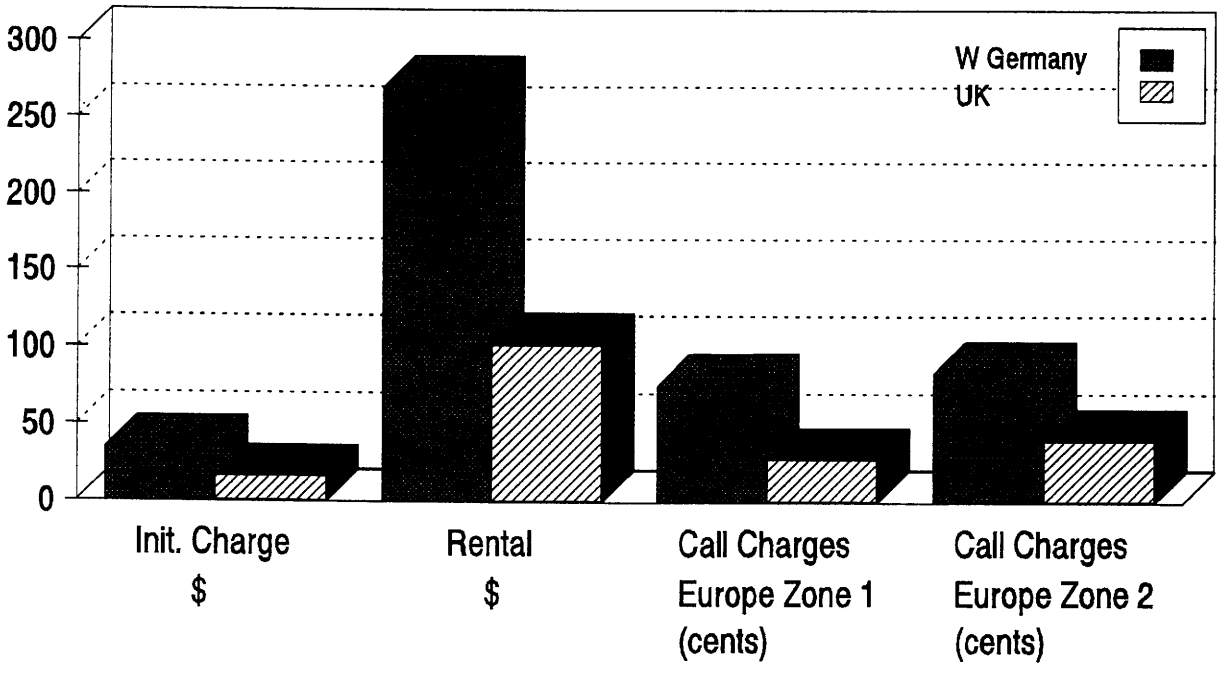
Service Providers throughout Europe considered that the growth of the market is held back by a lack of awareness by Information Providers and users of audiotex as a medium for information dissemination. In part this stems from the association of audiotex with 'pink' entertainment services, but it is largely just a question of lack of knowledge. Service Providers consider that part of their current marketing activities is directed towards educating potential clients about audiotex in general, rather than simply selling their services. This educational aspect is a common problem in the information market and has been experienced with on-line, CD-ROM etc. Information industry associations are not very aware of audiotex as their poor response to this survey indicated, although some audiotex industry specific associations are beginning to emerge in the more established markets eg ATIEP in the UK. Service Providers and industry observers consider that once audiotex is more

widely known about, then Information Providers will emerge with interesting service ideas. The lack of interesting and innovative service offerings was cited a number of times as being a limiting factor in this market. A number of Service Providers also put forward the view that once audiotex was more widely experimented with, then both Service Providers and Information Providers would create more useful, user friendly, menu systems for both tone MF and voice operated services. The long, drawn out nature of some menu services is considered to be a deterrent to many users and development work is required in this area.

Availability of International Services

The international free-phone service has now expanded to cover many countries worldwide, enabling callers to use toll-free (or local call cost) numbers to access free-phone subscribers in other countries. The free-phone subscriber pays for the call costs and the free-phone service. This development has clearly helped to improve the ability of companies to provide enquiry services, but they are not interactive audiotex services, and variations in charges do exist between different countries.

Graph: Free-Phone Charges US$



A similar development is called for in the audiotex market to enable a user in one country to access an interactive and/or premium rate service based in another country. An agreement between the PTTs would be required to ensure that the user was properly billed for the service and that the Service Provider received a proper proportion of the charges. Service Providers would clearly improve their business potential by using an international service giving them access to a much larger marketplace, giving them incentive to investigate multi-lingual versions of their services as necessary.

In some countries, PTTs do not currently allow interactive services on their networks, or presumably therefore via other PTTs. This problem would need to be addressed as part of setting up an international service. A common approvals system for equipment would probably also be necessary for such a service (see above).

The Link between Audiotex and Videotex and Other Media

The potential link between audiotex and videotex services is already being tested out in the French market. A number of Service Providers commented during this survey that they considered that such a link, audiovideotex, which would enable the user to read, save and/or print out information derived from an audiotex service, to be a very important factor in the development of the business information audiotex market in particular. Users would be enabled to access complicated databases using simple voice menus and receive detailed information on screen.

This link would enable larger volumes of information to be transferred to the user than is possible using voice synthesis - the spoken word is much slower than videotex, and the user can scan through the result easily. The transfer of information by videotex would be much cheaper than by spoken word because data can be transmitted faster, and can be sent using data lines (in packets) which are cheaper than voice lines.

France Telecom is thought by the French audiotex industry to be protecting Minitel from audiotex competition by not relaxing its rules and tariffs for audiotex. The audiotex industry in France, and in other countries, seem to

regard the two media as complimentary rather than competitive and regret that there are few pilot services in operation.

Audiovideotex services would appear to have great potential, particularly in the business information market. Services could still be made available on a kiosk basis to encourage ad hoc usage, but the need to have videotex equipment would necessarily limit the market outside France where videotex terminals are not so widespread. Linking audiotex to fax delivery services is also seen as adding to the potential of this market. Audio/fax services are already being developed in the UK by Faccess and Fax the Facts (now part of Mercury).

Separation of Network Operators and Service Providers

In the same way that the overlapping interests of France Telecom in both videotex and audiotex are a cause for concern in the French market, the position of British Telecom in the UK as both network operator and Service Provider is also seen as a problem by the UK audiotex industry. Although Mercury have recently started a premium rate telephone service, and Racal Vodaphone operate similar services, British Telecom are still in a virtual monopoly position with respect to premium rate services. The industry does not appear to be satisfied with the assurance that British Telecom keeps its network business (Callstream) separate to its Service Providing business (Spectrum) and there is a strong call for a complete separation of these functions. This separation would end what the industry feel is unfair competition between Spectrum and other commercial services, allowing the market to develop fully.

E. SUMMARY OF RECOMMENDATIONS

In order to facilitate the growth of the emerging audiotex market in Europe, this survey suggests a number of action points as follows:

- Early agreement between European PTTs to establish European and international premium rate services in the same way that free-phone services are currently provided. This will encourage PTTs throughout the EC to relax internal telecommunications rules and permit interactive, premium rate telephone calls.

- The preparation of EC Standards for audiotex hardware/ software to enable the speeding up of individual PTT approvals procedures, and to enable sales of nationally developed equipment on an EC wide basis.

- The introduction of fully itemised billing by PTTs to allow users to identify audiotex call costs (this is thought to be particularly important for business users of audiotex services).

- The introduction of variable rate call charges for audiotex services

- PTT encouragement of the early uptake of DTMF telephones in the business and consumer telephone markets.

- A complete separation between the activities of PTTs as network operators and as service providers, which may prohibit PTTs acting in both capacities.

- The clear separation of entertainment and business information services in the marketplace, by a method acceptable to the audiotex industry such as different telephone prefixes.

- An increase in the awareness of audiotex as an information medium by all participants in the industry as well as users.

It is clear that the completion of the digitisation of PTT networks will enable PTTs to act much more quickly on many of the above points. However, it would be helpful to establish some consensus within the audiotex industry about these issues and it is recommended that a European audiotex industry workshop should be organised at the earliest opportunity. This would encourage the industry to think on an EC wide scale and help increase the awareness of the opportunities in the market.

F. UPDATE

1. UNITED KINGDOM

The UK market remains the most well developed audiotex market in Europe and a number of developments have occurred which are expected to enable further growth.

Premium Rate Networks: Competition

There are three premium rate networks in the UK, operated by British Telecom, Mercury and Racal Telecom. British Telecom is widely believed to have retained the vast majority of the market in PRS services.

Mercury Communications, the second telephone network operator began operating PRS services in September 1989 and during the course of 1990 it began to win a substantial amount of business. Mercury provides the PRS facility but, as a question of policy, does not operate as a Service Provider itself. Service Providers who operate through Mercury include a number of services that have migrated from British Telecom's Callstream as well as a number of new SPs.

Mercury offers PRS at two tariff levels which are available on two different numbers (25p off peak/38p peak and 33p/44p). These tariffs are not sufficiently varied to have produced any significant segmentation in services. As far as callers are concerned, most are unaware that they are calling a Mercury PRS service (as opposed to a B Telecom service), especially since the call prefix numbers are very similar - Mercury's 33p/44p number is 0839, the Callstream prefix is 0898.

Mercury has a clear policy to build a PRS business that is based on both 'leisure' and business information services; chatlines and adult entertainment programmes are not tolerated on the network and Mercury enforces a clause in its customer contract under which SPs must not bring the network into 'disrepute'. A number of sexlines were shut down by Mercury in early 1990 and Mercury now advertises its network as being free of 'adult' services.

Service Providers

The largest Service Provider is still probably B Telecom's Supercall, although there are indications that William Hill, specialising in horse racing, may be almost as large. Supercall is thought to handle around 10% of PRS calls.

Key Service Providers have been the subject of major acquisitions during 1990. Large newspaper groups, such as Maxwell Communications and News International, now have a direct interest in key SPs who provide a great deal of their advertising revenues. This acquisition activity has raised issues about cross subsidisation of between the newspapers and the Service Providers.

Types of Service

The use of audiotex for various marketing and promotional purposes has increased during 1990 with prominent consumer brands running competitions, prize draws and information lines using PRS. Financial information services continued to do well in 1990 and the key providers, with the exception of City Call (B Telecom) are now all associated with national newspapers: Today Cityline, The Times Stock Watch, The Scotsman Portfolio, the Financial Times Cityline, Guardian Sharecall, Evening Standard Sharecall and the Daily Express City Lines.

These financial services often require the use of DTMF phones or tone pads; in addition, the use of Personal Identification Numbers allows callers to build up a personal portfolio of shares for easy access. The first Fax linked service, CityFax (Telekurs), began operation during 1990 and further extension of audiotex into fax delivery is expected through service bureaux such as Mercury Faxess and Comwave.

One of the more sophisticated services introduced in 1990 was Flitecall, operated by Infotel on Mercury. This interactive service provides flight information for Gatwick airport, providing details from a database by way of voice synthesis. At the caller's request, the enquiry can be routed through to a human operator at any time.

Other information services of interest include health services such as a vitamin counselling service (operated by a pharmaceutical company); an interactive health advice service for travellers operated by the Hospital for Topical Diseases; a news and donation line for the Labour Party; and a Gulf Crisis Line (run by the Foreign Office).

Some SPs are now offering internationally available services - partly using PRS through telephone credit card schemes (TIC/Southnet), or through arrangements with overseas PTTs (OTC) involving revenue sharing, or networks (Global Access Network, operated by International Telecom).

Regulation of the industry

ICSTIS (the Independent Committee for the Supervision of Standards of Telephone Information Services) published a consultative document on the regulation of the audiotex industry in August 1990. This document dealt with key issues including: pricing (how to inform consumers of the cost of calls, variable tariffs); potential call length limits on some types of PRS services; the possible differentiation of leisure and 'serious' services using different prefixes; and the potential for international audiotex.

This ICSTIS Consultancy Document has had a mixed reception in the industry. Many regard the document as laying too much emphasis on containing the abuse of PRS services by teenagers etc. The PRS industry as a whole regard the problem of developing lucrative entertainment/leisure and serious information services with matching high tariffs as a much more pressing issue.

Through the efforts of Oftel there has been a considerable curb on the operation of chatlines. There is considerable pressure from the media and certain politicians to curb adult services further and replace ICSTIS with a statutory, government funded body.

Tariffs

PRS tariffs were increased by British Telecom (Callstream) to 33p per minute off peak and 44p peak period. Charges on Mercury and Racal were increased

at the same time, although Mercury also retained the original tariff band on a separate number. Mercury and Callstream both pass on 22.5p per minute of PRS revenues to Service Providers which is a share out of just over 51%. Racal pass on 23p per minute standard rate, 21.5p peak and 20p per minute cheap rate. Service Providers vary considerably in the amount that is passed on to Information Providers and it appears that royalty figures are entirely negotiable.

Both British Telecom and Mercury have given indications that they will introduce a more flexible tariff system at some point in 1991. Details of what these might be, and whether 'single drop' charging would be introduced are not yet available.

Size of the Industry

Some observers consider that the growth rate for the UK audiotex market is slowing down and predictions of a doubling of market size are now considered too optimistic. Revenues were thought to be increasing by around 20% pa in 1990 which is only slightly below predictions given in last year's Audiotex Report. Figures for 1989 PRS revenues are not available from British Telecom , but working from their 88/89 projection of ECU200 this 20% increase puts the total PRS revenue for 1990 at approximately ECU240m. Triton Telecom have estimated 1990 PRS revenues would show an increase of over 39% on 1989.

In January 1990, Callstream considered that some 41% of services operated on their network could be considered as 'serious' information services, but no detailed definition was provided. This compares with 24% serious services in January 1989.

2. FRANCE

The most important development in France during 1990 has been the growing awareness of the potential of audiotex as an information medium. The interests of current and potential Information Providers have been canvassed

by the industry organisation AFTEL (Association Francaise de Telematique) and synthesized into a position statement called Le Livre Blanc de L'Audiotex.

In this document, AFTEL outlines the potential for PRS audiotex in France and lays down the criteria for the successful development of the industry. Issues which are tackled in the document include: call length limitation, variable tariffs, restrictions on who may be Information Providers (restrictions lifted in June 1990), the revenue split between France Telecom and Information Providers and the fundamental requirement for a single national PRS network (PRS in France currently operates in 9 separate regions). Le Livre Blanc also addresses the relationship between videotex and audiotex which are increasingly seen by the industry and France Telecom as complementary rather than competing media.

France Telecom are understood to be very receptive to the arguments presented by AFTEL, and indicate that they will take action on many of the points within approximately 18 months.

Size of the industry

The present regionalised PRS system (3665) generates a high call volume of approximately 300 million calls a year, according to France Telecom. Since calls are charged at 5 times the unit phone call cost of 0.73 Francs including tax, the total PRS revenue must be in the region of 1095m Francs, excluding any line charges.

Types of Services

The variety of PRS services remains largely as it was in 1989 and includes mainly passive, recorded entertainment services such as news, horse racing, sports, games etc. Interactive applications do exist and include horoscopes, weather and stock exchange information. The restriction on call length to 140 seconds obviously discourages interactivity although there is a relatively high penetration of DTMF telephones which facilitates interactivity to some extent.

The link up between audiotex and videotex is still seen as a potentially viable service offering but as yet no commercial services are available. Likewise, there are currently no fax based services available.

3. GERMANY

The Bundespost has announced that it will run a limited trial of PRS services which is due to start early in 1991. The first services are likely to include entertainment oriented services since it is recognised that these are likely, at least initially, to form the basis of a PRS market. Since the market is still undeveloped, there is no code of practice for PRS operators yet, although they will nevertheless be bound by general telephone regulations.

4. DENMARK

Kopenhagen Telecom is due to start PRS services in May 1991. KT will act as the Service Provider enabling private Information Providers to operate through them. The first service is likely to be horse racing, although a market in non leisure information services is expected to develop.

Kopenhagen Telecom will operate a code of practice, based on the general telephone regulations; Information Providers will have responsibility for the content of services. Adult services will not be allowed. There is a very high penetration of DTMF telephones in Denmark (around 90%) and the current free information services take advantage of this in providing interactive services.

5. BELGIUM

PRS services in Belgium were announced in May 1990 and services started in August. RTT operates a passive recorded message service which currently offers horse racing, horoscopes, diet information and share prices. A full DDI service is also offered for private SPs on 30 lines.

The cost of setting up as an SP is very high with a large annual line cost, payable up front. The charge to callers for PRS calls is 5 BFrcs per 20 seconds, ie 15 BFrcs per minute, which is the same as the mobile phone call rate in Belgium. It appears that there is no possibility of variable tariffs in the near future for technical reasons. The revenue split with Service Providers is the lowest in Europe at 35% and this division is being hotly contested by SPs who do not consider the market sufficiently lucrative.

The types of services that may be operated on the PRS system are tightly controlled by RTT under a Code of Practice administered by it. Chatlines and adult services are not permitted.

It is too early to make any estimate of market size in Belgium as services are only just starting. However, as in other countries, entertainment services feature heavily amongst the first services being offered. Some games applications are relatively sophisticated and involve interactive voice recognition, and one requires the use of PIN numbers for the accumulation of points. It is understood that fax related services are currently in development and may well be launched in February 1991.

Audiotex services for banks are relatively well developed in Belgium with interactive voice or DTMF connection to bank mainframes. These services are not operated over PRS. Other free interactive audiotex services include ordering services (business to business and consumer). This background of interactive voice services and a high penetration of DTMF telephones (estimates are between 45% and 70%), suggests that PRS has a high potential in Belgium.

6. NETHERLANDS

The nature of the audiotex market in the Netherlands did not change significantly during 1990, with the majority of services being adult or entertainment. Information services are thought to be less than 20%, and these are largely 'light' information such as weather. There are indications that the market for serious information services is being to form: an interactive stock exchange service was launched in November 1990, and other service providers have indicated an interest in news services.

The capacity of the PRS network (06) was increased over 4 fold to 55,000 lines during 1990 and call revenues were expected to rise in proportion to this. PTT-Telecom estimated a market of 450 million calls in 1990, generating revenues of 225m Guilders. Call charges were not increased and at 50c remain very cheap. Some experimental services with flexible tariff levels were due to be organised at the end of 1990.

Aside from low tariff rates, the main restriction on the growth of services in the Netherlands is still said to be the lack of available lines.

7. USA

The US market continues to grow but is still dominated by entertainment and marketing services with some banking services. Observers suggest that audiotex is rather better placed to provide consumer information services than videotext given the high penetration of DTMF phones and the national 900 service.

Estimates of the US market vary considerably, and may currently be in the $500 - $1,000m range (Strategic Telemedia). International Resource Development have estimated the US market for interactive voice or touch tone response systems in 1993 to be up to $1.4 billion, excluding 'free to caller' services operated by airlines etc. Information Industry Bulletin estimates that the number of PRS services increased by 34% in the first half of 1990; most of this growth was thought to derive from national 900 services rather than local 976 services which are said to be in rapid decline. Some 5,419 programmes were available on 900 networks by mid 1990.

The regulation of PRS in the USA is increasingly being brought into public scrutiny. Proceedings are underway in several southern states that may prevent telephone companies from billing for national and regional PRS services and charges may have to be collected directly by the network operators ie AT&T, MCI, Sprint and Telesphere. The network operators carry between 20% and 30% of PRS calls each, representing the business of over 300 Service Bureau or Providers. There are no regulations regarding the fees

for PRS calls although each of these network operators has its own policy and three of them have a network maximum price scale.

The Information Industry Association (IIA) has recently published a draft document on Standards of Practice for 900 Service Providers. These are voluntary standards and were produced in response to public concern over PRS programmes and marketing. The Standards are mainly concerned with ensuring that callers are notified of call charges and that programme content is truthful, not offensive, pornographic or exploitative. Special concern is expressed for the protection of minors.

In parallel with the UK, there is considerable political activity concerning adult services offered on PRS networks. There is some pressure for all services to begin with a recorded warning of call charges; this suggestion is referred to as a 'kill message' by the Service Providers since they predict that it will adversely affect their revenues.

8. IRELAND

National premium rate services were introduced in June 1988 using the prefix 0300. Telecom Eireann initially offered a managed service in order to stimulate the market, but now only acts as the network provider, offering DDI lines to private Service Providers. Calls are charged at 0.48/0.36/0.24 Irish Punt (IR£) per minute depending on the time of the call. The revenue split with Service Providers varies between half and two-thirds of the call charge. It is understood that new tariffs may be introduced in October 1991 and these may include a substantially higher tariff alternatives. It has recently been decided that PRS services are subject to VAT at 10%.

The Irish audiotex market is estimated at IR£2.9m in 1990 and is predicted to rise to IR£5.0m in 1991/92. In the period June 1989 to June 1990, there were some 3 million calls to PRS services operated by 8 Service Providers across 300 lines. Relative to its population of 2 million, audiotex appears to be relatively successful and the industry is expected to grow quickly given the fact that most business telephones are thought to be DTMF, and that audiotex equipment originating in the UK is readily approved.

Types of Service

Telecom Eireann tries to carefully control the types of services which can use PRS. It operates a Code of Practice which Service Providers must sign prior to starting operations; adult entertainment services and chatlines are not allowed. Telecom Eireann decides for itself whether a service is 'suitable' and has indicated that it will take action to close unacceptable services. There is no external regulatory body for telephone services although there are some suggestions that a trade body could be an acceptable method of regulating the emerging industry.

The first PRS service to be offered was a racing service operated by the Irish Thoroughbred Racing Board. Subsequently, further entertainment services such as horoscopes and competitions were launched. Services are a mixture of passive and interactive. The first financial information service is expected to be launched shortly, it will provide stock exchange related information and will be accessible both as an open public service and through PIN access using DTMF.

TABLE: EUROPEAN PRS REVENUES AND CALL VOLUMES

	REVENUE 1990	CALL VOLUME	CALL CHARGE PER MIN	REVENUE SPLIT
NETHERLANDS 06	225m GUILDERS 97.83m ECU	450m	50c 0.22 ECU	50%
IRELAND 0300	L£2.5m 3.26m ECU	2m	L£0.48/36/24 0.63/0.47/0.31 ECU	50-66%
FRANCE 3665	1,095m Frcs 157.94m ECU	300m	1.56 Frcs 0.22 ECU	50%
UK 0898/0839/0836	£177m 240m ECU	250/300m	£0.25/38 £0.33/44 0.36/0.54/0.46/0.62 ECU	51% 51%
BELGIUM 077 started Sept '90			17.85 B Frcs 0.36 ECU	10-35%
USA 900/976	$750m 540m ECU		95c upwards 1 ECU upwards	58-61%