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JU844
Secretary of State for Trade and Industry

25 July 1985

Andrew Turnbull Esq
Private Secretary to the
Prime Minister
10 Downing Street
London SW1

Dear Andrew,

"SYSTEM Y": DG/OFTEL'S REPORT

British Telecoms' decision to purchase Swedish-designed digital telephone exchanges from Thorn-Ericsson, to supplement (and arguably supplant) its purchases of System X, provoked considerable criticism, reflected in Lord Weinstock's correspondence with the Prime Minister. Following representations from industry interests and from some MPs, Professor Carsberg - the Director General of Telecommunications - undertook to investigate the issue and to give his opinion. His report was published on Tuesday, 23 July; a copy is attached.

NO GR - GKC

2 Professor Carsberg's report reviews the background of BT's involvement with System X and its decision to seek a second source of digital exchanges (System Y), concluding that BT's decision is commercially justified and need not harm the prospects for System X. However, he notes that any significant increase in the proportion of BT's future ordering going to System Y might well damage the viability of the System X suppliers and recommends that BT restrains its orders of System Y for 3 years to the levels currently envisaged (between 300,000 - 500,000 lines a year, or not more than 20% of BT's total programme). Thereafter, System X should be able to compete with System Y for all BT tenders beyond the 20% level; and efforts should be made to enhance the UK content (including system development) of System Y.

3 The report considers at some length the longer term outlook for UK capabilities in digital telecoms switching, stressing the importance of high volumes of production, export orders, and a continuing domestic R&D capability. Carsberg notes that opinions remain divided on whether the UK market alone (between 2m - 3m lines a year) can support a viable industry, but emphasises that success in overseas markets is essential if System X is to gain the volume economies necessary to stay competitive with systems

from much larger supplies (for example, Ericsson are selling over 5m lines a year of their AXE exchanges, supplied as System Y). He recommends that Government give assistance to help the export of System X, echoing the industry's criticisms of the Government for opening access to the UK market without securing reciprocal access to protected telecoms markets overseas.

4 The strategic importance of retaining an indigenous capability in advanced telecoms technology is stressed, and set against the fear that unrestricted competition might damage that capability in the UK. As well as arguing for the maximum technology transfer as part of the System Y arrangement, the report suggests that other ways of maintaining UK expertise in this area, for example a national R&D centre, should be explored.

5 DTI Ministers will be discussing the report with Professor Carsberg and with the companies (including BT). While they remain far from happy with BT's decision and with Carsberg's guarded vindication of it, GEC and Plessey are likely to welcome the report as confirming their case that the UK industry faces real problems and for raising the issues for further debate. BT for their part are likely to resent the implied intrusion into their commercial discretion over procurement policies. The crucial issues for all the (domestic) parties, however, is the future size and structure of the telecoms industry, and this will doubtless be the subject of continuing discussions over coming months.

6 The report was not requested by the Department and there is formally no call for a public response. It is quite likely, however, that there will be Parliamentary pressure for some response. We would not wish to respond publicly in any substance before the discussions with the companies, and we will use the recess for that.

Yours Sincerely

Andrew Lansley

ANDREW LANSLEY
Private Secretary

BRITISH TELECOM'S PROCUREMENT OF DIGITAL EXCHANGES

A Report by the

Director General of Telecommunications

Introduction

1 At the end of last year,British Telecommunications plc (BT) invited tenders for a second range of digital telephone exchanges, to be known as "System Y". Until then all BT's plans for the modernisation of its inland network had centred on the "System X" exchanges - which the company had itself taken the lead in developing. The decision to purchase System Y from Thorn Ericsson Telecommunications Limited - a joint Swedish/UK firm, using Swedish technology but 51 per cent UK owned - was announced at the end of March 1985. I received a number of representations about BT's decision, including an approach from an all-party delegation of MPs. These representations were overwhelmingly opposed to BT's approach. The complainants expressed the fear that BT was exercising its unique buying power against the public interest. They suggested that UK firms had been unfairly excluded from the tender, and that the decision to go for a second range of exchanges would reduce the market for System X, while harming its export prospects.

2 My duties under the Telecommunications Act 1984 (the Act) are such that I must consider any matter which relates to telecommunication services provided, or telecommunication apparatus supplied, in the UK and which is the subject of

representations made to me. Given the widespread concern, I concluded that I should investigate this matter in detail.

3 I started my investigation by visiting the companies producing System X (General Electric Company plc (GEC) and Plessey Telecommunications and Office Systems Limited) and the System Y company (Thorn Ericsson). I was provided with useful memoranda and background information by all these companies. I was also given a full briefing by BT. Representations were received from the British Telecommunications Unions Committee and the Electrical Electronic Telecommunication and Plumbing Union among others. Later in my investigation I decided that I would have to take some view about strategic factors affecting the likely future development of the UK industry. To help with this, I asked for, and received, advice from one firm of consultants and I held informal discussions with another.

Background

4 Throughout the world, telecommunications networks are undergoing rapid modernisation. A wholly new, digital, technology is being introduced. This technology will increase the number of services offered on the telephone, and at the same time will improve reliability and overall performance: calls will be clearer, breakdowns fewer, and costs will be lower. At the centre of this technology are the new local, trunk, and international exchanges or "switches" which combine computer control and digital operation. Inevitably a complex period of development is needed to produce a fully working system. Plans

must take account of the need to link into existing, pre-digital, technology until such time as complete replacement is possible. Further, the speed of investment is constrained by financial and economic factors. Therefore, much as consumers might like to obtain the benefits of the new system immediately, it will inevitably take some time to be introduced.

5 Each major nation has tended to find its own individual approach, generally led by the public telephone company. The result is that, despite high costs of development, many different large digital switching systems are available in the world today(one estimate gives the number as about twenty). System X is the single UK player in this increasingly competitive game. It has many advanced features and progress with implementation in the UK has been ahead of that in most other countries.

6 The genesis of System X lay in a joint Post Office (ie BT)/Industry Study Group which started work in 1969 (henceforth the current designation - BT - will be used). The original System X agreements were signed in 1977, establishing a consortium in which BT, GEC, Plessey, and Standard Telephone and Cables plc (STC) were four equal partners sharing the development work, although BT was primarily responsible for funding and for specifying the system performance requirements. The product was exhibited in Geneva in 1979 and the Baynard House trunk exchange was handed over in July 1980. In the early 1980s a reorganisation was agreed, whereby BT still defines the requirements and provides substantial development funding, at

least during the transitional stages; in October 1982, a new specification was agreed with BT (Systems Enhancement Programme 1) and Plessey was appointed the prime development contractor and GEC the major sub-contractor; STC withdrew from the programme.

7 The objective behind the System X programme has been to develop a family of exchanges with the capability of evolving to meet a variety of potential needs and advances in technology. The facility which makes this possible is the modular design of both the hardware and the software. This allows the building blocks to be configured in various ways to meet varying circumstances. Thus individual parts of the system can rapidly be amended to take advantage of new developments. At the present moment System X exchanges are in operation both for trunk and local exchanges - the first normal production trunk exchange was opened in January 1984 (at Coventry), and the first large local exchange in September 1984 (in St Vincent), and the first similar exchange for BT in May 1985 (at Baynard House in the City of London). A contract for a second System Enhancement Programme was placed in early 1985. Nineteen System X exchanges are now in service and a rapid increase in the number of completed installations is expected over the next year; plans are for installations in service to increase to 300 by March 1986.

8 Plessey now have factories capable of producing System X in the Liverpool area and in Northern Ireland while GEC have factories at Coventry and Kirkaldy in Scotland. Current employment in the design, manufacture and marketing of public

switching systems, including old as well as new technology, is about 14,000 - but without substantial further growth of orders, employment will inevitably fall. BT is planning for an increase in orders from Plessey and GEC above the 1984-5 level of 900 thousand lines: the current level of orders is 2 million lines, and BT states that its aim is to purchase 2 to 3 million digital lines (ie System X and System Y) a year for the rest of the decade. It has ordered 100,000 lines from Thorn Ericsson for delivery in 1986-7 and a minimum of 300,000, which may be increased to 500,000, for the following year. The System X manufacturers have told me that they planned their capacity on forecast orders from BT of 3 million lines per year which will clearly not now be achieved. Plessey and GEC have made substantial investments in design and manufacture technology and have available to them some of the most modern facilities in the world. They could easily meet BT's total requirement for digital switching. They need a high volume of orders to recoup their costs, including the future costs of keeping the system abreast of the latest technology.

Preview

9 I want to begin my analysis of the issues by identifying what I see as the central dilemma of this case. On the one hand, my duties under the Act place heavy emphasis on the promotion of competition and the interests of consumers. BT has wanted to have a second switch to put the manufacturers of System X under some competitive pressure and also to reduce supply uncertainties;

and it has seen this as in the interests of consumers in that the competitive pressures will facilitate cost-effective modernisation of the network. If I were to resist the decision I should be going against the primary rationale of the regulatory regime in telecommunications. On the other hand, GEC and Plessey have had to adapt to a large shift in their environment. The purpose of introducing competition is to strengthen them - not to damage them; and too rapid a shift towards System Y may give them too little time to adapt and hence damage them rather than strengthen them. Furthermore, exporting is important to the success of System X but its manufacturers face an assymetry in international trade; while UK markets are open to suppliers from overseas, the attempts of British companies to export are impeded by de facto exclusion of competition from some countries and the need to compete in others with companies from countries whose governments give direct assistance to exports. These are the key issues that must be taken into account in my investigation and they - together with related issues - will be discussed in detail below.

10 In the next part of the report (paragraphs 11 to 23), I consider the justifiability of BT's decision independently of wider strategic issues relating to the future development of the UK telecommunications industry and the effects on international trade. Those wider issues are considered in paragraphs 25 to 39.

BT's case

11 BT has both publicly, and in discussions with me, affirmed its commitment to System X - a system on which it has itself spent at least £350m in development expenditures (a sum which would be considerably greater in current prices). It expects that System X will remain the major type of digital exchange in the UK network. But it believed, when it placed the order for System Y, that past experience with System X indicated doubt about the timing of completion of elements of the programme. BT states that it is anxious to proceed with the modernisation of its network as rapidly as it can. The process of liberalisation means that it is now under actual and potential competitive pressure in some of its markets from the new national telecommunications operator, Mercury Communications Limited. Mercury will from its start be using the latest technology in its switched network, and so should be able to offer its customers a uniformly better performance than that available on the older parts of BT's network. Hence BT's need to meet this challenge as rapidly as possible.

12 BT gives two main reasons for wanting a second switch. In the first place it needs to know that should particular suppliers run into difficulties it will be able to obtain sufficient new equipment to carry through its network modernisation programme on a realistic timescale. In other words it needs security of delivery. At the same time, BT makes little secret of the fact that given its primary commitment to System X, it has the need to

ensure that the companies involved feel under a sufficient commercial pressure to maintain their performance - they have to be made aware that failure to deliver on time and at a competitive price will lead to some reduction in orders. In this respect it seems to me that BT is acting with normal commercial prudence: no firm wants to exclude itself from some flexibility of choice in its supply channels, particularly during the development phase of a key product. Further, BT is acting in no way differently from several other major PTTs, and it was actively considering the possibility of another source for public switching equipment well before privatisation. The new competitive environment does, of course, alter the pressures on BT management. The result has been that the company has placed several other important contracts overseas as well as System Y. I am currently also concerned with one of these in particular - the decision to buy from AT & T/Phillips the equipment for the Derived Services Network (to be used for the Link Line service giving customers cheap, or even free, telephone calls to firms).

Some objections to BT's course of action

13 It is easy to see BT's objectives. Nevertheless doubts remain about the course which it has chosen. The development of System X is at a pivotal point. After years of research and development work and the redevelopment of their factories, the companies are now poised for mass production. The restructuring which was started in 1982 is now fully in place. Naturally the companies want to be able to achieve the largest possible levels of output. The figures which I have seen suggest that there are

significant economies of scale so that with a loss of 250,000 lines to bring output down to 1 million lines, each company might experience an increase in average cost of production per line of about 10% - this might represent the position if BT ordered the maximum of 500,000 lines of System Y in 1987-8; if BT went further so that the loss were 500,000 lines to each System X company, the increase in cost per line could be 20% or more, depending on the level of orders remaining with System X (i.e. on where total orders fall in the range 2 to 3 million). Or, to put the point another way, the incremental cost per line over 1 million is only a little over half the average cost per line for the first one million. The diversion of some orders to Thorn Ericsson will, therefore, tend somewhat to worsen the position of Plessey and GEC, as regards average cost.

14 The decision has, of course, increased the competitive pressures on Plessey and GEC. Some have argued that the existing structure for the production of System X already provided for sufficient competition, since both Plessey and GEC compete in the manufacture of exchanges; but the development of the system has not been subject to competition, and development is a key point; and although existing arrangements for development may be changed after 1986, the commonality of development up to then limits the extent of competitition between GEC and Plessey. Some have also argued that the mere process of competitive tendering would have placed sufficient pressure on the System X suppliers, and that BT did not need to go so far as to commit itself to the purchase of a second system. Clearly this argument has some merit, but I am

inclined to accept BT's point of view that competition cannot be made credible in the absence of a decision actually to place some orders elsewhere.

15 A widespread complaint has been that BT was wrong not to allow GEC and Plessey to tender for the System Y contract, so that they could have bid a price based on marginal costs if they wished. BT's answer to this complaint is straightforward: the company had decided that it needed another source of supply, and so it did not want to give the order to a System X company. Moreover, BT is already well aware of Plessey's and GEC's capabilities and prices, and knows how readily either company could achieve a rapid increase in production. My own view is that BT's decision was commercially reasonable, and that it would not have achieved its objectives without actually obtaining supplies from another source.

16 People have argued that "fair competitition" or "real competition" cannot exist in the circumstances of manufacturing of telecommunications in the UK - and hence that any attempt to promote it is necessarily futile. That argument has much merit if competitition is seen as effective only in a market that involves many buyers and many sellers, operating without barriers. BT is a very large company - dominant on the buying side. If it buys only from the single supplier who offers the best deal, it will force other potential suppliers out of the market and reduce the competition to its own probable disadvantage. It can sustain competition only by managing it to some

21 A key argument of the complainants about the BT decision is that it should be opposed on the ground that UK employment will suffer. In considering this argument, I will first set aside the important issue of maintaining a development capability in the UK; I deal with this separately in paragraphs 35 to 39. The BT decision will inevitably mean that employment in Plessey and GEC factories will ultimately be lower than would otherwise be the case, but the agreement that BT has with Thorn Ericsson ensures that there will be a rapid build-up in employment in the UK for the production of System Y exchanges based in Thorn Ericsson's Scunthorpe factory. Figures I have seen suggest that a rapid increase will take place in the UK content of these exchanges to about 70 per cent of manufacturing cost over the next two years; and that this, combined with a continued build-up in the number of programmers employed at the Ericsson software development company in Brighton, means that over 500 new jobs could be created in the UK in the next two years, with the prospect of a further 500 if Thorn Ericsson's output is increased to 500,000 lines a year. A similar increase in System X output might well have increased UK employment by more than this but the difference appears not to be very large. Thorn Ericsson have provided me with information about their intentions not only for employment at their Scunthorpe factory but also for acquiring components from UK suppliers. Their plans support the estimate of build-up in UK content, given above. However the reassurance provided by this information will be increased if it can be shown to be borne out by actual working experience and I hope that Thorn Ericsson will feel able to publish information about their progress in increasing UK content at regular intervals in the future.

22 The balance of employment gains and losses is, of course, of great concern to the localities affected. However, my duties under the Telecommunications Act 1984 mean that I must primarily be concerned with the health of the UK telecommunications industry as a whole in the interests of consumers. I could not suggest that particular policies should be followed solely for reasons of the employment generated if other effects for the telecommunications industry or for users were deleterious. In any case, I do not feel that total employment in the UK as a whole will be very much affected whichever path is chosen. The manufacture of large exchanges will become increasingly automated using skills that are mainly different from, and more easily assimilated than, those needed for the production of electro-mechanical equipment. The greatest employment of highly skilled manpower is likely to be at the development stage, particularly in software.

23 The one remaining issue to be considered in this part of the report is a key issue: people have argued that a need exists to recognise the difficulties faced by GEC and Plessey in the transition from a situation in which they had a special relationship with BT to one in which the relationship is more at arms length. The object of introducing competition is to strengthen the old-established suppliers; a transition that is too rapid may have the effect of damaging them and impairing their ability to compete. Time is needed to allow the manufacturers to complete the redevelopment of their productive process. This raises the question of how rapid is too rapid. BT

states that the transitional period has already started to run in that the System X suppliers have known for at least two years of its wish to introduce another source of supply. However, I am not convinced that a sufficient time has yet been allowed. BT has placed an initial order for System Y which is just sufficient at its lower level of 300,000 in year two (or perhaps a little higher than just sufficient) to allow Thorn Ericsson to operate a factory on a reasonable scale; that seems to be a justifiable beginning. Furthermore, no guarantees can be given that a particular level will be held absolutely because that would remove the element of incentive in the competition. However, I do believe that any further shifts of orders away from System X and to System Y should be limited to nominal amounts for a period of about three years so that the System X manufacturers have a further opportunity to adapt to the new situation, subject to an exception if System X manufacturers fail to meet reasonable cost and delivery requirements in the meantime. The loss of a maximum of 20% of annual orders for lines to System Y makes the job of System X manufacturers harder but neither has argued to me that this job has become impossible; however, the loss of a further 20% (say) in the very near future would be much harder to bear. This kind of transitional arrangement should not last indefinitely. After three years from the placing of the initial System Y order, a further element of competition might be appropriate, subject to what I say below about technology transfer.

24 Having dealt with a number of the major points made against the BT decision, I now turn to what I see as the two main issues of contention which still remain to be considered. These are as follows:-

(i) What should the future "rules of the competitive game" be between the System X suppliers and Thorn Ericsson?

(ii) How can the future health of the UK telecommunications switching industry best be secured?

Rules of the Game

25 We are now in a period of transition - the production of System X is becoming firmly established, while that of System Y is just being set up. I have accepted the rationale behind BT's desire to have access to competitive systems; and I have also stated my view that the orders for System Y need to be limited during the transitional period. However, if any future shifts in the proportions of orders for System X and System Y are made, BT must accept the responsibility of ensuring that it is scrupulously fair to all the parties. I suggest that if BT alters the proportions of its orders, it should seek tenders from both the System X and the System Y suppliers for the additional lines. The presence of System Y in the market would have met BT's real needs for security and for competition outlined above, whereas commitment to future tenders on this basis would give the System X suppliers assurance that their capabilities were consistently

being taken into account, and that they were not being unfairly shouldered aside by System Y orders. I suggest that BT declare its intention to adopt this procedure.

26 For competition to be effective, future tenders which are open to both Systems will have to be conducted on an equitable basis and all parties must be assured that the standards by which they are being judged are fair. BT must make clear the criteria by which it is evaluating tenders. Where flexibility is allowed in the interpretation of standard requirements this should be explicit. Further, all the manufacturers should be satisfied that the performance of their exchanges is being demonstrated in broadly similar operating environments. System X has had to be installed in some of the most difficult network operating situations in the world. The producers would rightly feel aggrieved if System Y was used only in less demanding environments. Moreover, BT itself will presumably wish to ensure that the two systems are broadly interchangeable, otherwise it will have failed to impose the necessary competitive spur.

Industrial Policy Considerations

27 An important element in the success of System X is its ability to gain export sales. Widespread agreement exists in the industry that the large fixed costs of operation, including notably research and development expenditures, have magnified the need for companies to have a large market over which to spread those costs. Two main scenarios have been suggested to me.

First, that the industry will have to position itself, at some time in the foreseeable future, to start the development of the next generation of switching equipment, which may be centred on the need to deal with broadband and high rate digital switching. This will be an extremely expensive process - people have spoken of costs of up to £1 billion at current prices - and the cost could almost certainly not be covered by a single firm even operating with the whole of the UK market. In the context of that scenario, the introduction of System Y to the UK would not be critical in the sense that the whole of the UK market is anyway not big enough to support such development. The second scenario, and the one that seems of more immediate relevance, comes from the observation that the industry cannot, at present, identify a line of development that indicates the need for a system that is radically different from the present one. Development of the present system is likely to meet all foreseeable needs. That development will be very expensive but not so dramatically expensive as the development of a fundamentally different system. On this scenario, the UK market could provide a big enough base, though a bigger market would give greater strength, and the loss of up to 20% of the market to System Y is a significant handicap but is not fatal to the effort.

28 Both manufacturers of System X, with support from BT, have been making concerted efforts to sell the system abroad. They have been hindered partly by the illiberality of telecommunications markets, and partly by the fact that they have only

recently been able to demonstrate a fully developed system in operational conditions. Further they have met fierce competition from other producers. To this date no large export order has been obtained, though many are now being pursued and the excellent performance of the System X exchanges has been widely recognised internationally. I have been impressed by the plans the companies have for generating export orders now that they can point to fully functioning exchanges in the UK.

29 BT says that it has, in the past, made every effort to support the export drive. Clearly it is in BT's own interest to ensure that the system with which it is so closely associated should have a firm economic base. However, some people have suggested that the System Y order has now shaken the confidence of prospective buyers in the British product. They say that other PTTs will have noticed that BT is not willing to put all its eggs in the System X basket, although the argument could be turned on its head by the suggestion that BT's move has merely shown that System X is of equivalent quality to the best exchange available under competitive tender from the world as a whole. The long standing suspicions that the particular, and possibly idiosyncratic, standards which BT has imposed upon its suppliers have harmed exports are also relevant to this point - this suspicion was voiced about the earlier generation of TXE4 exchanges in particular.

30 I believe that System X could be a world beater. Ever since it was shown in Geneva in its pre-production state there has been general agreement that it is technically among the best systems available in the world. Delays have been experienced with the progress of development but its manufacturers are confident that these problems are now well behind them. Were world telecommunications markets wide open to competition, I feel that System X would stand an excellent chance of success. But international competition is not effective, and we face the danger that market assymmetries may work to the disadvantage of the UK. The number of lines expected to be ordered each year in countries (outside North America) where UK firms can compete on an even basis is a small proportion of total world demand. A number of those who were worried about the BT decision suggested that the UK had now effectively opened its own market to competition without gaining reciprocal arrangements. I sympathise with this view, and regard this as one of the most important of the issues which have arisen in the course of this investigation. As John Butcher, Parliamentary Under Secretary for Industry has said: "A particular complaint from UK equipment suppliers is that foreign competitors now enjoy improved access to the UK market, while those competitors' own home markets - with the single exception of United States - remain at least partially closed to British (and other peoples') exports." He has said that he will be looking closely at the actions which the UK government could appropriately take to remedy the situation. More broadly, of course, the dangers of protectionism, and the benefits of open-ness have been firmly identified in reports stemming from the General Agreement on Tariffs and Trade - though telecommunications products are not yet covered by the GATT.

practice. Nevertheless, the EC through its Information Technologies and Telecommunications Task Force, is itself already pursuing a programme of joint European research in the proposed RACE project (research and development on advanced communications for Europe). The precise implications of ventures of this kind for the individual companies are for them to decide. Experience in other fields and in other countries suggests that collaboration between UK companies and those elsewhere in the world may be necessary as a means of securing the UK's place in world markets. PTT's also have a role in actively encouraging such collaboration if early results are to be achieved.

The importance of telecommunications technologies

35 Telecommunications technologies are so central to the current wave of technological innovation that a nation with no basic R & D capability in this field would, I feel, be lacking in one of the basic attributes needed to maintain a position among the leading industrial nations. Thus the UK would, in the long-run, be the loser if it no longer had home-grown engineers with experience of the latest telecommunications technologies - though I accept that the convergence of telecommunications and computer technologies tends to broaden the base from which such people can be drawn. In the past, the fact that a significant number of people have been employed in the development of advanced telecommunications systems - both at BT's own research centre at Martlesham Heath and the companies' centres - has benefitted the UK both directly, as a result of the products produced there, and

indirectly as the ideas produced in telecommunications have spread into related fields. Indeed, these indirect and inevitably unquantifiable effects may have been as important as the direct ones - an example is that of innovation in process control.

36 One of the main concerns that has been expressed to me is that market forces, if allowed completely free play, may bring about a situation in which technological skills are not maintained in the UK. Having reference to my duty to further the interests of the telecommunications industry as a whole and to promote its R&D, I should like to be reasonably satisfied that UK firms will have access to the resources needed to maintain an effective productive presence in the industry. I believe, therefore, that steps must be taken to ensure the availability of a new generation of UK engineers and programmers, with the necessary skills.

37 One partial protection of the UK technological facilities would be to insist on the transfer to the UK of the bulk of the System Y technology. Thorn Ericsson have assured me that L M Ericsson intends to use UK employees to expand the Brighton based software company - Production Control (Ericsson) Limited (a subsidiary controlled by L M Ericsson not by Thorn Ericsson) - in line with the System Y orders so that the AXE 10 exchanges can be adapted to UK use. In this way UK engineers and computer programmers will develop the skills necessary to maintain and develop the Ericsson exchanges. If BT expands orders for System

Y beyond the level in their current plans, I believe that formal assurances should be sought of L M Ericsson that "technology transfer" will continue. In the meantime, I am encouraged by the decision by L M Ericsson to pass control of Production Control (Ericsson) to Thorn Ericsson on 1 April 1986 - in recognition of the increasing support which that company will give to the development of System Y. It must, however, be recognised that much of the main work to develop the next generation of L M Ericsson technology will inevitably be done in Sweden, and not in the UK.

38 Another option I have considered would be to seek BT's agreement to continuing to play an important role. I recognise that BT's immediate commercial interests may now tell against substantial involvement in basic long-term research. The company will, however, need to ensure that its staff continue to have a complete working knowledge of System X, and that they gain an understanding of the AXE 10 (and indeed of the AT & T/Phillips exchanges). A full knowledge of the basic properties of both the hardware and the software of all these systems - probably gained in "laboratory" conditions - will be needed to provide full maintenance support. In addition, continuing work will, no doubt, be required to ensure that the security and integrity of the BT network is maintained.

39 The option of requiring Thorn Ericsson to meet certain conditions relating to technology transfer and the option of putting the responsibility on BT both have disadvantages.

Difficulty would be experienced in verifying conditions required to make the Thorn Ericsson transfer an effective reality, while BT's work at Martlesham might not be used in a way that promoted fair competition in the manufacturing industry, particularly given the uncertainties about BT's own intentions as regards manufacturing operations. The fundamental problem is that a continuing mainstream research involvement has a very high cost and requires scarce resources such that it may not be feasible (or may not happen) in an industry with competition among several firms which, because of the competition, have relatively small scale. One way of resolving this problem might be to establish a UK research organisation which would be given the objective of maintaining a competence in modern switching technology, which would be financed by firms in the industry, and which would have the obligation of making its know-how available to UK firms on an even-handed basis. Similar arrangements have been made in other industries. However, such a project would involve significant difficulties and I cannot at present fully assess its practicability. I intend to study the idea further and publish my conclusions in due course.

Conclusion

40 In my view, BT's action in looking to non-System X suppliers for a second digital switch, manufactured in the UK, in effect to enable BT to secure the modernisation of its network to meet competitive pressures and user requirements, need not destroy the basis for the success of System X. In fact it could have a

beneficial effect if it helps to induce further improvements in the development, manufacture and marketing of System X to assist it to gain a significant volume of overseas business.

41 I recommend that BT should not expand significantly its orders for System Y exchanges above the level envisaged for 1987-8 for three years unless the System X manufacturers suffer a major failure on cost or delivery; furthermore no increase to the System Y orders should be made without full competitive tendering. If, eventually, BT did decide to increase its orders for System Y, it would need to have increasing regard to measures to offset some of the potential disadvantages to the UK and to BT itself that I have identified above as likely to arise from reliance on a system developed outside the UK. In particular, it would be reasonable to expect BT to devote significant attention and resources to:

(i) increasing the UK content of System Y to the highest possible level, with due regard to the employment effects of the purchase of components in the same or similar areas to those that would be affected by any run down in production of System X and its components;

(ii) maximising the degree of technology transfer to the UK, with particular reference to systems and software design;

(iii) ensuring that the operational security of the UK network is safeguarded by the availability of staff located in the UK who are fully trained to deal with any conceivable eventuality arising from malfunctioning of systems not developed in the UK;

(iv) actively supporting the continued existence in the UK of R & D teams with the capability of handling the new systems development needs of the UK manufacturers; and

(v) continuing to give strong support to the System X export effort.

42 In preparing my analysis of the findings of my investigation, I have considered whether or not any of my other functions under the Telecommunications Act 1984 need to be exercised - apart from the giving of advice of which this report contains a good deal. My function of licence enforcement is not relevant because BT has not broken a licence condition. Section 50 of the Act gives me concurrent responsibilities with the Director-General of Fair Trading in exercising certain functions under the Fair Trading Act 1973 and the Competition Act 1980. I might need to exercise those functions if BT seemed to be pursuing a course of conduct, in their purchasing policy, which was likely to distort the effectiveness of competition in the industry. The present level of orders for System Y does not seem to have that effect, because it is not likely to be critical to

the continued production of System X. However, I shall keep BT's future buying policy for digital exchanges under careful review in the light of the competition legislation, mindful of the transitional difficulties of firms in adapting to the new environment in the industry.

43 I have also considered whether or not my duties under the 1984 Act call for the making of a reference to the Monopolies and Mergers Commission, seeking its report on proposals to amend BT's Licence in a manner that would deal with some of the problems discovered by this investigation:

(i) My primary duty is to secure the provision of such telecommunication services as satisfy all reasonable demands and to secure that any provider of those services is able to finance their provision; BT's intention, in placing the System Y order, has been to introduce competitive pressures on price and delivery, and gain additional security of supply to improve its ability to satisfy its customers' demands and to finance its services. I cannot see any basis for action under this duty. BT may or may not achieve its aim but its intention seems appropriate and the course it has chosen seems reasonable.

(ii) I must promote the interests of consumers in respect of the price, quality and variety of telecommunication services provided; the arguments seem to be the same as under (i) above.

(iii) I must maintain and promote effective competition between persons in the telecommunications industry in the UK; the System Y order is intended to have the effect of increasing competition among suppliers to BT. Admittedly the competition is imperfect, even artificial; but it may well be effective in providing incentives in the industry. If the effect of the introduction of System Y was to damage the System X manufacturers irremediably, the result might be to reduce competition in the long-term; but I do not see that result as likely in present circumstances.

(iv) I must promote efficiency and economy in the industry; the System Y order will increase the average cost per line of the System X manufacturers but will put them under greater pressure to achieve economies. BT expect it to contribute to the efficiency and economy of its network operations.

(v) I must promote research and development in the industry; the System Y order increases the difficulties of maintaining an independent UK switching technology - by fragmenting the market out of which R & D costs must be met - but it does not make the position hopeless. I believe that consideration should be given to the establishment of an independent research organisation as a means of strengthening the UK research effort.

(vi) I must encourage major users of telecommunications services to locate in the UK; the System Y order, if BT's intention is met of promoting competition to assist the modernisation of its network, is likely to assist this aim.

(vii) I must enable the producers of telecommunications apparatus in the UK to compete effectively both in and outside the UK; System Y will be produced in the UK and the UK content of resources used for manufacturing will probably be of the same order as that of System X; admittedly System Y is not likely to yield significant exports from the UK and BT's order for System Y may increase the difficulty in exporting System X - because of its impact on average cost per line; however the introduction of System Y may help the export of System X by sharpening the performance of its manufacturers through competitive pressures.

This analysis, none of which implies criticism of the quality of System X, leads me to conclude that the introduction of System Y is beneficial from the viewpoint of some of my duties under the Act but harmful or questionable from the viewpoint of others. Overall, I do not believe that a case exists for making a licence amendment reference to the MMC on the basis of the initial order for System Y although I shall keep BT's future buying policy under review in case the position should change.

44 Another conclusion of this investigation is that the long-term health of the manufacturing of switching equipment in the UK can be enhanced by the export of System X or by collaborative arrangements with overseas companies or perhaps both. The export of System X is seriously impaired by the lack of effective competition in international markets. Consequently, government pressure to promote effective competition internationally should be a high priority and consideration should be given to various forms of government support for British exports of telecommunications apparatus as a transitional arrangement.

July 1985

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