SWP 11/94 TELEPOINT : LESSONS IN HIGH TECHNOLOGY PRODUCT MARKETING

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INTRODUCTION

In 1991 Telepoint joined the ranks of notorious marketing failures, like Betamax and the Sinclair C5. This paper will address the issues connected with this failure and the interaction with established thinking on high technology marketing, new product innovation and the risks associated with entering a nascent market sector. I propose to look at the technology background and then chronologically at events from 1989-1991 when three of the four licensed Telepoint operators withdrew from the market, the fourth not yet having entered. Problems surrounding the product and the service offering will then be examined and reasons for failure identified. Finally, I wish to look at the current situation within this sector of the mobile communications market and conclude with lessons that can hopefully be learnt from the failure surrounding the marketing of this high technology product.

This paper concentrates on the newest technologies within the mobile communications sector and for clarification, the industry standard (CAI), Telepoint's competing technologies (cellular and PCN) and other technologies are described in Appendix 1. Having examined various definitions of what constitutes high technology industries/products, for the purposes of this paper, mobile communications and Telepoint will be referred to as such, since they meet criteria identified by several studies; Moriarty and Kosnik [1] define high technology marketing, as marketing situations for technological products where both market and technology uncertainties are high; Regis McKenna [2] purports that high technology industries are characterised by complex products, large numbers of entrepreneurial competitors, customer confusion and rapid change. This certainly fits Telepoint, where the technology was untried, there were too many operators for the market and those customers that were aware of the product were confused! A further discussion of Telepoint in the context of these definitions can be found on page 17.

BACKGROUND

It is easy to confuse Telepoint the service, with CT2 - the underlying technology. CT2 is the UK developed standard covering digital cordless telephony (second generation) for use as a public system. This basically means the ability to make one-way outgoing calls from a pocket sized cordless handset, from within range (100-150 meters) of a compatible base station or "telepoint". Based on digital technology, calls would be secure from eavesdropping and interference free. Base stations were to be installed at shopping centres, railway stations, post offices, banks, etc eventually with national coverage and site providers would earn a fee. Like cellular, the system relied on radio waves to get from base stations onto the fixed telephone network. The aim was to bring low cost mobile communication within reach of the mass market. It was said to be cheaper, both in purchase and use, than cellular phones; costs were initially comparable to payphones (see Appendix 3) and handsets were smaller and lighter than cordless domestic phones - but it quickly became apparent that the disadvantages soon outweighed the

"selling" points. Operators invested millions of pounds to gain only a few hundred subscribers and three of them ceased operations in 1991 with massive losses.

Over the past four years the UK mobile telecommunication market has seen buy-outs, shake-outs, mergers and closures and today bears little resemblance to what was envisaged when four Telepoint licences were issued by the DTI in January 1989.

> " Telepoint is the way ahead, it has the ability to profoundly change the way we regard telephones and telecommunications services". *May 1989* [3]
>
> " Telepoint has the image of being a total flop - it seems to be dead in the water". *January 1991* [4]

These quotes, less than two years apart are by telecommunications analysts. Telepoint's early promise and its disastrous demise illustrates the rapid turn-round which has been the inevitable result of rushing to market too quickly - a classic case of how not to introduce a new technology. Today with no Telepoint service operational, the future for mobile telecommunication is confused and uncertain.

CHRONOLOGY

The basic origin of Telepoint was in PA's Technology Division in 1978 and their report for the Eurodata Foundation (1981) on the future of mobile telecommunications in Europe confirmed the need for a low cost, mass market mobile telephony service. The demand came from two sectors, public telephone users (dissatisfied with the service) and some mobile communication customers, who wanted a less expensive, less congested service. The market potential was thought to be huge. In 1981 PA provided a working demonstration of their original system to BT, who felt it did not fit their marketing plans, so it was decided not to take the concept further at that stage. At around this time, the scene for today's telephony market was being set, BT lost its monopoly when Mrs Thatcher's first government intending to liberalize the market, licensed Mercury Communications to provide a competing fixed link public telephone network. Since then Mercury has eaten into BT's market share especially in the business sector. Also at this time two cellular companies, Cellnet (owned by BT and Securicor) and Vodafone (Racal) were enjoying a monopoly of the mobile telephone market. Their initial success meant that demand exceeded capacity and, too often, many subscribers failed to make their connection. Ferranti had bid for and lost its opportunity to operate a cellular licence but had come to the same conclusion as PA - there was a real need in the market for more mobile technology and so they funded PA to work on the concept.

Development of the enabling technology (CT2) led to improved performance in new digital equipment and Telepoint, the service or system concept, would allow operators to use this technology, install an infrastructure, sell the hardware and exploit what was thought to be a mass market. Since this form of "mobile" telephony did not fall under existing licences, OFTEL

(the industry watchdog) decided that a new licence would be required to operate it. Thus in September 1988, the DTI launched a "competition" to licence potential operators and invited applications. In order to balance the need to introduce competition and achieve economies of scale, whilst still taking into account the amount of business that the market was at the time expected to support, the Government wanted more than two but no more than four operators. One concern was that funding for a venture of this size was going to be a problem and that four could still be too many, another was that licencees could be driven to either join forces (as subsequently happened) or overcharge in an attempt to obtain a return on their investment.

The original prediction was that several million people were expected to be in the mobile phone market by the mid-1990's, attracted by Telepoint's cost advantage, especially over the more expensive cellular services. In January 1989, Consultants MZA predicted a Telepoint user figure of 2.5 million by 1995 [5], while BYPS forecast was 3.6 million by 1995 and 13 million by the end of the century. But experience has belied the optimism - at the time of the three operating companies' withdrawal in 1991 they had less than 10,000 subscribers between them. [6]

MARKET ENTRY STRATEGIES OF THE OPERATORS

In many high technology industries, alliances and partnerships are becoming the norm and the variety of alliances reflects a multitude of motives. They can take many forms and can be seen as a way of spreading risk, increasing knowledge, enhancing effectiveness and utilising competencies in order to improve positioning and ultimately gain market leadership. In the mobile communications sector, these alliances have taken the form of organisations grouping together initially for opportunistic reasons, to bid for operating licences - in effect forming rival consortia. Rising R & D costs and the speed of technological change, mean that it is increasingly difficult, even for large companies, to succeed on their own. But whilst allowing the sharing of skills, expertise and technology, these business alliances appear by no means stable (see Appendix 2 Overview of the Telepoint and PCN Markets).

Neilson's work [7] suggests that firms can indeed enhance their competitive performance by entering into various forms of collaborations but as in mobile communications, Kogut's research [8] shows that few joint ventures or other collaborations last beyond six years and most last less than four. With Telepoint and PCN, major players quickly left the sector, sold out to existing participants or to those seeking entry for other strategic reasons (Hutchison) whilst others have merged (or tried to, like Mercury and BYPS).

In January 1989 four consortia (from eleven applicants) BT, Mercury, Ferranti and BYPS were granted 12 year licences to operate Telepoint services but the slow roll-out and take-up rate, lack of market research and massive infrastructure investment made it most unlikely that all four could succeed. It was stipulated that the systems had to be on approved CT2 apparatus and carry outgoing calls only.

BT, Mercury and Ferranti quickly launched with individual equipment, three different kinds of handsets, three types of base stations - all incompatible, whilst BYPS preferred to sit on the sidelines apparently waiting for the introduction of the CAI standard before launching. Three launched in 1990 but have subsequently withdrawn from the market due to the low numbers of subscribers attracted. (See Table below).

	LAUNCH DATE	ENTRY STRATEGIES	PROBLEMS	CEASED SERVICE
BT Phonepoint Note (a)	Sept.1989	First onto the market; Alternative to payphones; Targetted price sensitive users; Built on being market leader in fixed phone network and BT's reputation. Mass market mobile communication.	BT undertook a repair programme on payphones; Too few base stations; After a year, and only 1000 subscribers BT decided on a relaunch, with a promotional spend of £3 million, lower prices and smaller handsets. Note (b). PHONEPOINT withdrew service with 3300 base stations and just 800 subscribers for an investment of over £25 million. Launched with incompatible equipment.	Oct 1991
FERRANTI Zonephone	Oct.1989	Followed BT onto market; Had developed original CT2 concept; Initially targetted business users; Believed Zonephone was the way to build expertise before addressing potential market opportunities of the next tech. - PCN;	Base stations limited to around the M25; Target market served by cellphones; Handset dubbed the "Ferranti brick"; Parent comapny in financial trouble; Investment of £25 million virtually abandoned. Launched with incompatible equipment.	July 1991
MERCURY Callpoint	Dec. 1989	Offered a combined technology and sales package; Planned to charge calls at the same from anywhere in the UK; Aimed to be nationwide; Stressed affordability, accessibility and portability; Pushed their reliability.	Too few base stations; Poor marketing; More committed to PCN licence? Launched with incompatible equipment.	June 1991
BYPS Rabbit	March 1992	Hoped for a competitive advantage by delaying launch until they had CAI compatible equipment and nationwide coverage; Established brand name early; Most powerfully backed operator; Highest pre-launch spend; Intended to succeed by being a late entrant; Building customer base for PCN network.	Too much advertising without a product, led to customer confusion; Consistantly delayed launch dates; Note (c) Take over by Hutchinson in Feb. 1991	Dec. 1993

Notes on above Table.

(a) Because of concern that BT would have unfair competitive advantage, their licence was subject to additional constraints, eg a minority shareholding plus separate billing arrangements. Similar conditions applied to the consortium containing Mercury's interests, but to a lesser extent as it was not dominant in the marketplace.

(b) BT's relaunch was repeatedly delayed, apparently over "technical hitches" regarding the move to CAI and begs the question, why did Phonepoint delay pulling out until October 1991 while continuing to invest in, install and advertise a product which they knew to be a failure? Perhaps the answer lay with Cellnet - BT's cellular subsidiary (BT owned 45% of Phonepoint and 60% of Cellnet). Cellnet and Vodafone are cash generators for their parent companies - Telepoint never was or would be in that form. Unless vetoed by OFTEL, the 800 BT Phonepoint subscribers were to be given either a refund or free cellular handsets and subscriptions to the cellular system. Cellnet could capture up to 800 new customers in one go!

(c) BYPS operated a "wait and see policy". At the first Telepoint Conference (May 1989), BYPS excused its delayed entry into the market by stating that:-

> " We cannot go forward on something less than a service which is entirely adequate and delivers all that consumers require". [9]

In April 1990 research by the Henley Centre for Forecasting found that despite "post-hype pessimism" [10] there was still potential for mass market phones and forecast that up to 12 million UK customers could be using some form of mobile communication by the year 1995 [11] but the major problem was that no-one was willing to invest the millions necessary to alert the public to the potential.

These four consortia had "won" their licences and the right to operate a Telepoint system but their problems were just beginning. It was estimated that each consortium would need to invest up to £50 million to install the necessary infrastructure and that at least 20000 base stations (per operator) would be required to run an efficient nationwide service.

COLLABORATIVE STRATEGIES

Littler and Wilson [12] outline some of the pressures for collaboration that many firms in high technology sectors face and they have been summarised below in as far as they apply to the Telepoint consortia.

Desired Outcome	Possible Causes
Market entry.	Shorter product life cycles as a consequence of rapid technological change results in the need for speedy access to major markets and often "narrowing windows of opportunity" [13]. The window of opportunity for Telepoint proceeded to get smaller and smaller.
Market exit.	A way of reducing the cost of exiting from a market by reducing the involvement in a collaboration over time, eg Barclay's reduced their share from 33% to 5% when Hutchison took over the BYPS operation.
Rapid product development.	Intense competition and the rate of technological change focuses on the need to have short development periods in order to get to market quickly. Co-operative arrangements can accelerate the commercialisation process of short life technologies.
Economies of scale.	Collaboration spreads the high cost of technical development, product design, marketing and infrastructure. It also reduces costs and can expand markets through mutual access. This should have been beneficial to Ferranti in particular, being a manufacturer as well as a service operator.

Access to technology and expertise.	Allows the exchange of technological developments and skills. Some interdependency between technologies means that sometimes more can be gained by collaborating than competing.
Risk reduction.	Collaborative alliances are a way of insuring against the very high costs of failure - they spread the risk.

Source: based on Littler and Wilson

In nascent sectors, triggers for initiating alliances could be either tentative - to explore the potential; opportunistic - for short term gain; or as commitment - a long term interest in developing the sector/market, but most of all it would appear that they must be flexible and constantly evolving. By the time BT suspended their service (October 1991) BYPS had still not launched and its composition had altered drastically, as had all the consortia (see Appendix 2). It may be that the nature of the involvement will be unclear until it develops enough for the returns to be more apparent.

Less than a year after launch (December 1990) merger talks were underway between Mercury Callpoint and BYPS who both denied it to be a defensive move. Cable and Wireless would be the largest shareholder in the new Mercury company but it would be marketed under the BYPS "Rabbit" brand. The proposed deal would have the approval of OFTEL. Cable and Wireless said that the combined marketing and technical strengths of the two companies would bring substantial benefits to customers. It was also rumoured that BT Phonepoint and Ferranti were expected to join forces in an attempt to cut costs. Mergers were having to be considered because sales were way below predictions (see Problems page 9). The Government would be embarrassed if one arm of its liberalised communications policy failed and operators blamed the lack of success on the economic downturn and Government announcements on future licences for PCN technology, but there were many more reasons for the poor performance. Having spent more than £90 million setting up Telepoint, operators were faced with having to spend much more to popularise it. Ferranti could not afford further heavy investment and had failed to sell its majority stake. At this time the industry hoped that CAI handsets due early 1991, enabling users to "roam" the networks, would give the system the boost it needed. But in January 1991, talks between BYPS and Mercury ended in failure because the two sides could not agree terms and in February 1991 Hutchison Telecomm (UK) an arm of Hong Kong's Li Ka Shing (a branch of Hong Kong's Hutchison Whampoa Group) were negotiating with BYPS to take a controlling stake in their Telepoint operation. Hutchison saw great potential in Telepoint when used with a paging network, Philips and Shell pulled out completely but Barclays Bank retained a 5% holding. This gave the UK subsidiary of the Hong Kong company a hold in the UK telecommunications industry just as it was opening up to competition and could enable them to launch directly into the European market.

By July 1991 Ferranti and Mercury were no longer operational and subscriber figures were almost impossible to come by - all four networks were reluctant to discuss numbers, which were thought to be less than 9000. The market was now effectively down to one operator (BT), with a second biding its time in the wings. Interestingly enough this second player was not the obvious one but was a very ambitious Hutchison Telecomms (UK). The company had been undertaking a "blitzkrieg of UK acquisitions" [14] and had already bought the Millicom Paging Company and Millicom Cellular, as well as BYPS and in July 1991 they acquired a PCN licence via Microtel.

COMPETITION

In the constant search for competitive edge, businesses must continually be engaged in a process of improvement, modification and innovation. This is especially important in nascent sectors, such as those founded on new technology, where failure to do so could erode the basis on which they compete and with so many potential sources of change, result in a loss of competitiveness. The mobile communications sector could well be described as nascent, open to the possibility of new market opportunities as the PCN and Telepoint technologies developed. Littler and Leverick [15] have found such embryonic sectors to be "highly energetic, encountering significant technological change, with rapid rates of market development, high rates of product obsolescence and considerable uncertainty". Such sectors also focus on "the technology itself and the product rather than the benefits sought by potential customers". Being so product led (as with Telepoint) can blinker the company (or in this case the operators) to the user and marketing requirements and eventually result in the failure of the business objectives.

Competition must not be viewed too narrowly, there is a continual threat of innovation by existing or new rivals; from new products which supercede the current offering; or are cheaper or better versions of the same. Developments could also arise from as yet unknown or previously unconsidered areas. Companies offering advanced technological products must be aware that any early advantage they may have established could soon be eroded by new later entrants building on the lessons learnt, therefore any marketing position gained must be sustainable against existing and new competition.

Telepoint's competition came from two sectors, existing telephony (payphones and cellular) and from emerging technologies like PCN.

Payphones

As Telepoint's main competitor was the humble payphone, it would have made sense to position it downmarket - aiming at consumers who could not afford cellular but who did want the convenience of a "phonebox in their pocket". But its success was hampered by improvement in the service of traditional phoneboxes. When the system was first mooted, working call boxes were like "snow in June" then BT undertook an intensive repair programme and improved the

performance of one of its own competitors. Even so Telepoint was still at a disadvantage, since in a call box, calls can be received - not so with a CT2 handset!

Cellular

The success of cellular, the first mobile technology to market, led to rapid market growth (from 46000 subscribers in 1985 to over 1 million in 1991) initially with demand consistently exceeding predictions. The sector quickly developed the image of being a highly lucrative market, with many companies showing an interest in the developing technologies. As a result, Telepoint and PCN licence applications were oversubscribed, with 11 applications for Telepoint and 8 for PCN - despite the very high development and infrastructure costs. Cellular's initial success meant that demand exceeded capacity and, too often, many subscribers failed to make their connection. The system has been dogged by congestion and poor quality service, despite high rental and call charges, thus user dissatisfaction has grown, with recently up to a 2% drop out each month. Even so, the cellular sector is now an established market and is beginning to mature. Vodafone have a 56% share of the cellular market (92/93) and pre-tax profits were up 11% on 1991/92. There was 8% growth in total user numbers during 1991/92 compared with 33% growth during 1990/91 [16]. Cellular phones initially had the image of belonging to high flying executives because of the expense involved both in purchase and in use, but they may have become victims of their own success.

> "Although subscribers have exceeded forecasts, call congestion is getting worse, interference is bad, battery life is improving only slowly and user frustration mounts. Marketers have raised the customer's expectations to a level that they are unable to satisfy." [17]

But in the end, Telepoint could not be a real rival to cellular as it was never truly mobile.

Competition also came from the threat of emerging or new technologies which would "leapfrog" CT2, the most immediate of which was PCN.

PCN

In December 1989, with Telepoint struggling to establish itself, the DTI announced the awards of the next technology - PCN. This promised to be everything that Telepoint was not, two-way and fully mobile. Telepoint was doomed, leapfrogged before it had started. The intention was to offer the sophistication and convenience of expensive cellular radio phones but supposedly at a lower cost. Licences were awarded to three consortia:-

Mercury PCN (Cable and Wireless, Motorola, Telefonica Spain),

Unitel (STC, Thorn EMI, US West and Deutsche Bundesposte Telekom),

British Aerospace consortium called Microtel.

The two existing cellular operators could also turn their services to PCN's, making a maximum of five operators possible. Cellnet and Vodafone had spent over £500 million each on building

their nationwide networks of base stations. PCN operators were expected to spend up to £1 billion each on the infrastructure and in developing digital technology based on GSM for compatibility in the European market. Originally scheduled for introduction by 1993, PCN's will not now be available until the mid-1990's and investment has been cut with Mercury now planning to spend around £200 million and concentrate within the M25 region only.

In July 1991, the British Aerospace consortium (Microtel) was acquired by Hutchison Telecomm (UK) and Mercury and Unitel merged to form a joint venture, effectively bringing down the competing operators in the PCN market to two [see Chart in Appendix]. PCN is the type of product that has been referred to as "vapourware" [18], a product which does not yet exist, although its promised performance would improve on existing technology. The main question to be answered was and still is, can the planned PCN's really produce mobile services cheaply enough to compete with fixed line and cellular phones. The operators always believed that it would not really compete with the Telepoint system directly, Ed Candy BYPS:

> "There is major confusion concerning the positioning of the PCN and Telepoint technologies. PCN is not likely to begin trial systems until at least 1996, by which time Telepoint will be an established market".[19]

Roger Best, Phonepoint:

> "PCN is not a competing technology with Telepoint. It will be aimed at the top end of the market - competing with cellular. Telepoint is a mass market service offering convenience and flexibility at a low price".[20]

But it had to be seen as competition and potential customers had to decide whether to buy or wait. Analysts at Barclays de Zoete Wedd still believe there will be 10 million UK consumers using either cellular or PCN phones by the year 2000. Cellnet and Vodafone already have their network and support infrastructure in place and intend to develop technologies to compete with the new PCN operators, they are well placed to fight a price war - as soon as a PCN service is launched they will simply cut their prices.

PROBLEMS

With the benefit of hindsight it is possible to identify 10 problems contributing to the failure of the Telepoint system:-

1) RESTRICTED RANGE AND NUMBER OF BASE STATIONS - Telepoint phones only work within range of a base station, unlike cellular, which work throughout the country and between cells. The number of locations and the spread of the service would be key to the systems success. Despite operators claims, Telepoint's coverage never competed with cellular or payphones and major problems arose over siting. The aim was to have base stations every 500 meters in cities and every 10 minutes along motorways, but in reality they were very limited, concentrated only in central London and along the major motorway routes. The failure to

establish a national network before launch was one of the main reasons for collapse. The estimated minimum coverage for an efficient nationwide service was said to be 20,000 base stations per operator - the approximate number on closure were, Mercury 2500; BT 3300; no figures were available for Ferranti. Phonepoint subscriptions were so low after 8 months that it was thought to have more base stations than subscribers! (as it indeed did have on closure).

2) POOR IMAGE - From very early on Telepoint was seen as a commercial flop and quickly acquired an image of failure. It attracted such terms as "skodaphone" "second class product" "lacklustre image" and "a dodo!". The "call box in your pocket" was originally marketed as a "poor man's cellphone" - this was enough to kill it at birth. This negative image had the knock on effect of making potential site providers unwilling to become associated, they did not want to be seen to promote something deemed to be a failure.

3) INCOMPATIBILITY - Government made it clear at the outset that operators had to support the CAI standard by 1991 (see definition section) however, three operators launched with incompatible equipment aiming to get in early and capture a large slice of the emerging market. This meant that initially handsets only worked with each operator's proprietory equipment: after 1991 it would be mandatory for handsets to have access to any operators base stations to enable inter-system "roaming". BYPS maintained that their delayed launch was because they would wait as long as necessary to be able to launch with CAI standard equipment. International standardisation is also an issue as the appeal of the service would be enhanced if one handset could also be used in overseas.

4) ONE WAY ONLY (CT2 technology) - A major disadvantage for the customer was the inability to receive incoming calls - a restriction imposed by the DTI after lobbying by the cellular operators. With one-way communication, it was perceived to be inferior to its competitors. The DTI belatedly realised its mistake and approved handsets with built in pagers in mid-1990 but it was too late to make any difference.

5) LACK OF MARKETING AND CONFUSION IN THE MIND OF THE CUSTOMER - With a proliferation of products, including static phones, cellular radio phones, Telepoint and the idea of the personal communicators (PCN's), potential customers were confused. By Christmas 1990 only 6% of consumers asked had ever heard of Telepoint [21] and even less knew what it was. Ian Reece, Communications Consultant at BIS Mackintosh said.....

> "Telepoint has acquired an air of failure, the lack of promotion has been a marketing disaster".[22]

and the Financial Times stated "Telepoint is undergoing an identity crisis". [23]

Moriarty and Kosnik [1] have found that high technology marketing mishaps and many product casualties occur when **basic marketing** lessons have not been learnt, such as:

- market selection, choosing the right customer to serve.
- marketing concept,identifying and satisfying unmet needs.
- differentiation, how to fill a particular need better than the competition.
- 4 P's marketing mix.

The lack of marketing was a very real problem for this product. All the operators had grossly under-estimated the advice and marketing needed to explain the system to the public, competition was fierce, sales tactics dubious and some of the technology unsatisfactory. Communications consultants sprung up overnight and early on there was confusion among the salespeople. It was a real chicken and egg situation - explaining precisely why anyone should buy such a restricted system called for intensive marketing, but the more the public learnt about it, the more obvious its limitations became - could this be why the operators did not go out of their way to fully explain and market the technology? Critics (including David Willis an Independent Communication Consultant in an FT Survey [24]) argued that the operators effectively missed the boat by failing to market the service properly and that they would not be able to re-establish themselves in the UK's increasingly competitive mobile marketplace. Potential customers were uninformed and confused and the product was still too expensive for the market at which it was aimed, but operators always insisted that the market was on the point of taking off!

In their haste to go into operation, those launching pre-CAI did much to confuse potential users and base station providers, since post-CAI all hardware would have to be replaced (base stations and handsets). Having four operators in the market proved to be a great test of the open market principle, it always seemed unlikely that the market could support all four but if two or more had succeeded in offering compatibility from the start then some user frustration and confusion could have been averted.

BYPS Rabbit spent the most on their marketing - but had still not launched when all three competitors had failed. Launch dates were put back time and time again and talk of trial launches (by all operators) signalled to would-be subscribers that Telepoint's future was by no means certain and added to the confusion, Cooper [25] cites poor execution of a new product's launch as one reason for a product's ultimate failure. The dismal awareness figures for Telepoint post-launch, would appear to back this up.

Rothwell's study [26] finds that one particular failure of innovating companies is associated with the "we know best" attitude when they fail to acknowledge the need to consult potential users concerning their invention. McKenna [27] goes as far the other way in suggesting that they should -

> "integrate the customer into the design process to guarantee a product tailored to customer needs and marketplace requirements".

This appears to be conspicuous by its absence in the sector under consideration and not the normal marketing route for high technology companies. Instead, supply-side markets, as identified by Shanklin and Ryans [28] follow Say's law, which states that the supply of a product can create its own demand. This is contrary to the conventional marketing wisdom of devising offerings to fill demands or needs and mainly seems to occur in high technology industries, where by nature the products have not existed before. Technical progress can create market demand which relies on a "presumptive need" rather than an identification of buyers' desires. In these cases the marketing strategy tends to be formulated on sketchy market information and sometimes even on intuition.

Shanklin and Ryans [29] found that supply-side conditions dominate the early stages of marketing most high technology products and that industry shakeouts and later entrants signal an evolution to more demand driven marketing as the product/technology/market begins to mature. With this change, the marketing role becomes more traditional, requiring a change in organisational thinking, but the problem with fast moving technology markets is that the market/product/company may not last long enough for this change to take place. The main error therefore, for poorly marketed high technology products seems to go back to companies being product/technology led rather than market led. Bill BonDurant (Marketing Director, Hewlett Packard) comments:-

> " Most new products fail for marketing reasons, not for technological reasons. We can do what we set out to do, it's just that frequently what we decide to do is not what the market wants" [30].

This ties in very nicely with a quote from Graham Wilde, (communications research organisation CIT);- "Telepoint is a bit of a dead end, it is a technology led initiative - they found they could do it, but there is not much use for it!" [31]. Often, enthusiasm for the technology, the need to respond quickly to a market opportunity and to establish a position in an emerging sector puts marketing considerations low down on the list of business priorities, this is far removed from Regis McKenna's view that marketing is everything and should evolve as the technology evolves [25].

6) GOVERNMENT - Strategic blunders by the operators were exacerbated by inconsistent Government action. Unhappy with the cosy duopoly that had developed in the cellular market (Vodafone and Cellnet) and the conventional market (BT and Mercury) the Government was keen to stimulate competition, but new technologies such as CT2 needed nurturing, not to be thrown open to market forces. To have four different operators spending all their energies fighting each other over sites and charges, resulted in rash claims and a rush to market. The Government then shot Telepoint in the foot by announcing its technological successor (PCN's) on the very day that the Telepoint licences were awarded, which effectively marked it as an interim product and rendered it obsolete before it had begun.

"A major cause of the Telepoint failure was the Government going overboard with the launch of PCN. It deterred further investment, pushed the operators into launching too early and stopped customers buying".[32]

CIT Research Consultancy have also placed some of the blame for the failure of Telepoint firmly in the lap of the Government and feel that the DTI should only have granted one licence.[33]

7) TARGETING/POSITIONING - Telepoint was initially expected to address a new market (it is not clear how much research was done on this) - an emerging niche of people who felt the need for more mobile personal communication, for example women and older people who were becoming increasingly concerned about personal safety and a more mobile population of both business and domestic users would result in a growing need for mobile communication with family, friends and associates. As Shanklin and Ryans demonstrate [34] techniques of identifying customer needs and targetting market segments are most suited to market situations in which the producer can identify the broad user groups for each new product. However, with truly innovative new products, as already illustrated, there is usually no existing market demand from which to gather such information and to formulate strategies.

CT2 phones or *"the phone box in your pocket"* were originally designed to be a low cost alternative to the cellular network but really competed with the telephone box. By positioning itself in this way it could only make limited inroads, with only a few thousand customers, whilst cellular had over one million. Industry observers say that this indicates that CT2 was positioned in the wrong market-place from the beginning. The fundamental problem was that the industry had the technology but did not know who it was aimed at. The operators said they were not targetting cellular customers, as they believed this market would be taken over by PCN's, but charges were nearer to cellular than to the fixed network or payphones. There was a basic mismatch between the image and the product, in that even though it was being marketed as *the poor man's mobile phone* - it was overpriced for the target market (see also 10 Mispricing).

8) LIMITED LIFE CYCLE - Operators believed that CT2 had 5-7 years before it would be overtaken by the next technology (PCN). This time span would be necessary to become established in the market, consolidate their position, improve their services and reduce costs. However, it soon became obvious that the window of opportunity was not that long and that it would be leapfrogged by new technologies before it had time to reach the volume of sales required to reduce prices significantly. In the event, other issues forced the operators out of business before the technology even became established.

Faster new product development and speed to market is becoming more important, as it has been acknowledged that product life cycles (PCL's) are getting shorter, [35], [36]. Moriarty and Kosnik [1] however, have found no evidence that high technology PCL's in particular, are

getting any shorter than more traditional products, but did find evidence that all PCL's are becoming shorter. Shanklin and Ryans [29] have determined that the concept of a PLC - whereby a new product is introduced commercially and then proceeds through predictable life cycle stages until it dies or is terminated, can be grossly misleading for high technology products. It is not always apparent where such products are in their life cycles at a given time and the market turbulence of such sectors makes the idea of forecastable life cycles tenuous at best. In such sectors it is the technology life cycle that is crucial. A company must continually monitor and evaluate objectively how its technologies are performing in the marketplace and how they could perform against rival technologies.

9) NOT TRULY MOBILE - Telepoint technology does not permit users to make calls on the move, as there is no hand over facility to allow a call made on one base station to be switched over to another, but you can move within range of a base station. The system was officially classed as not mobile when it was exempt from the mobile telephone tax, as imposed in the 1991 Budget statement. It is therefore difficult to see how it could have been marketed as a form of mobile telecommunication.

10) MISPRICING - The operators faced a dilemma over pricing. Like conventional and cellular operators, Telepoint companies expected their principle source of income to come from call charges - this meant building up a large subscriber base as quickly as possible. The best way to do this would have been to sell the handsets at manufacturing price or less. However, the backing companies had invested such large sums in the networks, that they were naturally keen to recoup their investment by charging more for the hardware. So they chose to try and maximise handset profit. In asking around £200 (the same as the cheapest cellphone) predictably there were few takers - price falls followed but too late - what consumer interest there had been had died. This is one area that Hutchison would have to address in order to be successful:

> " Hutchison will probably have to give handsets away, if the market for Telepoint with its history of problems, is to take off in the current climate".[37] Ian Reece, Telecom analyst BIS.

CURRENT SITUATION

BYPS was bought out by Hutchison Telecomms (UK) in February 1991. They sat back and watched the other operators rush to market - Neill Macklin, Hutchison's Marketing Director stated;- "The lessons have been learnt" [33]. Rabbit (cockney slang for chatting) was launched in Manchester in March 1992, the Granada TV region in July 1992 and hoped to be national by the end of 1993.

The company adopted very different strategies from its failed competitors:-

a) They planned to go back to a system based on PA Technology's original concept of marketing it as an alternative to fixed office and home phones, with the advantage that it could

also be used in the street. Hutchison saw this as the biggest missed opportunity, other operators concentrated on street communication when there were already two strong markets for improved mobile communications - home and office. The ability to use a home or office phone in the street became a bonus, not the main selling point.

b) They intended to delay national launch until the service could be used in almost any town or city in the UK. This would require at least 12000 base stations. In the regions where it was piloted there was extensive press and TV advertising, home calls and street trials. They continued to use high profile marketing.

c) Hutchison also hold a licence for PCN (via Microtel) and own a national paging operation. In a shrewd move, they see "Rabbit" as a pathfinder for PCN and by building (hopefully) a large subscriber list for their Telepoint network, they will encourage these customers to upgrade to PCN when it does arrive - giving them a head start in the PCN market.

Six weeks after the Manchester launch, Rabbit had over 1000 subscribers and latest published figures (May 1993) showed that they had approx 10000 customers (Ref Hutchison PR Agency 1/6/93) compared with predictions of 50000 [38]. Instead of targetting the business market, Rabbit aimed at lower socio-economic groups who they hoped were still eager for mobile communication. They had what they believed to be an improved product offering, the handset and base station was to retail at between £199 and £240 and could be linked to a pager (optional) for use in the home, office or street. The overall cost of a Rabbit system was between a half and a third that of cellular, however, some sceptics believed it to be "doomed from the outset to suffer the commercial equivalent of terminal myxomatosis" but Peter Wright MD remained convinced there was a niche in the market:

> "Thanks to some good judgement and a little luck we can now succeed where all three of our Telepoint competitors failed miserably". [39]

He hoped that by being patient, Rabbit would reap the rewards of being the only player left in a potential mass market for basic mobile telephony.

However, Hutchison Telecomm's Rabbit service ceased at midnight on December 31st 1993. Carrying losses reported to be £122 million, they closed with 9000 customers and 1200 base stations.

LESSONS LEARNT

It is important to assess the failure of Telepoint in terms of lessons learnt, regarding the introduction of new products in nascent and growing sectors. With hindsight, it is possible to look at the issue from three perspectives, leadership and followership; market and technological uncertainty and risk evaluation and see how it fits into theoretical frameworks already established in each area.

LEADERSHIP AND FOLLOWERSHIP

The advantages of being technological leaders are to set standards for the industry; use the opportunity to exploit a new niche with initially few competitors; move from technology leadership to market leadership and ultimately make money. But with leadership comes many problems, high cost; high risk; instability; the need for management commitment; it is research intensive; with high resource use; technology push without market pull.

> "Although pioneers take the greatest risks and are shaken out in the greatest numbers - those that survive can be well rewarded, early entrants must bear the costs but they have the opportunity to define the rules of competition to their advantage."[40]

As far back as 1967, Ansoff and Stewart [41] identified the perils of leadership as "risking large investments of time and money in technical and market development without any immediate return. The company must be able to absorb mistakes, withdrawal and recuperation without losing its position in other product lines". The three Telepoint leaders who rushed to market faced these perils and ultimately had to deal with large losses. Ferranti especially has felt the full effects of withdrawal from a market in which it had a large stake in the original technological innovation and Mercury may face increased competition for its second place in the market behind BT.

> " Technology leaders tend to become technology losers".[42]

Rothwell has found [26] that early participants in the development of high technology sectors often provide opportunities for later entrants to learn from the experience of the pioneers and become more successful. Followers can therefore, enter a market quickly either with a very similar product or with new or improved technology and vie for the leadership position, like Mercury, or they could be content to be second but better with the emphasis on development rather than research. Late followers are not really innovators but learn from the pioneers and try to improve the product offering, like Hutchison, they have to decide whether to out-imitate the pioneer or try to leapfrog by launching a new version.

> " Follow the leader strategies try to learn from the innovators' mistakes, so as to develop an improved, more reliable product that may well include "advanced features" whilst avoiding entirely those product attributes which proved to be market failures".[43]

After the withdrawal of all three operators in 1991, the market was left open and being the only licensee left in the running, Hutchison were under no competitive pressure to rush to market and were said to be "testing the system to destruction". Marketing Director Neill Macklin believed that by biding its time Rabbit would launch with the right product (with the potential for worldwide compatibility) with a solid infrastructure and at the right price.

MARKET AND TECHNOLOGICAL UNCERTAINTY

As previously stated in the introduction to this paper, defining high technology products and industries presents its own problems. In most modern industries, technology embodies product technology (embedded in the product itself), process technology (part of the production/delivery system) and management technology (knowledge of how to market the product and run the business) [44]. Shanklin and Ryans [34] definition of a high technology company is based on three criteria:- the business requires a strong scientific technical base; new technologies can quickly make existing technologies obsolete; and as new technologies come on stream, their application can create or revolutionise markets and demand. Whilst Moriarty and Kosnik [1] define high technology marketing as marketing situations in which both the market and technology uncertainties are high.

Market uncertainty is when the market is ambiguous about the kinds and extent of the needs to be satisfied - it is impossible to know what the market wants if the technology is not in place. In very new (nascent) markets, customers themselves are unsure about the potential uses and benefits of a developing technology - eg many early adopters were unsure what they would use their first home computer for - a basic lack of understanding of the technology is not always the customer's fault. Without a track record for the product, there can be no certain knowledge of its potential uses or market, therefore it is very difficult to predict future sales or forecast market size. Thus, uncertainties in these sectors take many forms, but particularly surround the product specification's acceptability to customers; the intensity and amount of competition; pricing and positioning and defining a market segment.

Technological uncertainty, on the other hand is not knowing if a technology can meet a set of needs in a better way than an alternative, ie what benefit did Telepoint offer over and above its main competitors. This type of uncertainty is often based around a lack of information,

- about the reliability of the technology
- about the product's functional performance
- over delivery patterns
- technical obsolescence - whether and when a newer technology will come onto the market
- difficulties in forecasting market response
- unproved ability to make sales
- uncertain return on large investment
- doubts over realising the technology's potential.

It would seem proven therefore that high technology products and suppliers are by definition dealing with uncertainty and as a consequence involve to a greater or lesser degree, an element of risk. Many companies would acknowledge that risk exists yet do not account for it in their strategic planning or in the marketing process.

RISK EVALUATION

It should be a crucial task of such companies to define these risks and look for ways in which the customers perception of risk could be reduced or to effect Shankleman's "worry minimisation"[45]. Research undertaken by Millman and Meldrum [46] has identified 10 areas of risk which "can substantially impact upon the potential success of high technology ventures". These have been looked at in the context of the Telepoint failure.

INADEQUATE TECHNOLOGY - will it work, will it deliver what is required, has it been launched before all the problems (technical hitches) are ironed out. With Telepoint this proved to be the case in that calls were one-way only, there were problems over the short range use to base stations and the technology was not truly mobile. It was not sufficient to sell this product on the success of cellular technology alone.

NOT AN ACCEPTABLE SUBSTITUTE - is the product an acceptable substitute to existing products that fulfil the same function - in this case cellular and payphones. What are the additional benefits above the existing offerings? If the answer is very little then this means that initial market penetration is likely to be slow and great investment may be required to convert technological success into commercial success.
"The fundamental question to be asked of any new technology is, what does this offer over and above other inventions that are already on the market - in the case of Telepoint the answer is nothing, it falls spectacularly between two stools." [47]

SPECIFICATION DRIFT - this occurs when customer or Government specifications change during the development cycle. This makes the forecasting of costs and deadlines very difficult. With Telepoint, problems over handset weights, paging attachments, standards for roaming requirements and design modifications pushed costs up and deadlines were passed, ie BT relaunch.

TECHNICAL LEAPFROGGING - this is when an existing technology is overtaken or leapfrogged by a substitute or new generation of the same technology. This occurred with the promise of CT2+, CT3 and PCN, leaving a very small window of opportunity in which to exploit Telepoint, making customers unwilling to buy with a new, better version around the corner.

CREDIBILITY - Millman and Meldrum cite this in two ways, the credibility of the technology itself and the credibility of the organisations offering it. With Telepoint the lack of credibility was down to a very poor image from its beginning (see page 10) mainly due to the absence of or inconsistencies in marketing. Companies with a credible reputation tend to be favoured by purchasers facing high risk decisions and BT especially, pushed their leadership in the fixed phone market as being an important consideration

in the consumer's decision of which CT2 system to buy - although in Phonepoint's case this seems to have made little difference as they closed with less than 1000 subscribers!

TIME SCALE FOR PROJECTED SALES - with market uncertainty all forecasts made have to be taken with a degree of optimism. Telepoint was originally forecast to have 3.6 million subscribers, BYPS to launch by 1992 and PCN's to be introduced by 1993! Deadlines were put further and further back. Very often selling takes much longer than projected and Telepoint seems to have had distribution channel problems as many people had problems in tracking down where to go to purchase.

STANDARDS - these could be informal, non-existent or incompatible. In this case, problems over CAI led to a rush to market without waiting for the standard, resulting in incompatibility between systems and the inability to roam.

CUSTOMER MISMANAGEMENT OF TECHNOLOGY OR CONFUSION - Problems over the standards issue, a lack of marketing and technical information and promises of even newer technologies, led to total confusion in customer's minds over what was on offer, with very low awareness about both the technology (CT2) and the product (Telepoint).

COST/TIME OVERRUNS - Sometimes original specifications cannot be met without running into cost or time overruns. This can be due to many factors including, production problems, distribution channels, the technology itself and HR problems. It usually occurs in the early stages of development. Telepoint tried to overcome these by rushing out an incompatible product to capture market share, only to have to deal later with problems of adapting both the product and the infrastructure once the CAI standard became mandatory in 1991.

LACK OF INFRASTRUCTURE - the supporting technology must be adequate if the proposed product is to be a worthwhile purchase. It is not viable if the industry has to wait for enabling technologies or if the concepts are promised ahead of reality (as with PCN). With Telepoint the infrastructure was one of the main problems. It had to be built from scratch, operators underestimated the costs and time involved and it proved to be pointless launching without full national coverage.

CONCLUSION

It is easy to see the implications of all these risks with the benefit of hindsight but this does not get away from the necessity of incorporating risk management strategies into any project involving new product development and launch. I would argue that with Telepoint some of these risks (infrastructure, standards, marketing) presented such obvious stumbling blocks that ignoring them was blatantly courting failure. Only when the full range of **potential** threats are

successfully identified and plans made to deal with such contingencies, can companies involved in technology based industries develop strategies to successfully bring their products to market.

With the withdrawal of the last operator in the market (December 1993) the Telepoint concept is now dead. This failure highlights how the emphasis on a technological development which was at best interim, allowed the companies involved to make the classic error of believing that a clever technology would sell itself and thus require little attention to customer needs and values - new providers will ignore marketing at their peril and must build in risk evaluation if newer technologies are not to suffer the same fate as CT2.

"All this was a lesson in how to bungle a brilliant opportunity"[48].

Optimism has been a feature of the telecommunications market since the success of cellular phones but with the drawbacks of the product itself, its short life cycle and very little market research or support, the only surprising thing is that Telepoint made it to the marketplace at all!

APPENDIX 1

DEFINITIONS

CT1
These were the first domestic cordless telephones which allowed the user to be up to 300 meters (indoors or outdoors) from the transmittor/reception point.

CT2
"Portable phone box" second generation cordless telephony, enabled outgoing calls to be made within range of low powered antennae, located at base stations in public areas - UK Telepoint service.

CT2 plus
An enhanced version of CT2, allowing users to make and receive calls - under trial in Canada by Ericsson.

CT3
Developed by Ericsson of Sweden, similar to CT2 plus but with more features and at a higher cost.

Pager
Pagers receive radio signals generated by public or private telephone services then emit a signal indicating a call or display an alpha/numeric message.

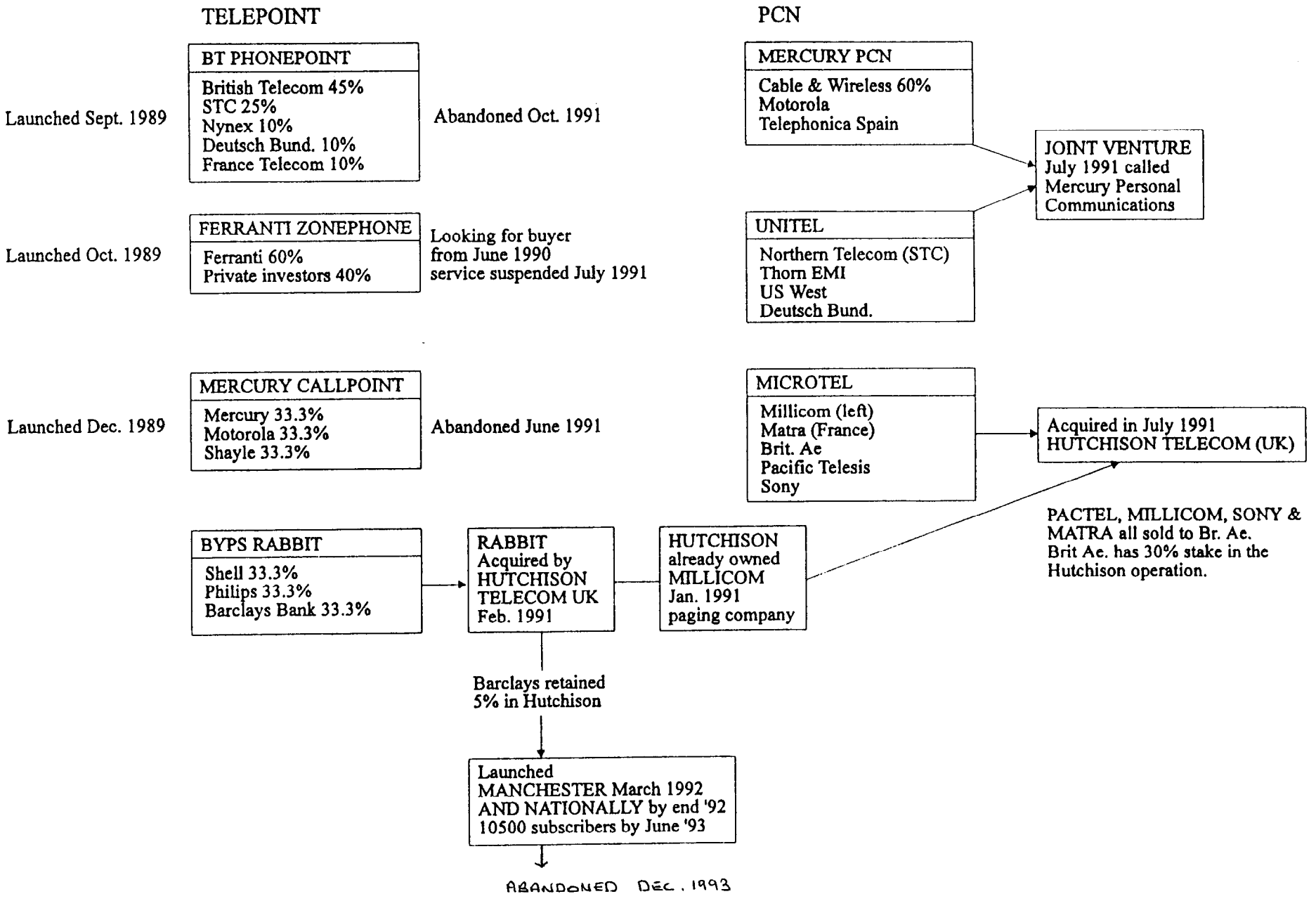
GSM
Groupe Speciale Mobile, the name to describe the latest cellular radio service. It uses digital transmission and as the same frequencies have been allocated across Europe, eventually this will enable calls to be made from one handset to anywhere in Europe.

Common Air Interface (CAI)
CAI is the Government standard regulating the way signals pass between handsets and base stations. It was made clear at the outset that all operators would have to conform to this standard after 1991. This was to ensure that users of one network would be able to gain access to other networks, eg a Callpoint handset could make calls from a Phonepoint base station (known as Inter-System Roaming) without any restrictive agreements. Although making life more convenient for Telepoint users, the move to CAI added to the complexity of the infrastructure, as systems had to be put into place (both in the hardware and the software) to ensure compatibility and to calculate who to bill for which calls. However, three operators (Mercury, BT and Ferranti) launched their services without waiting for CAI equipment to become available, thus the networks were incompatible. The CAI standard has been defined so a single handset should be able to access public and private Telepoint base stations, PCN's and GSM's. The ultimate intention was for Telepoint and GSM to converge in a third generation service (CT3) to be introduced by the year 2000.

Cellular
Cellular phones use radio signals to transfer calls to any fixed or mobile phone in the area served by either of the two UK cellular operators, Cellnet and Vodafone. Each network divides the country into cells - areas as small as one kilometre in radius, that are each equipped with a base station, controlling a low powered radio transmitter and receiver. Calls are received at these base stations and passed to regional exchanges, which either connect them to the fixed line network or to another base station if the call is to another cellular phone. This is true mobile technology as it allows calls to continue as callers travel between cells.

PCN - Personal Communications Networks
PCN's are a development of cellular radio technology. Both operate on the basis of a national network of base stations contained within cells. Calls received at base stations are passed onto regional exchanges then connected to fixed line networks or another cell. PCN transmitters will operate at higher frequency ranges than cellular (between 1.8 and 1.9 gigahertz) enabling them to carry more data in smaller cells. Future European services are being developed at around 2 gigahertz (again higher than cellular) which allows for smaller, cheaper handsets, using less battery power than cellular radio. This technology is still in the product development stage. It will be mobile and have two-way calling ability.

OVERVIEW OF THE TELEPOINT AND PCN MARKET



APPENDIX 2

MERCURY CALLPOINT

Mercury's minimum charge is one minute and calls are charged in 30 sec increments thereafter.
There are 3 time periods:-
ECONOMY- Mon-Fri 6pm to 7.30am, all day Sat and Sun
STANDARD- Mon-Fri 1pm to 6pm
PEAK- Mon-Fri 7.30am to 1pm

CALL TYPE	ECONOMY	STANDARD	PEAK
Calls within UK	10p	16p	20p
Other calls	50p	80p	80p
Europe	1.00		
Outside Europe	1.60		
Joining fee	20.00		
Monthly service charge	8.00		
Itemised billing	1.50		

FERRANTI ZONEPHONE

Unlike the other operators, which charge a different amount per minute of call depending on the time of day and where you are, Ferranti charges for calls in the same way that BT does. A unit is a set price, which varies whether your calls originate from within the M25 (12.5p per unit) or not (10p per unit). Time allowed in secs for each dialled call unit is:-

CALL TYPE	CHEAP	STANDARD	PEAK
Local	330	85	60
National (a)	96	34.3	25.7
National (b1)	60	30	22.5
National (b)	45	24	18
Mobile (m)	12	8	8
Irish Rep	12	8	8

Joining Fee	25.00 Direct debit
	30.00 other forms of payment
Monthly Service Charge	8.33 (DD), 10.00 (ofp)
Itemised billing	1.66

CHEAP - Mon-Fri 6pm-8pm, all day Sat and Sun
STANDARD -Mon-Fri 8am-9am, and 1pm-6pm
PEAK- Mon- Fri 9am-1pm

BT PHONEPOINT

BT calls are charged in 2 time periods, Off peak and Standard, as well as local and national tariffs.
All calls are charges in units of one minute.

CALL TYPE	OFF-PEAK	STANDARD
Local	10p	13p
National	25p	30p
Other calls	55p	85p
Europe	1.00	1.00
Outside Europe	1.60	1.60
Joining fee	20.00	
Monthly service charge	8.00	
Monthly itemised billing	1.00	

PAYPHONES

Standard rate of 10p per unit, depending on place and time.

CHEAP RATE- Mon-Fri 6pm-8am and all weekend
STANDARD- Mon-Fri 8am-9am and 1pm-6pm
PEAK- Mon- Fri 9am to 1pm

CALL TYPE	CHEAP	STANDARD	PEAK	(in seconds)
Local	120	85	60	
National a (up to 35 mls)	81.8	35.1	26.2	
National b1 (over 35mls)	51.5	31	23.2	
National b	38.8	24.8	18.6	

CELLULAR PHONES

	CELLNET	VODAFONE
Car phones		75.00
Hand portables	399-600	199.00
Connection	65.00	50.00
Monthly charge	25.00	25.00
Calls		
inside M25 (peak)	35p	33p (1 min), 16.5 every 30 secs
outside M25 (peak)	25p	25p (1 min),12.5 every 30 secs
any other time	12p	10p (1 min), 5p every 30 secs
Itemised billing	2.50 every month	Free of charge DD
	10.00 one off	2.50 ofp

CELLNET
PEAK - Mon-Sat 8am-10pm
any other time - Off peak

VODAFONE
PEAK- 7.30am-9.30pm Mon- Sat
any other time - Off peak

OPERATORS PACKAGE AND HARDWARE COSTS AS AT JANUARY 1991

	MERCURY	BT	ZONEPHONE	BYPS
Handset Price	99.95	170.00	200.00	199.95
Base unit	129.95	170.00	235.00	218.50
Package Price	25.00 pm	245.00	210.00	None
Itemised Billing	1.50 pm	1.00 pm	5.00 qr	N/K
Handset Weight	130g	130g	270g	230g

MERCURY:- The package is for monthly rental incorporating a numeric pager, so that user knows to call out. (Cost is less than for pager alone).

BT PHONEPOINT:- This includes the handset, joining fee and 3 months subscription.

ZONEPHONE:- The purchase package includes handset, charger, enrolement and the first years subscription.
Rental packages were only available from Zonephone direct, purchase via dealers.

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