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## BRIEFING PAPER

### TELECOMMUNICATIONS IN SCOTLAND : AUDITING THE ISSUES

by J A Taylor, Senior Lecturer in Public Management, Department of Human Resource Management  
H Williams, Professor of Business Computing, Department of Management Science  
B McLeod, Research Assistant, Department of Human Resource Management

#### Introduction

The study upon which this article is based was concerned with the uptake and use of telecommunication services in the Scottish economy. It was also concerned with the formulation and implementation of public policy designed to encourage the uptake of telecommunication services. Its specific objectives were :

- (a) To uncover telecommunications issues as perceived at the level of individual businesses in Scotland. This part of the work was undertaken through a survey of Scottish Business in six LEC areas and in three sectors - Software, Mechanical Engineering and Textiles.
- (b) To uncover telecommunications issues as perceived in interviews with officials in selected organisations which have key representative, advisory and policy influencing roles within the Scottish economy. This part of the work was conducted through interviews.

The notion that new flows of information in and between firms using modern telecommunications are central to business activity in the UK has become accepted by increasing numbers of industrial and public policy-makers. The clarion call of '*Management in the 1990s*' is that Information Technology, particularly the combined use of computers and telecommunications services, provides the basis for developing and sustaining competitive advantage [Scott Morton, 1991]. It is also clear that this dependency on new information flows runs across all economic sectors (manufacturing and services) and, increasingly, within each of the functional activities of the firm.

The trajectory of these processes of '*informatisation*' has been rapid from the mid-1980s and is continuing apace [Taylor and Williams,

1989]. It has been supported by technological innovations which have brought about the capabilities necessary for firms to transmit and manipulate large volumes of information in real time between distant places. Increasingly, then, the business firm is dependent upon these information flows, not simply for improving its efficiency and driving down its cost base, but also for the development and retention of its competitive advantages.

Such an analysis has relevance for regions, cities and towns too. Just as the individual firm gains advantage from new information flows, so too it is argued do places. Indeed there is now a well-established body of research which seeks to show the advantages and issues for rural, regional and local economies of the presence of advanced telecommunications infrastructures and services [Goddard, 1992; Hepworth, 1988; Gillespie et al, 1989]. Some of the key findings of this work are:

- that advanced telecommunications is a necessary, though not a sufficient, condition for economic development. Where new telecommunications infrastructures are implemented alongside other communications infrastructures (road, rail, air) then they can have considerable economic impacts.
- that advanced telecommunications secures interconnections between relatively remote or peripheral places and the core centres of the international economy. These interconnections, whilst providing opportunities for the promotion of the business networks of the remote region outwards, also permit business encroachment from outside.
- that advanced telecommunications can support the small firm in gaining better

access to market information and in integrating activities between firms whether in clusters of small firms or between large and small firms.

- that advanced telecommunications is an important factor in locational decisions made by firms. For the large firm a shift of headquarters or back-office functions, for example, will often be contingent upon the presence of good telecommunications. For the small footloose and information-intensive firm, good telecommunications can act as an anchor settling the firm in a particular location.
- that advanced telecommunication services allow firms to exploit different labour markets and time zones whilst maintaining an integrated structure and work processes.

As with the firm, however, such comparative advantages depend upon the presence of technical infrastructures. In the liberalised telecommunications environment of the UK, with its contingent variations in the geography of service provision, modernised digital technical infrastructures which will support all the firm's preferred communications needs cannot be assumed. Issues over the availability, cost, quality and timeliness of service delivery are now increasingly central to the debate over the provision of telecommunication services.

The contemporary importance of telecommunications to the Scottish economy is already evident. Many of Scotland's new growth sectors are telecommunications-intensive firms, such as in the electronics and oil and gas-related industries. In Scotland's traditional industries too, eg financial services, textiles, fishing, whisky, it is evident that good telecommunications provision is seen as central to continuing development and growth. On-line market information systems, export documentation handling system, as well as discrete intra- and inter-firm information flows are of growing significance. Telecommunications is clearly being signalled too by local economic development agencies as vital to overcoming inherent geographical and topographical features of Scotland which bring in their train economic disadvantages. The ISDN initiative in the North of Scotland is one manifestation of this concern to overcome these sorts of conditions [Taylor and Williams, 1990].

In the context of the European open market, arguments such as these are important for Scotland as a whole. High quality telecommunications infrastructure will, amongst other developments, be vital both to offsetting the economic disadvantages of peripherality and enhancing its advantages in the context of European Market development in the 1990s. Quality of life factors already provide a good incentive for business location and re-location in Scotland. As business is increasingly conducted 'over the wires' so high quality telecommunications provision is likely to become a further central factor in locational decision-making.

### Survey results

The survey results presented below are based on the analysis of data collected in firms in six LECs (Fife, Forth Valley, Glasgow, Grampian, Lothian and Tayside) and three sectors (textiles, mechanical engineering and software). These LECs and sectors were chosen in order to give a representation of the uptake and use of telecommunication services in the Scottish economy as a whole. By using aggregated data for the Scottish economy a sampling framework was devised. The data was collected by telephone interview.

#### 1. The Use of Telecommunications by Scottish Firms

The survey tested the use of telecommunications by Scottish firms in two ways. First, firms in the three sectors were asked about their costs of telecommunications on a quarterly basis. Secondly, they were asked about the range of telecommunications devices which they use.

The survey revealed the highest cost of telecommunications was borne by small and medium sized software and mechanical engineering companies, as is revealed in **Table 1** below. Twelve of the companies employed between 11 and 30 staff in mechanical engineering have quarterly costs of between £1,001 and £10,000, while one company employing between five and ten staff in the software sector had quarterly costs of approximately £5,000. Telecommunications costs in the textiles sector tends to be considerably lower compared to mechanical engineering and software companies of all sizes. For example, five textile companies, all with over 201 employees, have quarterly costs of between £2,501 and £10,000, using between three and eight exchange lines each. A mechanical engineering company of comparable

size has quarterly costs of £25,000 and uses 20 exchange lines. It seems that small software companies, alongside mechanical engineering companies of all sizes, could be described as substantially larger users of telecommunications in Scotland than textiles companies.

Table 2 demonstrates the types of telecommunications facilities and services which are currently being used throughout the firms sampled. A strong feature of the findings here is the higher and increasing use of fax, inversely related to the use of telex. These trends are apparent in each of the three industrial sectors surveyed.

The most striking finding revealed by this evidence, however, is the low uptake in Scotland of the more sophisticated telecommunications services, in both telephony and data communications. These results compare negatively with similar data for England gathered 18 months before this survey was conducted. Uptake of services in England then was marginally stronger than it was in these sectors in Scotland in late 1990. Given the strong trajectory of diffusion and adoption of telecommunications occurring in the economy generally, it is not unreasonable to suggest that the gap between England and Scotland will now be wider than our historical figures allow us to ascertain.

While a high level of sophisticated use (eg Mobile, Enhanced Services, DDI, Modem) by the Software sector (revealed in Table 3) may have been anticipated, there is also a sizeable amount of advanced telecommunications use amongst mechanical engineering firms, and to a lesser extent, textiles firms. There are, for example, early signs of ISDN and Electronic Data Interchange (EDI) use in the sample of mechanical engineering companies in the Grampian LEC. Overall, however, the take-up of new and enhanced services such as VANS and PSS is extremely low. There was no evidence of video-conferencing whatsoever. The overwhelming number of firms in Scotland do not appear to be aware of many enhanced telecommunications services nor of the part that they might play in the improved conduct of their business.

## 2. Awareness of Telecommunications Services and Facilities by Scottish Firms

One important explanation for low awareness of telecommunications by Scottish firms resides in the market provision for three services. Table 4

reveals the extent of the competitive presence of Mercury Communications Ltd (MCL) in the LEC areas which were studied.

MCL has a presence in Glasgow, Grampian and Lothian LEC areas and is non-existent in Forth, Fife, and Tayside. Further analysis of the data shows that where MCL does have a competitive presence it is essentially in the central cores of those LEC areas. The main reasons cited by companies for using MCL services is costs. Interestingly, too, there appears to be a further impact upon firms (ie in addition to cost savings) from the presence of MCL as a competitor to BT. In Glasgow, Grampian and Lothian, firms have a sharper awareness of telecommunications costs, quality of service issues and services than they do elsewhere. The limited presence of MCL in Scotland appears, therefore, to inhibit the general development of awareness of telecommunications amongst business firms.

Further to these findings, firms surveyed were asked if they were members of the Telecommunications Users Association (TUA). The findings show that there are no members of the TUA in the sample, a fact which adds considerable weight to the view that the Scottish business users' voice is not being heard at local and national levels of the telecommunications debate.

## 3. Sources of Advice on Telecommunications

The evidence revealed in Table 5 demonstrates that the overwhelming majority of companies turn to their telecommunications service providers for advice required. In most cases this is BT, as 90% of the sample use only BT services. When combined with evidence about the lack of any effective alternative advice from bodies such as the TUA, the Scottish Advisory Committee on Telecommunications and public sector organisations (eg local authorities), it is unsurprising that most companies turn to BT despite the fact that the privatisation of BT has given rise to increasing doubts about the objectivity of its advice. The survey findings suggest that these doubts become strongest where MCL has a presence.

Interesting differences appear when the data collected for this work is compared with a study of English regions [Taylor and Williams, 1989]. The findings from that study demonstrated that only 44% of firms turned to BT + MCL for advice, compared to 84% of the Scottish survey who cited

them as the main source of advice. In England 15% of firms stated that they received telecommunications advice from the local public sector, while 36% said they received advice from the public sector at the national level. Such a relatively heavy reliance on local and national public sector authorities by English companies is in stark contrast to the Scottish case. Thus, in terms of the availability and spread of advice the situation is more constrained in Scotland than it is in England.

When examined on a sectoral basis the evidence shows that only the software sector appears to turn to a wider variety of sources of advice. 50% of software companies see the telecommunications service providers as their main source of advice, and 50% turn to sources such as trade press, in-company colleagues, fellow professionals, direct mailings from suppliers and the 'grapevine'. Of those surveyed, therefore, only the software sector can be said to be significantly independent of the dominant suppliers for its telecommunications advice.

#### 4. Representatives, Advisors and Policy Influencers and Telecommunications in Scotland

The group of senior personnel interviewed for this work varied widely in their approaches to, and understanding of, telecommunications. Where technical awareness was at its strongest a number of key points was made, namely :

- that BT's modernisation programme in Scotland should be accelerated to provide universal narrowband ISDN by 1996 rather than at the turn of the century as scheduled. The key problem signalled here was BT's heavy reliance in Scotland on the small, pseudo digital exchanges (UXD5) which do not support all enhanced services.
- that a near-universal 2-way mobile service in Scotland should be in place by the year 2005. Presently it was said there are too many 'holes in the cheese' in Scotland.
- the desirability of the availability of 2-way satellite telecommunications in Scotland by the turn of the century. The example of East Germany was cited where the accepted desirability of the rapid diffusion of telecommunications was leading to the

freer use of satellite based systems.

- the desirability for Scottish (and European)-wide access to EDI. Here the French EDI Générique was cited as offering lower cost entry to EDI facilities through its provision of a public service platform rather than relying upon specialist EDI service providers.

Where the economic development potential of telecommunications was most emphasised a number of points emerged. These are :

- the significance of telecommunications for peripheral regions such as Scotland, particularly in the context of the development of the European open market.
- the importance of telecommunications infrastructure for large back-office relocations into Scotland.
- the significance of telecommunications for rural areas in Scotland. Here the emphasis was upon the growing importance of teleworking and, in particular, of teleservice centres.
- the importance for rural industrial of access to information sources available 'across the wires'. Increasingly, information services are becoming important for traditional industries such as farming.
- the low level of awareness of the business advantages which telecommunications can bring was stressed by many of the interviewees. This low level of awareness is not only present within businesses themselves but also in business advisory agencies and associations.
- the uneven presence in Scotland of MCL was referred to by a number of interviewees. As a consequence, the direct benefits of competition are not occurring in most parts of Scotland. Moreover, it was recognised that as BT and MCL compete in large volume business areas other lower volume places are likely to lose out in network investment.
- the distortive economic impact of the ISDN initiative in the Highlands and

Islands emerged in the interviews. This impact was particularly evidence in adjoining areas.

- the importance of creating incentives within local economic policy-making for the uptake and use of telecommunications.
- the importance of making policy linkages to include a telecommunications element.

One of the most surprising general findings from these interviews was the relatively low appreciation of telecommunications issues amongst this 'élite' group. Some illustrative points are included below:

- telecommunications provision, in supporting both relocation in Scotland and economic development initiatives more generally, is assumed to exist. BT is perceived as omnipresent and an uncontentious provider of a public utility service (sic).
- telecommunications was perceived by one senior official as an issue which was important "*twenty years ago*" and which presently is *passé*. There was little awareness of the contemporary significance to firms of telecommunications infrastructures and applications.
- telecommunications was occasionally perceived in interviews as an important area for policy development, but one which is ill-understood and for which there was little resource to develop further awareness. Occasionally, telecommunications was 'crowded out' as a policy area in local government Economic Development Departments, for example, by more immediate issues, with little appreciation that a high quality telecommunications infrastructure might be complementary to such issues.
- some interviewees made the point that there was no effective lobby in Scotland for improvements and developments in telecommunications. There is a "*deafening silence*" on these matters, said one respondent.
- several of the interviewees pointed to the

low levels of awareness of telecommunications amongst business advisers in local authorities, trade associations and other agencies in Scotland.

### Summary and conclusions

Uptake and awareness of telecommunications services and facilities are major issues in Scotland.

Amongst business users the evidence is clear that there is very low uptake generally of telecommunications services and facilities beyond plain old telephony. Furthermore, it is evident that where MCL has a competitive presence in Scotland, awareness of telecommunications issues is stronger than where it does not. MCL's presence, however, is uneven and whilst this remains the case levels of awareness will be lower in those areas where its presence is slight.

There is also a distinct lack of awareness of the growing significance of telecommunications in some of the policy development and advisory agencies consulted for this work. Whilst some of these bodies display high levels of understanding at senior levels, others scarcely perceive the relevance of telecommunications at all. These latter are mainly public sector agencies, including local authorities, but they also include national representative bodies for business interests.

In addition to this lack of uptake and awareness is the issue of advice on telecommunications in Scotland. Clearly emergent from this research and our previous work is a narrowness in sources of advice in Scotland compared to England. In Scotland there remains very heavy reliance upon BT, despite the latter's status as a competitive company. In particular, public sector organisations in Scotland are scarcely used as providers of telecommunications advice and do not perceive such advice-giving as part of their role.

A further issue over advice which emerged concerns the 'front-line' advisers of business organisations. Amongst those interviewed there was often a lack of familiarity with telecommunications and, where there was, it was rather euphemistically pointed out that agencies with business support functions often needed 'updating' in this area. In an era where demand (actual or perceived) is a key determinant of network service development this lack of awareness may well feed into an uneven development of the telecommunications infrastructure.

The research also brought out issues over the question of access to telecommunications services in Scotland. For example, as new services become technically feasible, such as ISDN and EDI, it cannot be assumed that access to these services will be available universally in Scotland. It is also clear that the benefits of competition, and thereby access to MCL's alternative services, are available only in some places in Scotland and not in others.

Finally on issues of access, there is the issue which flows from spatially restricted developments in telecommunications such as the Highlands and Islands ISDN initiative. Regions of Scotland outwith the Highlands and Islands, but contiguous to it, have perceived themselves as disadvantaged in the access they have to advanced services.

In recognising the business significance of telecommunications for firms the issue arises of how to encourage uptake through the creation of appropriate incentives. One Regional Council was considering tackling this through offering grant support specifically targeted at firms wishing to upgrade their facilities.

Finally, whilst it is clear that in some quarters the link between economic development in Scotland and a good telecommunications infrastructure is well understood [eg Scottish Enterprise, 1991] it is also evident that this is by no means universally the case. Telecommunications is about infrastructure and therefore a long-term consideration which can be 'squeezed out' by pressing and immediate development issues. Moreover, telecommunications is still perceived as universally available, a perceptual legacy of the days of public utility provision of simple voice telephony. The striking evidence of this work is that the majority of Scotland may be receiving the worst of both worlds as BT increasingly focuses its investments on specific market opportunities, spurred on by the competitive threat of a liberalised market and the 'cherry picking' of MCL, yet often the supposed advantages of the competitive environment in telecommunications to consumers are as absent in reality as is the competition itself.

Many of the issues highlighted in this article were subjected to more detailed study and analysis in a subsequent research project conducted for Scottish Enterprise. These will be reported upon in the next edition of Quarterly Economic Commentary.

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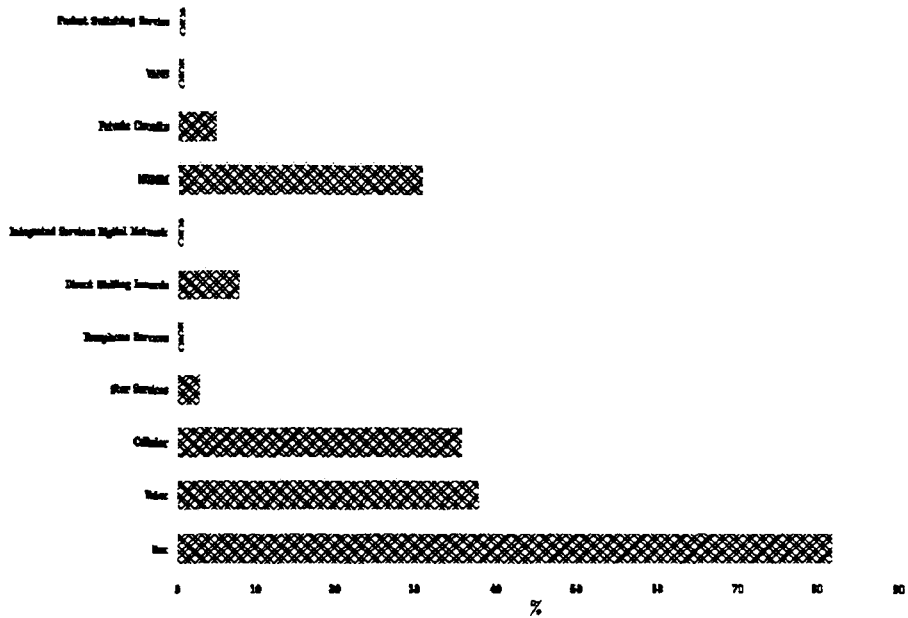
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**Table 1 : Quarterly Telecommunications Expenditure by Industrial Sector and Numbers Employed**

Telecoms Costs	Number of Employees									
	1-4	5-10	11-20	21-30	31-40	41-50	51-75	76-100	101-200	201+
<b>Software :</b>										
£10,000 +										
£2,501-£10,000		1					1	1		
£1,001-£2,500			1							
£251-£1,000	2	4		1						
£0-£250	2		1							
<b>Textiles :</b>										
£10,000 +										1
£2,501-£10,000									1	4
£1,001-£2,500			2					1		1
£251-£1,000	1		1	1		1			1	
£0-£250		3	1							
<b>Mechanical Engineering :</b>										
£10,000 +										1
£2,501-£10,000				5	1	1	1	1		
£1,001-£2,500		1	2	3						
£251-£1,000	1	4	1	2	2					
£0-£250	1	1								



**Table 2 : Telecoms-Related Services and Facilities Used by All Companies**



**Table 3: Use of Telecommunications-Related Services and Facilities by Sector (%)**

Sector	Fax	Telex	MP	ENS	FPS	DDI	ISDN	Modem	PC	VANS	PSS
Software	73	13	33	7	-	7	-	60	7	-	7
Textiles	72	44	27	-	-	4	-	20	-	-	-
Mechanical Engineering	93	45	42	3	2	10	2	27	5	2	-

MP = Mobile Phone  
 ENS = Enhanced Network Services  
 FPS = Free Phone Services  
 DDI = Direct Dialling Inwards  
 ISDN = Integrated Services Digital Network  
 PC = Private Circuit  
 PSS = Packet Switching Service

**Table 4 : Source of Supply for Basic Telecommunications by LEC Area (%)**

LEC Area	BT	BT + MCL	MCL
Glasgow	76	10	14
Forth	100	--	--
Lothian	89	11	--
Fife	100	--	--
Tayside	100	--	--
Grampian	87	--	13

**Table 5 : Sources of Advice**

