

PREM 19/2250

Information Technology.

Inadequacy of Interdepartmental  
Whitehall Machinery.

Acad Report.

INDUSTRIAL POLICY

Part 1: January 1980

Part 4: September 1983

Referred to	Date	Referred to	Date	Referred to	Date	Referred to	Date
<del>12.9.83</del>		30.1.87					
<del>5.10.83</del>							
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PREM 19/2250



## Published Papers

The following published paper(s) enclosed on this file have been removed and destroyed. Copies may be found elsewhere in The National Archives.

Making a Business of Information: A survey of New Opportunities - A report by the Information Technology Advisory Panel. Published by HMSO. ISBN 0 11 630824 9

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New Opportunities in Manufacturing: The management of Technology – Advisory Council for Applied Research and Development. Published by HMSO. ISBN 0 11 630823 0

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Signed

J. Gray

Date

11/1/2016

**PREM Records Team**

PART 4 ends:-

PAB to D.E.S 30.1.87

PART 5 begins:-

DES to PAB.



10 DOWNING STREET  
LONDON SW1A 2AA

*From the Private Secretary*

30 January 1987

ITAP REPORT: LEARNING TO LIVE WITH IT

|| You wrote to Mark Addison on 19 June last year to say that work was in hand on the preparation of a draft co-ordinated Government response to the above report. Could you please let me know exactly what timescale is proposed for this.

P. A. Bearpark

R. L. Smith, Esq.,  
Department of Education and Science.

RLS



Treasury Chambers, Parliament Street, SW1P 3AG

The Rt Hon Sir Geoffrey Howe QC MP  
Secretary of State  
Foreign and Commonwealth Office  
Downing Street  
LONDON SW1A 2AL

20<sup>th</sup> August 1986

Dear Geoffrey,

IT/TELECOMS STANDARDISATION

Geoffrey Pattie wrote to you on 31 July. He has suggested relaxing our opposition to the proposed IT Directive, which would oblige public sector purchasers to use European Standards.

While I am keen to see IT standards used in public purchasing, the case for the Directive has little merit, whether on value for money in public purchasing or from the point of view of the UK IT industry. If the UK IT industry is to compete in international markets, it needs to conform to international standards. If European standards diverge from international ones, UK suppliers will have to face the heavy additional costs of meeting both standards, or losing their international markets. Non-European companies may or may not be prepared to meet European standards where they diverge: either way, value for money will be reduced, whether by reduction in purchasing choice or additional development costs. In addition, departments' strategic plans for IT may well be disrupted, again increasing costs. We have consulted departments purchasing IT equipment. All of those who have replied consider we should continue to oppose the Directive.

The present draft Directive may prove to be ineffective. European draft IT standards cannot be put straight into procurement contracts as they stand, making it impossible to implement the Directive without national embellishment of the standards.

However, we need also take into account whether we can effectively block the Directive from an isolated position.

Looking first at Geoffrey Pattie's proposal, I think there are two serious objections. First, the derogations are so wide that they would make the legislation ineffective. My officials are confident that through careful use of such derogations they could avoid the use of European standards for the vast majority of

purchases. We would expect other member states to do similarly. An ineffective Directive would make the whole exercise pointless, and simply impose additional bureaucratic costs. Even in the cause of being good Europeans, we do not want this.

Second, we have no idea of whether the proposed derogations would be acceptable to the Commission or other member states. If we propose them and they were rejected, we would have lost much of our bargaining position, perhaps irretrievably. However, if we were to continue outright opposition, we would have to persuade other member states to change their position. This might not have been difficult if we had acted earlier. It will be much more difficult now, particularly given our acquiescence in the Internal Market Rolling Presidency Action Programme.

I therefore suggest we explore a third possibility, which is to seek to change the emphasis of the Directive to one which fully supports the international competitiveness of the European IT industry. This would best be done by the Directive making international standards mandatory, and using European standards as a provisional measure only when there are no stable equivalents available internationally.

This line would give a positive signal of European intentions to accept international work and help to guide the European programme in the right direction. It should eliminate many of our concerns about unnecessary disruption to the UK IT industry and departmental plans, though it would still require derogations covering compatibility with existing investments and security matters. At first sight, it may appear to go against the principles of an Internal European Market. But it must be recognised that IT is already an international market in which others have the lead and European suppliers must compete to survive. If the EC chose to put European standards first, it would go against the spirit of the GATT, and risk creating unnecessary confusion.

The Presidency gives us the opportunity to introduce a proposal on these lines as a means of breaking the current deadlock. If others agree, I suggest that we instruct our officials to work out the best way to carry the proposal forward, and that we should aim to consider it towards the end of September.

I am copying this letter to members of OD(E), to all Ministers in charge of Departments (with a copy of Geoffrey Pattie's original letter), to Geoffrey Pattie, and to Sir Robert Armstrong.

*L  
Lumsden  
Pm*

PETER BROOKE







DEPARTMENT OF HEALTH & SOCIAL SECURITY

Alexander Fleming House, Elephant & Castle, London SE1 6BY

Telephone 01-407 5522

*From the Secretary of State for Social Services*

R L Smith Esq  
Private Secretary to  
The Rt Hon Kenneth Baker MP  
Secretary of State for Education and Science  
Department of Education and Science  
Elizabeth House  
York Road  
LONDON  
SE1 7PH

NSM  
5 August 1986

Dear Rob,

"LEARNING TO LIVE WITH IT"

Mark Addison wrote to you on 28 May conveying the Prime Minister's request that your Secretary of State produce a coordinated response to the Information Technology Advisory Panel's report on "Learning to Live with IT".

DHSS Ministers consider this an excellent report but feel that, by restricting itself almost entirely to the role of IT in the formal educational system, ITAP has missed an opportunity to draw wider lessons for the future. The NHS, for instance, has nearly a million employees, a high proportion of them in professional or specialist jobs that call for significant training and periodic retraining. Information technology has a major part to play in making this training more efficient and effective and it would have been helpful if ITAP had examined this area also.

Partly to remedy this, we would support the report's proposal for a more detailed study with the emphasis still on information technology and with education and training interpreted in its broadest sense. In view of its major training needs we would expect the health service to be involved in any such further study.

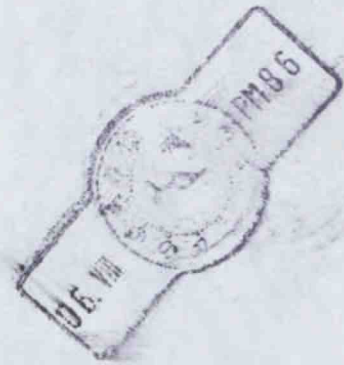
I am copying this letter to the Private Offices of Cabinet Ministers, of the Minister of State for Information Technology, to Michael Stark and to the Chief Scientific Adviser, Cabinet Office.

Laurance

Tony Laurant

A Laurance  
Private Secretary

INO Pól: Unto Tech PT4





DEPARTMENT OF TRADE AND INDUSTRY

1-19 VICTORIA STREET

LONDON SW1H 0ET

Telephone (Direct dialling) 01-215

GTN 215) 5147

(Switchboard) 01-215 7877

From the Minister of State  
for Industry and Information Technology

GEOFFREY PATTIE MP

Rt Hon Sir Geoffrey Howe QC MP  
Foreign and Commonwealth  
Secretary  
Foreign and Commonwealth Office  
Whitehall  
LONDON  
SW1

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31 July 1986

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IT/TELECOMS STANDARDISATION

My officials have been discussing with those of other Departments the Commission's proposals for a Directive or Council Decision laying down an obligation on public purchasers in Member States to specify European standards in their purchases of IT and telecommunications equipment; and the need to establish a UK line in view of the emerging consensus among other Member States in favour of a legally-binding Decision or Directive.

At the 9 June Industry Council, at which Peter Morrison represented the UK, there was a clear consensus of all except Germany and the UK for rapid adoption of a legally-binding instrument. The Dutch, having made some rather ill-timed attempts to gain agreement have now left this task to the UK Presidency. However, adoption is viewed as a priority measure by the Commission and the climate has changed since the proposal was first put forward last May. From initial opposition to any legally-binding obligation, France has now moved to become a leading exponent of the Commission proposals, no doubt in part a reaction to increasing pressure from other Member States for the proposal. The Germans, behind whom we have been able to shelter, are now considering what they would need in terms of derogations to be able to accept a mandatory regime.

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There are obvious disadvantages in obstructing progress from the Chair during our Presidency; the project is included in the current Internal Market Rolling Presidency Action Programme. More directly unless we are able to establish our priorities within a legally-binding framework, we will be unable to influence or gain any advantage from what increasingly seems an inevitable outcome.

I therefore propose that we now indicate to the Commission a willingness to consider relaxing our present position of only accepting a non legally-binding regime, provided that we can obtain adequate safeguards. Broadly, the safeguards I would consider adequate centre around obtaining a flexible but transparent regime. This would require among other things a series of derogations, allowing

- (i) the installed equipment base to be maintained and possibly augmented working to the original specifications;
- (ii) the use of international rather than European standards where they exist;
- (iii) use of non-standard equipment where evolution of the requirement or technology moves the most appropriate solution outside the scope of the original standard;
- (iv) the ability to reject a European standard which is determined to be inadequate to fulfil its intended function;
- (v) reference to alternative specifications where, in response to tenders, it is shown that there is no economic source of supply or where no other Member State is purchasing on a commercial basis to that standard.

The Commission has indicated that it might be prepared to consider derogations along some of these lines if we were able to accept a mandatory regime. We will need to follow this up urgently if we want to influence the final shape of the proposals.

The Commission proposal also envisages an advisory committee of Member States' experts to help in the drawing up of mandates for European IT standards. We have been hitherto concerned that this committee should be able formally to determine whether or not a




mandate should go forward. The latest Commission ideas propose that the work of this Committee should be undertaken by an existing advisory Committee of Senior Officials on IT standardisation, which submits mandates for final approval to a committee set up under the standards information directive 83/189. This latter committee has a formal qualified majority voting procedure. If we were able to secure a declaration from the Commission that it would not go against the majority view of Member States (the so-called aerosols declaration), perhaps in the form finally agreed in relation to the Telecoms Mutual Recognition Directive at the 9 June Council, I believe we will have adequate powers to influence the mandates for these standards. Moreover, CEN/CENELEC, on which the UK is represented by standards experts has the right to reject a mandate if it considers it unworkable or in conflict with work elsewhere.

I believe that the time has now come for us actively to seek ways of making a mandatory regime consistent with the needs of public purchasers for flexibility and for UK industry not to be disadvantaged. If we want to pursue this route we need to come to a firm decision quickly to prepare for the October Industry Council. Given the rather special circumstances of the IT sector, I do not believe that in accepting legally-binding commitments to use European IT standards we shall be setting an uncomfortable precedent for other areas.

I would be grateful for your endorsement of the line proposed in paragraph 4 above.

I am copying this to colleagues in OD(E) and Sir Robert Armstrong.

  
GEOFFREY PATTIE

SPD11BM13



CEB

DEPARTMENT OF EDUCATION AND SCIENCE  
ELIZABETH HOUSE YORK ROAD LONDON SE1 7PH  
TELEPHONE 01-934 9000

FROM THE SECRETARY OF STATE

MLA

Mark Addison Esq  
Private Secretary  
10 Downing Street  
LONDON SW1

19 June 1986

Dear Mark,

**ITAP REPORT: LEARNING TO LIVE WITH IT**

You wrote to me on 25 May <sup>at 11.45</sup> about this report, which we understand is to be published during July.

Work is in hand on the preparation of a draft co-ordinated Government response. Mr Baker will be consulting colleagues about this at the appropriate stage, and will submit a draft to the Prime Minister as soon as possible thereafter.

Copies of this letter go to the Private Offices of other Cabinet Ministers and of the Minister of State for Information Technology and to Sir Robert Armstrong and the Chief Scientific Adviser, Cabinet Office.

yours sincerely,

R L Smith

R L SMITH  
Private Secretary

IND POL - UNO TECH PTU.





10 DOWNING STREET

THE PRIME MINISTER

29 May 1986

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*LPO*

*a fairclough } sent.  
Aldrich } VM  
Whene } Fairclough  
Davies }  
Hartley }*

*Dear Mr. Read,*

Thank you for your letter of 19 May and the Panel's report on "Learning to Live with IT". As the final report from the Panel, and one which focusses on such an important topic for our future prosperity and success, careful consideration will be given to the messages which it contains.

I have agreed to publication of the report and asked for arrangements to be made for the Government to draw up a written response. I shall see this is sent to you and to your colleagues who participated in the production of the report in due course.

*Yours sincerely  
Margaret Thatcher*

Charles N. Read, Esq., C.B.E.

*SM*





10 DOWNING STREET

28 May 1986

From the Private Secretary

Dear Rob

The Prime Minister has received the report of the Information Technology Advisory Panel (ITAP) on Learning to Live with IT. She has noted its conclusion that a wider enquiry into the future educational and training needs of the country is needed and that existing initiatives intended to meet part of these needs may not in themselves be adequate.

BF // The Prime Minister would be grateful if your Secretary of State, in consultation with colleagues, would consider the report, draw up a draft coordinated Government response, and submit this to her for approval.

I am copying this letter to the Private Offices of other Cabinet Ministers and of the Minister of State for Information Technology, and to Sir Robert Armstrong and the Chief Scientific Adviser, Cabinet Office.

Z es

Mark Addison

(MARK ADDISON)

R. L. Smith, Esq.  
Department of Education and Science.

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hte  
CASA  
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GR/CF.

Could I have the pp's back  
after digitals - we need to  
write out the Depts.

PRIME MINISTER

You have seen the ICAP Report on IT Education and Training and agreed that DES should coordinate a draft Government response to it.

I attach a letter of thanks to the Chairman of the Panel for your signature.

MAA

Mark Addison

27 May 1986

PRIME MINISTER

ITAP REPORT ON THE IMPACT OF IT ON EDUCATION AND  
TRAINING

ITAP, now subsumed by ACARD, have produced their final report, on education and training.

I attach John Fairclough's covering minute and

- Flag A: A summary of the report
- Flag B: A draft letter for your signature to the Chairman of the Panel
- Flag C: The Covering letter from Charles Read, the ITAP Chairman
- Flag D: The report itself

ITAP propose that the report should be published to stimulate a wider debate. John Fairclough agrees.

The report, however, goes considerably wider than IT matters alone. The main recommendation is for a Commission of Inquiry to consider "the educational system which this country will need for the next century". The panel clearly intends that, among other things, the existing division of responsibilities within Government for education and training generally, and for IT in particular, should be looked at. This is not all. The other three recommendations call for Government funding to be made available for research, etc., including an additional budget, on a continuing basis, for IT-based applications in schools, colleges, universities, etc. The report does not appear to say where the money should come from.

John Fairclough feels you may like to endorse the report but I think in fact you will not wish to give any encouragement at all to the idea of a wide-ranging Commission of Inquiry into education and training. The proposals for additional resources will need to be looked at by the

attached  
of.  
ppm please

Departments concerned against their other priorities. You will, therefore, simply wish to ask the DES to draw up a draft Government response in consultation with other Departments, and to submit this to you for your approval before publication.

Agree:

- (i) with John Fairclough that the report should be published? *Yes*
- (ii) that DES should be asked to co-ordinate a draft Government response, as proposed above, and to put this to you for approval? *Yes*
- (iii) to send a letter of thanks to the Chairman of the Panel as John Fairclough proposes (at Flag B)? *Yes*

*mt*

*Mark Aelders*

MEA

23 May 1986

LO5ABR

Summary  
attached

W033

PRIME MINISTER

21 May 1986

ITAP REPORT ON THE IMPACT OF IT ON EDUCATION AND TRAINING

You wrote to <sup>at ITAP</sup> the members of the Information Technology Advisory Panel (ITAP) on April 17 to inform them of your decision to subsume the work of ITAP within that of the Advisory Council for Applied Research and Development. In that letter, you referred to their report on the impact of IT on education and training which was almost ready for submission to you.

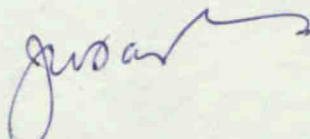
2. This work has now been completed and I attach a copy of their report, "Learning to Live with IT", (Flag D) under cover of a letter (Flag C) from Mr Charles Read, the ITAP Chairman. I have prepared a summary of the report (Flag A) which is also attached.

3. Their investigation has focussed on the implications of IT for education and training in general, and not just for the teaching of IT-related subjects. This is a broad topic and the report raises a considerable number of important issues concerning the changes which IT could create in our educational system and elsewhere, and the way in which these reinforce and accelerate other changes already underway.

4. However, I am sure that the Panel members would themselves agree that it has not been possible to give full justice to this vital subject with the limited resources at their disposal. Indeed, their main recommendation is that a fuller enquiry into the future educational and training needs of the UK is needed, and the role of IT in meeting these is only a part of a larger investigation which extends beyond their own competence. As a contribution to this debate, they are seeking your agreement to publication of this report to

promote a wider discussion on the issues raised within it, and I believe that this would be both sensible and constructive. I also feel that the report's specific recommendations to improve the effectiveness of learning and teaching with IT deserve serious consideration by Government, as does their conclusion that IT emphasises the need to establish a framework within which Britain's changing education and training requirements can be adequately met. A draft Private Secretary's letter to that effect is attached (Flag B).

5. I am copying this letter and attachments to Sir Robert Armstrong.



JOHN W FAIRCLOUGH  
Chief Scientific Adviser

## SUMMARY OF ITAP REPORT "LEARNING TO LIVE WITH IT"

ITAP have examined the relevance of IT in education and training, looking beyond the immediate implications for teaching about IT itself, to the wider application of IT in support of general learning. They have looked at the developing technology and its educational impact and at ways in which IT may cause or encourage changes in teaching and learning, and have drawn together the changes promoted by IT with the larger changes underway in education and training in the UK.

2. The report focusses upon the opportunity to improve the effectiveness of learning and teaching by using the flexibility of IT to enrich both of these activities, through assistance with their mundane aspects and by allowing more freedom, particularly for students, in the way that they approach their work. IT offers the opportunity to improve the quality of education and training by allowing the best teachers, throughout the educational system and beyond, to reach a larger number of students than is possible conventionally. IT is a key element in the growth of the information-rich society of the developed world, and education and training, as knowledge and information intensive activities, can take advantage of IT in dealing with the explosive growth in knowledge which is occurring. To take full advantage of these opportunities, ITAP recommend a programme of research into the use of IT in education and training and into IT's effect on teaching and learning.

3. In looking at the developing technology, ITAP identify some possibilities for personal computer terminals, but see developments in software design techniques (including the field of Artificial Intelligence) as even more significant. They recognise the impact of general public opinion about IT and its social consequences on the way that IT is used for education and training, and in particular that there may be concern that the use of computers and IT in education diminishes the human element. They argue that this is not a real problem where IT is used wisely, and see IT as providing support and assistance to both teacher and student rather than eliminating the need for personal contact between them. ITAP recommend that the momentum of the investment already made in IT should be maintained through an additional budget, on a continuing basis, for IT-based applications throughout the educational system, and through demonstrations of innovative projects in educational IT, including

developments to assist teachers to make full use of IT resources at their disposal, together with advanced trials in a small number of educational establishments.

4. ITAP look at the changes in the role of formal education caused by improved access to information and knowledge sources and to IT-aided learning. They see a shift in the control of the educational process as a result of the growth in alternatives (already clear in training) and the pressure on timescales for change which IT creates. New educational opportunities in continuing education and recreational learning particularly are foreseen with the possibility of an education industry, supported by IT, to meet these widening needs. They see dangers in this process if educationalists are not able to fully participate, and recommend that the provision of IT equipment and services throughout the educational system should be backed up with adequate support for those involved through training, retraining, consultancy, and so on, while emphasising that teachers at all levels must themselves take a positive attitude to the opportunities which IT brings.

5. Finally, ITAP look to the wider implications of IT for our society and to the role which education and training must play in equipping us to manage and exploit the vital base of knowledge which is becoming a key economic resource. They recognise the widespread changes already underway in the UK, and list some of these as factors which, like IT, are modifying the way in which we view our existing education and training institutions and those within them. They note the initiatives undertaken to improve the relevance and effectiveness of education and training in the UK, but perceive a danger that the distribution of responsibility for education and training issues across Government (particularly noticeable with regard to IT where the Department of Trade and Industry has taken a major responsibility) could lead to a lack of coordination in meeting the long-term needs of the country. The nature of existing initiatives focussed on particular problems, and the delay before these can be judged to have been effective or not, supports this view. They conclude that their own study should only be regarded as a contribution to a wider investigation intended to consider the educational system which the UK needs for the next century. They recommend that a Commission of Enquiry should be set up to carry out such a study and to make recommendations on the changes in the existing arrangements needed to meet adequately these emerging needs.



W032

MR ADDISON

21 May 1986

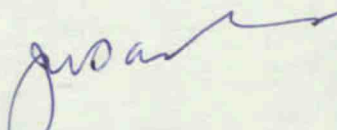
ITAP REPORT: "LEARNING TO LIVE WITH IT"

The Information Technology Advisory Panel (ITAP) was dissolved by the Prime Minister last month in the awareness that a final report from them had not yet been submitted. The report, "Learning to Live with IT", is now ready and I enclose a copy, together with a covering letter from the Panel's Chairman, Mr Charles Read. I also enclose my summary of the report, my advice to the Prime Minister on the handling of the report and a draft Private Secretary's letter which would act on that advice.

2. ITAP are proposing that this report should be published as a contribution to a wider debate on the long-term educational needs of the UK and the part that IT can play in meeting these needs and in stimulating change in our existing arrangements for education and training. I believe that the report and its recommendations will be constructive in assisting Government policy making in this area and support its publication. As this is the Panel's final report to the Prime Minister, I suggest that an acknowledgment of receipt should go to each of the five members. I enclose a draft letter for this purpose.

3. Since the report is concerned with the impact of IT on education and training in the UK, it is most directly concerned with the responsibilities of DES, but other Departments will have a strong interest - in particular DTI from which much of the initiative in the introduction of IT into educational establishments has come. I would recommend that DES is invited to coordinate the Government response, and that DTI and DEmp are closely involved in this. The Scottish Office and Northern Ireland Office will also need to be involved because of the different educational arrangements which apply in Scotland and Northern Ireland, and other Departments may have views which need to be taken

into account. It would be helpful if the Prime Minister could draw the attention of her colleagues to the report and indicate to them how it will be handled. The attached draft Private Secretary's letter could be used to do this. We shall supply you with the required number of copies of the report and its covering letter from Mr Read.



JOHN W FAIRCLOUGH  
Chief Scientific Adviser

JANASP

DRAFT LETTER FROM THE PRIME MINISTER'S PRIVATE SECRETARY  
TO THE PRIVATE SECRETARY OF THE SECRETARY OF STATE FOR EDUCATION AND SCIENCE

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The Prime Minister has received the report of the Information Technology Advisory Panel (ITAP) on Learning to Live with IT. She has noted its conclusion that a wider enquiry into the future educational and training needs of the country is needed and is concerned that existing initiatives intended to meet part of these needs may not in themselves be adequate.

The Prime Minister accepts the Panel's view that there is danger in waiting for the results of current measures to become apparent because of the long delays involved, and supports their idea of an enquiry which could provide a framework within which the effect of these changes, together with related aspects such as the effect of technology, could be assessed. She is also interested in the opportunities which may exist to improve education and training through research into the use of IT in support of teachers and students, and how this might be realised through specific aids such as tools for the development of educational software, where your Department is well placed to provide the necessary stimulus and co-ordination.

*or consult with colleagues,*

The Prime Minister <sup>would be grateful if you</sup> looks forward to hearing your Secretary of State's ~~views on~~ these matters and the views of other ministers to whose offices I am copying this letter. *would consider the right side, draw up a draft coordinated response Best response, and submit this to her for approval.*

I am copying this letter to the Private Offices of other Cabinet Ministers and of the Minister of State for Information Technology, and to Sir Robert Armstrong and the Chief Scientific Advisor, Cabinet Office.

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DRAFT LETTER FROM THE PRIME MINISTER TO MR CHARLES N READ CBE

19

Thank you for your letter of 9 May and the Panel's report on "Learning to Live with IT". As the final report from the Panel, and one which focusses on such an important topic for our future prosperity and success, careful consideration will be given to the messages which it contains.

I agree to publication of the report and have asked for arrangements to be made for the Government's written response. This will be communicated to you and to your colleagues who participated in the production of the report in due course.

- cc. Mr M J Aldrich
- Mr I H Cohen CBE
- Mr C A Davies
- Dr D F Hartley

Report  
attached



CABINET OFFICE

70 Whitehall London SW1A 2AS Telephone 01-233

The Rt Hon Margaret Thatcher MP  
The Prime Minister  
10 Downing Street  
London SW1

19 May 1986

*Dear Prime Minister,*

In your letter of April 7 in which you told me of your decision to subsume the work of ITAP within that of ACARD, you indicated that you expected to receive a final report from ITAP. My ITAP colleagues and I have now completed that work and I attach the report.

For some considerable time, whilst also carrying out a number of shorter and more immediate studies such as our relook at Cable Systems last year, we have been studying the impact of Information Technology on education and training. This report "Learning to Live with IT" is the result of those studies.

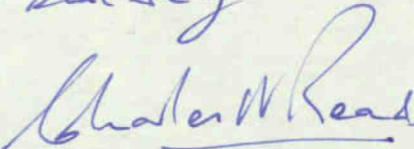
Our report on the subject of tradeable information and its national importance, entitled "Making a Business of Information", which you kindly agreed should be published two years ago, has produced some most encouraging results. The Confederation of Information Communication Industries which brings together the many trade associations and other bodies concerned with information handling has been established; there has been much progress in improving the Government's handling of the, now recognised, Information Industry; and new research initiatives in relation to this industry and its economic, social and cultural importance have been taken by ESRC. There is no doubt that these many activities will increasingly bear fruit in the future.

Our study of education and training also sprang out of this earlier work, for our starting point was the commercial opportunity for UK companies selling software and systems to the education and training markets. This had to be widened to an examination of the ways in which IT could assist the teaching and learning processes, as it became clear to us that IT has very far reaching implications for all aspects of our education and training systems. This is because the new technology is providing new tools and techniques for teaching and learning and because it is making radical changes in the demands made upon our education and training systems. As we have stated in the concluding section of our report there is no doubt that by the year 2000 knowledge will be the key strategic and economic resources within the developed countries of the world and the richer and the knowledge base of any given country the more chance that an enterprise culture will exploit it for the common good. Our future education and training arrangements are therefore of more profound national importance than they have ever been.

There are many other factors in addition to rapidly advancing technology which are currently subjecting those arrangements to considerable stress. We have therefore concluded that whilst further support of the excellent work already

being undertaken in developing the use of IT within education should be undertaken, any further isolated consideration of such developments is not desirable. We believe there is a need for a major examination of the UK's future education and training needs to establish a framework within which all the necessary changes can be brought together including those concerned with the curriculum and examinations, with the institutional structures and the ways in which they are funded, with the role of educationalists and their relationship to industry and commerce, and of course with the use of new technology.

These are weighty matters and a full debate of them would surely be beneficial. I hope our report can contribute to this. I therefore seek your agreement to the publication of our report as a stimulus to further discussion.

*Yours sincerely*  


Charles N. Read

INFORMATION TECHNOLOGY ADVISORY PANEL

"LEARNING TO LIVE WITH IT"

AN OVERVIEW OF THE POTENTIAL OF INFORMATION TECHNOLOGY  
FOR EDUCATION AND TRAINING



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## 1..... Introduction

### - Background to the Study

#### Communication in Education

1.1 Education is a diverse field which covers many levels, disciplines and techniques but which is, in all its facets, highly demanding of human effort and expertise. Students must assimilate knowledge and skills acquired under the guidance of a teacher who, in turn, must react to the individual needs of the students. Good communication amongst all those involved is a fundamental aspect of this relationship - there is obviously a flow of information from teacher to student, but feedback to the teacher on the level of understanding achieved by the student and on problems encountered in the course of study is just as important and interaction amongst the students participating in an area of study is also vital. Modern education also depends on good access to information sources of all kinds to assist and extend learning by experience and instruction.

#### Technological Support

1.2 Technology, particularly that aspect now termed Information Technology, has long played a part in assisting the educational process. Writing, and later printing, allowed the expertise of teachers to reach a larger audience than was possible on an individual basis. More recently, the development of photography, broadcasting, and audio and video recording has further increased the opportunities for access to information. All of these techniques, however, have the disadvantage that they are predominantly one-way methods of communication. The student lacks easy access back to the teacher, in order to request clarification or assistance with difficult areas, and the teacher has little opportunity to assess the student's reaction to the material presented and to modify the style of tuition accordingly. We have all adjusted to these limitations - everyone accepts that it is necessary to flick through textbooks

to find passages relevant to the topic at hand, or to combine such passages from several textbooks, gleaning understanding of individual aspects of the topic from each - and, in some ways, this has been beneficial (a better understanding of the context of the desired information within a larger corpus of knowledge may result from such browsing through textbooks, for example). Nevertheless, the absence of an opportunity to obtain a direct answer to a specific question can be very frustrating and, in some cases, can act as a significant obstacle to the student's progress.

1.3 The opportunities for better communications in education at all levels have been dramatically improved by the advent of the new Information Technologies. These technologies, such as cable networks and interactive video systems, provide access to information from databases, and the processing of this information, on a vast scale and at costs well below any previously achievable. All of these technologies depend on cheap computer power, in the form of microprocessors, dense memories and associated microelectronics devices; and the computers themselves, as small, cheap but powerful personal microcomputers, are developing as a major - perhaps the dominant - element in the influence which IT will have on the future of education. All of these technologies offer a much-enhanced capability for a "return channel" of communication from student to teacher, as well as expanding the options for communication from teacher to student, and the interactions of students themselves. Two-way and multi-way communications of this sort have not previously been practical or even possible for educational applications and new methods of teaching and learning can be expected to develop as their use spreads. An important aspect of this will be the development of skills in accessing the enormous quantities of information which are becoming available electronically through the spread of IT.

#### Flexibility

1.4 IT is enriching the variety of media which are available for the communication of information and this will have a significant influence on education. IT has both expanded the number and type of information delivery systems which can be used, and has introduced new ways in which these systems can interact. The role of television in schools, for example, is made more flexible through the use of video recorders which allow broadcast and pre-recorded video to be used in a way and at a time which fits conveniently with other classwork, rather than to coincide with television schedules. With

the advent of interactive videodisc systems and the prospect of recordable and rewriteable videodiscs, further flexibility in such applications is possible through the use of software in the control functions of these systems, allowing a responsiveness to the user which previous technologies were unable to achieve. The mixing of sound and image by such means, together with graphics and overall direction through program control, offers an exciting prospect of learning in an environment full of interest and relevance to both student and teacher. It is with the prospect in such new possibilities in mind, together with those already established in education, that we have prepared this report.

- The Report and its Aims

A Stimulus to Further Discussion

1.5 The intention of this report is to examine some of the changes which may take place in education and training through the use of IT as an aid in teaching and learning, and to provoke discussion on the issues which this raises. We are not ourselves educationalists and our approach in this study has not been confined to the formal educational system. Lacking the specialist knowledge of those within the educational field, it would be somewhat presumptuous of us to examine in detail each aspect of the educational system and to draw particular conclusions about what needs to be done in each area, and this we do not attempt. Instead, our intention has been to look beyond the existing framework of the educational system and its institutions and to consider where IT may encourage or assist in the process of change already underway. We have talked to many of those involved in the educational scene at all levels, both in education itself and in training, and have drawn heavily on the information and views which they have made available to us. Their individual enthusiasm and interest may be reflected in the emphasis within the report on certain areas, particularly on the application of IT in schools where a great deal of innovative and exciting work is underway, but this is a measure of the uneven spread of IT at this stage, which we have not sought to disguise. The views presented here are largely coloured by the potential of the technology itself, since it is in this area that the expertise of the Panel mainly lies, but we have attempted to place these technological possibilities in the context of educational and other influences which will apply, since

these will condition the extent to which the potential of IT for education will be realised.

1.6 In our studies leading to the preparation of this report, we have learned a great deal about the current use of IT in education, and have been highly impressed both by the calibre and knowledge of many of those active in the field and by the often startling results which they have obtained with current technology. We are most grateful to all those who provided us with evidence, both written and in discussion, and hope that the example provided by the best of the existing applications can act to encourage the use of new developments in IT in suitable and helpful ways. There is no doubt that the enthusiasm of teachers and others involved in the educational use of IT, at all levels of our educational system, will be the UK's most valuable resource in ensuring that we get the best from IT in this area.

#### Learning to Live with IT

1.7 The title of this report has been chosen to reflect the mixed nature of reactions to prospects of IT-aided learning as well as the recognition that, as with most things, these prospects and the eventual reality will themselves be a mixture of advantages and disadvantages. The more obvious interpretation of the title suggests finding a way of accommodating IT within the existing educational system and practices, and implies a somewhat pessimistic attitude to its eventual role. Considering the swift pace at which IT has become significant at all levels of education, while educationalists may have had little opportunity to come to terms with new and unfamiliar technology, such a cautious attitude is not surprising. However, we feel that this view is unnecessarily negative and that a much more optimistic attitude can be taken towards the possibilities which IT opens up for education and those involved in it - students, teachers and administrators. The other reading of the title, prompted by this more positive line, presents IT as a tool in education for life in general. This is the emphasis portrayed in this report and, we hope, that which will apply both inside and outside of the formal education system.

1.8 Society itself is changing under the spreading application of IT and this should be mirrored in education. There are many signs that our society will have to adapt to increased leisure, a shorter working life and the other effects of spreading automation forced by the need to remain competitive nationally and internationally. This pattern is already clear in the

manufacturing industries, and can be seen to be working through society as IT matures and its applications widen. Education must equip the populace to understand and cope with these changes in lifestyle and help those with more leisure to use their time profitably in self-development. In this way, the relevance of education to the lives of people in the developing "Information Society" can be assured and the effectiveness of learning and understanding for students of all ages, disciplines and levels, can be maximised.

1.9 With this in mind, it is as well to make clear from the beginning that we do not believe that IT should be regarded as providing an opportunity for any reduction in the number of teachers needed within any level of our educational system. We recognise that deficiencies exist in some parts of that system, but consider IT offers the chance to improve the quality and coverage of education in the UK by assisting and supporting teachers in their work, and releasing them for more of their time to concentrate on the teaching task itself. IT must not be used as an excuse to worsen teacher/student ratios on the basis that teacher effectiveness is increased through the use of IT. IT provides a chance to improve education, not to cut costs.

1.10 But we are aware that there are implications in this for the skills required of individual teachers. The impact of IT in the more mundane areas of teachers' work will mean that they spend more of their time in exercising skills directly relevant to guiding the students' learning. This will stretch the abilities of many teachers, at all levels of education, who do not currently use these skills or at least do not use them so intensively, while the use of IT equipment will itself create a need for retraining of teachers to allow its full potential to be realised. These problems must be recognised and tackled through the development of teachers and teaching skills which will complement the technology.

#### Structure of the Report

1.11 The report tackles the issues raised by the use of IT in education by examining the reasons for that use and the technological and educational implications for the future, and looks at ways in which IT may cause or encourage changes in teaching and learning as it develops. Three particular themes emerge from this analysis and run throughout the report. They are IT's effect on the content and form of education, its effect on our educational establishments, and its influence on the management and assessment of learning.

We seek to show the implications of IT for those involved with education and educational IT, and we attempt to draw together the changes promoted by IT with the larger changes underway. We make recommendations for action, where we feel that this is necessary to improve the existing situation or the prospects for the future, but a major aim in producing this report is to stimulate discussion on the issues raised on as wide and informed a basis as possible and, although we have made only a small number of formal recommendations, there are other ideas and issues raised throughout the text.

1.12 It is clear that our educational system is under considerable pressure through the effects of expenditure constraints and demographic changes, while contractions in the education service are leading to an ageing teacher population and reduced career prospects (it has been estimated that more than two-thirds of schoolteachers will be over forty by the end of this decade). Major changes in attitude towards and within the educational system are evident in moves to alter curriculum and examinations in the schools and in the increased emphasis on immediate relevance to national needs at all levels. Teachers throughout the educational system are looking differently at their work in the wake of the extended dispute in schools and as a result of comparisons with private sector employment, especially in technical areas. We are seeing the introduction of new qualifications, such as the Certificate of Pre-Vocational Education and the GCSE at the schools level, and a widening interest in vocational graduate and postgraduate courses such as those encouraged through the Engineering and Technology Programme and the work of the IT Skills Agency focussed on IT itself. Training generally is growing in significance with vocational programmes like the Technical Vocational Education Initiative in schools and the BTEC courses. All of this points to a climate of change within education and IT will act as an accelerator of the rate at which this change will occur. We have tried to look beyond the existing framework of institutions and methodologies and to avoid being constrained by the current arguments about syllabus, examinations and so on. Education will develop in many directions in the years to come, and there will be opportunities for new applications and for new approaches to existing needs. We would like to see the wide range of existing initiatives in education and training examined within a broad debate on the country's longer term educational needs and the role which IT can fill in assisting with these. There is a danger that the sheer extent of the current activity will produce a smokescreen of piecemeal initiatives behind which both enduring and developing requirements could be obscured. This must not be allowed to happen.

1.13 The changes which will result from the widespread use of IT as a fundamental tool of education, rather than as a peripheral aid as at present, need the support of those within education and cannot be imposed from outside. It is therefore essential that teachers and others involved in education are aware both of the capabilities of IT systems which may find a place in their establishments and of the benefits in specific areas of education which these systems can bring when they are designed to meet the particular needs of schools, universities and so on. At the same time, those in the IT industry who produce the hardware and software (and, increasingly, the systems) used for education must be aware of the characteristics of their products which are important in this field, as distinct from (say) the home market. There will be a strong and important relationship between informal educational IT in the home and elsewhere and that in formal education, but care must be taken that the requirements of domestic and other users do not swamp those determined by the less numerous, but vitally important, educationalists.

1.14 Policy-making in Government must take account of both the educational and the industrial interests, and must ensure that educational IT finds a niche within the IT field as a whole so that the benefits which can accrue from the careful use of IT in appropriate areas of education, are not lost under a flood of short-term, low-quality applications intended to exploit what is still an immature market.



## 2..... Why is IT Relevant?

### - IT as an Enabling Force

#### IT Studies

2.1 IT has important implications for education and training in a number of areas. There is already considerable emphasis on the role of IT as a subject in itself, for example in the growth of computer studies as a schools subject or within the sadly-curtailed ITEC scheme, and in the current concerns over the shortages of suitably-qualified professional engineers and technicians with IT skills. This is an aspect which has already received a good deal of attention, from the work of ACARD and of the Butcher Committee to the present IT Skills Agency within the CBI. And there is growing attention on the need to develop and encourage young peoples's interest in science and technology before career and educational choices have been finalised. Education about IT aimed at the populace as a whole is also an important area, since familiarity with IT will be an important, if not essential, skill for the citizen of tomorrow. In this context, schemes such as "Micros in Schools" and the widespread penetration of personal computers in the home have improved awareness of IT systems as objects of everyday utility. As more and more information is stored electronically, the ability to access this information successfully and to use it constructively will become increasingly important for everyone in our society.

#### IT-aided Learning

2.2 This report concentrates upon the potential of IT as a generalised aid to learning and upon the areas within education where IT can have a profound effect by allowing learning to take place in ways which would otherwise be impossible or impractical and for individuals who would otherwise be denied access to the educational resources from which they could benefit. We also see IT as a way of tackling the problems which our existing educational system faces through the explosive growth in knowledge which is underway. Within IT

itself, it has been estimated that the available knowledge has been increasing at such a rate that less than half of the information currently available existed three years ago. Similar observations can be made in other areas and IT offers a hope that the ever-narrowing specialisation which is engendered by this knowledge growth may be avoided, or at least mitigated, by increased effectiveness of learning.

2.3 Our examination of these aspects of IT's influence on education is set against the background of the changes in society which are producing a need for education to be viewed as a part of continuous skill development. These changes - many of them fuelled by IT itself - create the need for individuals and society to regard education as a lifetime process and to accept that acquired knowledge and skills are being supplanted at a rate which will imply that retraining may be required several times in the course of a working life. IT is a vital tool for our educational systems to meet the demands which will be placed upon it as a result of this process.

#### Educational Technology

2.4 In the past, as falling costs have made particular technologies cheap enough for use in education, applications have been found which - though fruitful in themselves - have not led to the revolutions in teaching practices and effectiveness which were sometimes heralded. Language laboratories, for example, have not themselves led to great changes in the teaching of foreign languages, while video recorders, once seen as having enormous potential for education, have similarly settled into a fairly low-key role. This is not to say that these innovations have been failures - indeed, in some cases (such as video recorders), their full impact may not yet have been realised - but they have had only a peripheral effect on education overall.

2.5 IT will not be similarly constrained in the future. The degree of interactivity possible with the emerging technologies and their inherent flexibility of use have already been mentioned as fundamental departures from what has gone before, and a truly revolutionary influence on education can be expected as a result. With the aid of IT, the relationship between teacher and student can be made richer and more diverse, and a larger range of options for the way in which this relationship operates can be made available. The teacher may be distanced physically (in the case of, say, computer networking) or temporally (in the case of, say, interactive video) but this need not imply a

loss of communication with the student or a diminution of the intimacy of their relationship. On the contrary, where a teacher is creating courseware for, say, a Computer Aided Learning package, the potential exists for an even better understanding of the requirements of the individual student than is possible in a crowded classroom, through sophisticated analysis of the responses of the student to the teaching package and adjustment of the behaviour of the package to meet the particular needs thus revealed. As IT develops and its application to education grows more sophisticated, more and more of this potential will be realised.

2.6 Given the novel approaches to learning which become possible, any attempt to foresee in detail where IT will bring the greatest benefits to education is unlikely to produce correct predictions, although we can look ahead to point out some of the areas where IT may be expected to have important effects. It therefore appears sensible to look for an approach to the spread of IT in education which allows incremental progress to be made in understanding the benefits (and problems) which result. It must not be forgotten, however, that the most significant benefits from the use of IT in areas other than education, have only been achieved when such incremental changes have proceeded to a point where it has become clear that overall structural modification is necessary. This has been observed, for example, in the automation of manufacturing and, although this area and education are very different, the underlying need for change in the process because of change in the techniques employed is likely to be similar.

#### IT and Teaching

2.7 The possibilities which arise from the use of IT cover the whole range of teaching activities. At the lowest level there is support for teachers in the more mundane aspects of their work, such as administration of student records, timetabling and processing of examination results or the communication of straightforward information. More advanced systems/packages can provide assistance and advice in areas where teachers' own skills and abilities are weak or require further development, such as specific subject knowledge or perhaps even teaching technique itself. An IT-aided system can thus act as a "teacher's assistant" and can take on the burden of straightforward clerical work and some of the more mechanical parts of teaching itself, leaving the teacher free to concentrate on the individual needs of the students and on the higher level aspects of managing the learning process and, as the

sophistication of the support available increases, the boundary between the role of teacher and support system may shift. Some are of the opinion that, ultimately, sufficient of the teacher's knowledge and expertise can be incorporated in an IT-based learning system that there is little or no need for direct teacher involvement with the student. We do not subscribe to this view. Education does not consist only of the acquisition of information, or even knowledge (in the sense of the classification or categorisation of information) and there remains a strong need for more conventional educational experiences, to foster communication skills and social development, in addition to those acquired through IT-based learning. The role of the teacher, we believe, will be enhanced rather than diminished by the use of IT techniques to aid learning.

2.8 The development of IT aids for teachers (as distinct from aids primarily employed by students) will need to take account of the way in teachers perform their role and the extent to which aspects of this role can be supported or extended (or even modified, if this is advantageous) by IT. A particular example of this could concern the "talk and chalk" part of the work which, although only one aspect of teaching, is important in effective communication between teacher and students. One could envisage an "electronic blackboard" on which computer-generated displays could be used by teachers to enhance their presentation of course material, through an extension of the capabilities of current methods of display for this purpose. Of course, effective use of such a system would depend upon sophisticated hardware and software to support ease of use by teachers and the cost should be reasonable for the benefits gained, but teachers themselves might need to approach their preparation of courses using such systems in a different way, since some work to pre-programme the displayed information would be necessary. If this is not to create an additional burden on teachers, the effort involved must be minimised and there must be offsetting advantages (e.g. in achieving a better level of understanding in students more quickly) to encourage use of the system. Success in establishing aids of this kind will depend on adequate research into the nature of support which will be most useful and how best to apply potentially-useful systems in practice.

2.9 The student, too, will benefit from an IT-aided learning environment. Better access to information and a more stimulating presentation of that information will be coupled with an opportunity for more individual attention and assistance from the teacher. The flexibility of IT-based learning will avoid the necessity for all students to pursue exactly the same course of study and, together with an improved capability for student assessment through IT, will allow a more varied curriculum to be supported.

## - IT as a Learning Tool

### New Areas of Study

2.10 More recent developments in IT allow learning in areas where previously such studies were impossible or impractical. A good example where this has already occurred is computer studies in schools. The advent of cheap microcomputers, and the financial assistance made available to schools to encourage them to purchase these systems, has allowed a much higher proportion of the school population to have access to, and acquire familiarity with, computers than was ever possible in the era of mainframe computers and remote terminals. However, it is in areas of education less directly-related to IT itself that the major benefits are to be looked for. There is obvious potential in the simulation capabilities of IT systems, allowing students to become involved in studies previously precluded through cost complexity or risk of accident. A simulation of a fission reactor is practical while experimentation with the real thing is not. There is the added advantage that such simulations can include areas of operation (for example, the interior of a reactor core) which are totally inaccessible in the real world. A more down-to-earth example might be some of the computer simulations of physical phenomena such as wave refraction and reflection produced by the BBC to link in with schools television broadcasts in Physics. Although "real" demonstrations are possible here, much time-consuming and error-prone effort on the part of student and teacher can be avoided through elegant computer graphics. As an aside, this particular simulation demonstrates a flaw in the standard mathematical model used in schools for wave reflections at a curved surface - an unexpected bonus from the use of computers!

2.11 One of the consequences which can already be observed in the use of courseware such as computer simulations, is a tendency for IT-based material to cross disciplinary boundaries. There is a need to consider the effect on the curriculum of this trend, and the extent to which existing constraints should be relaxed. Part of the apparently more flexible use of IT (particularly microcomputers) in primary rather than secondary schools might be attributed to the tighter control of teaching methods and subject content in secondary schools, through the curriculum and examination system. The ability to use IT

in the assesment of students will be significant in this area, since one cause of rigidity in the existing system is the need to assess adequately a student's understanding and progress in a subject. There already exists a debate about the use of relative or absolute standards against which to make this assesment, and about whether the assesment should be made through examinations or on a continuous basis. The changes which result from the use of IT in subject study cut across these issues, since the reaction of the student to all aspects of the course material can be made available for analysis. The value of this depends, of course, on the usefulness of this analysis, but there is a prospect with IT of much more informed judgement on the student's understanding over the whole area of study. This will benefit the individual student and should allow the curriculum to depend less heavily on examinations.

### New Methods of Learning

2.12 IT can allow experimentation with learning. This applies both to the student, who can control the pace and order of the material presented and can review what has gone before at will, and also to the process of learning itself, allowing new approaches to be tried out. Perhaps the best-known example of this latter flexibility is the use of the computer language LOGO and its famous turtles to encourage children to explore the world of plane geometry and develop an understanding of the underlying mathematical principles through experimentation. LOGO draws upon work in child psychology and artificial intelligence to provide tools appropriate to this area of investigation which could not exist without their supporting IT systems. Although there are some indications that LOGO may not fulfill all the claims which have been made for it in the problem-solving skills which it develops, it remains a convincing example of what IT can do to facilitate learning and to motivate the learner. IT can also assist the learner to come to terms with new approaches to learning. Many commercial software packages, such as spreadsheets and database handlers, incorporate the facility for a user to request automatically-generated help information at any point. As a result, a novice user can explore the system and learn to use it, through examples and with the assistance of the help facility when necessary. Thus learning by experimentation becomes possible (or, at least, more practical) with the support provided by IT.

2.13 It is noticeable that many of the more innovative applications of microcomputers in schools are currently aimed at the primary level. In a sense,

this might appear an odd development since the communication of concepts and fundamental skills seems less susceptible to the application of automated aids than is the more factually-based subject matter of later education, but it can be argued that the job of the primary teacher involves a large element of managing learning rather than teaching. The result is that primary teaching can adapt more easily to using IT, since the approach adopted with IT is more closely aligned with existing good practice than is the case at other levels of education. The skills typified by the primary school teacher could, then, become more significant as the use of IT increases, with the interesting result that these skills will become more highly-regarded than is perhaps the case currently. This, in turn, might lead to a shift in teacher employment patterns - "primary school teachers" may find themselves in demand throughout education - as well as to a widespread need for training/retraining of teachers to emphasise these skills.

#### New Students

2.14 IT can also provide a means of increasing the potential audience in a given area of education. The opportunities which it offers for the physically and mentally handicapped to exercise control over their environment are already clear - IT gives them the ability to learn about the world in a way which the rest of the population take for granted. For the general student, the ability, through IT, to adjust the pace of learning to suit the needs of the individual reduces the frustration of those both above and below average ability who are faced with education adjusted to the norm, and encourages them to gain what they can at their own speed. There are also opportunities for those who wish to study at unsocial hours. The Open University already shows that many people are willing, or only able, to study out of normal hours and IT provides novel delivery mechanisms to allow them to do so.

2.15 The possibilities here are particularly striking with regard to training. IT-aided learning has already been used very successfully for training in many organisations, leading to significant cost reductions and improvements in efficiency. One obstacle to its further spread may be the reluctance of management to release staff from current work to participate in such training. In many cases, this is likely to be a greater problem than the costs involved (especially if these fall as the technologies involved mature). Consideration of incentives for employees to undertake this training partly or wholly outside of working hours is therefore needed. These could include financial and status

benefits, national recognition of the courses taken (eg recognised degrees) and, of course, improved job security through the skills acquired.

### Making Learning Fun

2.16 Above all else, IT makes learning more pleasurable. The ability to call up information, with virtually no effort, to establish relationships and to explore results at will, has a powerful attraction to students. When it is done well, IT-aided learning can strongly motivate students to feel that education is something they want to do, and not a necessary evil to be endured. The seemingly insatiable appetite of children for microcomputers is the most potent example of this enthusiasm. Although this often manifests itself in a passion for computer games, this reflects the nature of the software available more than any intrinsic limitation of the application of IT. Where good educational software can be applied in a relevant fashion to an area of learning, the additional control over their learning which this brings increases the appetite of students for the subject area under study. Much of the excellent material which was made available through the Microelectronics in Education Programme supports this, as does a good deal of the educational software available commercially from educational publishers and elsewhere. Even where the software is not specifically aimed at the educational market, it can strongly motivate learning where it is relevant and sufficiently flexible to meet educational needs. A case in point is the use of word processing to overcome the mechanical problems of writing and rewriting text, since these can be barriers to creative self-expression on paper. Although word processing programs developed for educational use exist, many commercial word processing packages can fulfil this function quite adequately and can encourage students to critically revise their written work after initial composition.

### - IT as a Knowledge Tool

### Managing Complexity

2.17 Our society's use of IT is expanding rapidly, and with this comes an increase in the amount of information available on every subject, to the extent that we are in danger of being engulfed by a flood of data from which we must



select that relevant to decision making. This trend also affects education but here the danger is exacerbated by the rapidly-growing numbers of researchers and other workers who contribute to the body of available information. Various estimates have shown a virtually-exponential growth in researchers and research results and, although some doubts have been cast on the contribution which this makes to real understanding, it is clear that it is increasingly important to be able to select quickly and meaningfully from what is available. If our educational system (at least at the higher levels) is not to be choked by the inability of the teachers simply to keep abreast of their field, then the assistance available through IT to order and select information must be fully exploited by both teacher and student. We are threatened by the need to respond to this increase in knowledge by narrower and narrower specialisation or by extending the period of study. Neither of these solutions is desirable but the only alternative is to learn more quickly and more selectively. IT offers the promise of mechanisms to support education in ways which could make this possible.

2.18 Information and knowledge are rapidly becoming the key resources for future economic success. The UK, with its comparatively-limited natural resources, has little option but to seek a strong position internationally in the provision, management and utilization of knowledge in order to maintain and improve our standard of living. In fact, of course, the UK has always been recognised as an important source of ideas and creative thought. We must ensure that this historical base is developed to allow the UK to reverse its relative decline as new economic opportunities, built around the exploitation of knowledge as a resource, open up. Education is the vital factor in allowing this to come about, and IT will be an essential tool for education if it is to succeed.

2.19 The use of IT in handling knowledge is therefore important in two ways. It is a stimulus to better understanding of the capabilities of IT for information handling in a society whose dependence upon, and use of, information is constantly increasing; and it is a way of increasing the effectiveness of education for an individual faced with the daunting prospect of an ever-growing mountain of knowledge to be scaled before achieving recognition and success. In both areas, IT offers both vastly improved access to large quantities of information and assistance with the organisation of that information.

## Access to Resources

2.20 A particular area to be highlighted in this context is the disparity in opportunity which students, particularly school-children, from different social backgrounds may experience in their access to IT resources. The early enthusiasm for home computers has mitigated the effect of limited resources in schools, but this very enthusiasm, paradoxically, may cause problems in the longer term. There are already signs that the limited capabilities of current home computers and their virtual dedication to playing games can create public disenchantment and a disinclination to invest in more advanced machines and software as these become available. A gap could therefore open between the better-off, where the cost of new equipment will not be significant enough to cause problems, and the rest. This could produce the social problem of "IT illiterates" unable to cope with the demands of a society based on information, and the establishment of a privileged elite in control of this vital commodity.

2.21 The effect of access to IT can be quite striking in the acquisition and manipulation of knowledge. In the Domesday Project, for example, where a description of contemporary Britain in words, pictures and sound is being integrated onto videodisc, teachers reported that young children have tackled data collection and analysis at a level which would have been impractical until they were several years older, were it not for the support which microcomputers provide. This indicates that many students could be capable of more advanced learning than is conventionally available, were the opportunity there. IT can provide that opportunity, but the resources must be available for this to happen, as must the skills to make selective use of information from the growing body of knowledge accessible through IT.

## Coping with Change

2.22 Consideration of IT in this context emphasises the importance of retraining in a society which is subject to constant change through the application and consequent effects of new technology. We will return to this theme, but it is worth emphasising here the relevance of retraining for teachers themselves. Some of the initiatives already underway to promote understanding about IT have been criticised because of their failure to provide adequately for the teacher training and retraining necessary to achieve the maximum benefits from the technology. There is, of course, a need to adapt initial teacher training to cater for the shifts in educational practice and

content, but it is clear that existing teachers, at all levels, will need retraining throughout their careers if they are to remain effective, and that adequate provision for this will have to be made on a continuing basis. This applies not only to teaching about new technologies but to the more fundamental changes in teaching practices which these technologies will accelerate.

- The Need for Research

2.23 Students learning with the aid of IT will be able to direct the course of their own studies to a far greater extent than is possible at present. This will lead to a much more independent attitude in students and an increase in their motivation. They will be able to control the pace at which they cover course material and will be free to review past material, explore interesting topics to the extent desired and even to strike off in new directions. Current IT information systems are intoxicating sources of serendipitous discovery and, in the future, as the technology develops to provide the user with help and useful hints for guidance through the information, they will become even more attractive to the student. Despite this, there will be those - children and adults - whose background and attitudes make learning through the use of such systems unsuitable. Some will feel ill at ease with the technology and, although this will doubtless bring them problems in a world where use of IT is an everyday skill, it must be possible to allow them access to a wider education without calling on that skill. Others will not think in terms which make learning through IT appropriate - visualising real concepts from representations on display screens may not be easy for everyone. There will always be value in the direct association of learning with the real world, especially for the young. Replacing such experience with simulations - even with the capability to make IT systems interact with physical objects through control interfaces - will not be a complete substitute. It is not clear where IT can be used most effectively, since there is not complete understanding of the interaction between IT and learning - as was pointed out in the 1983 report by Sage and Smith of the SSRC "Microcomputers in Education". We support the conclusions of this report, that increased research into the use of IT in learning and into the effects of IT upon the curriculum should be carried out, together with research into methods of assessment possible with the use of IT. We also see a need for research into the nature and application of IT tools which could be useful in assisting teachers in their work.

Recommendation: Government funding should be made available for a programme of research into the use of IT in education and training, and into IT's effect on teaching and learning. This research should examine the opportunities and limitations of IT-aided learning and should identify the most effective way of applying IT within the formal educational system and elsewhere, in support of both student and teacher.

### 3..... Where is IT Going?

#### - Technology and Education

3.1 Discussion of the potential effects of IT in education is difficult without a touchstone against which to assess the possibilities, while speculation on future technology trends is a risky exercise in such a volatile area. It is all too easy to seem either hopelessly short-sighted or overly imaginative. Nevertheless, some general trends can be perceived and these can provide a background against which examination of the educational implications can be judged.

#### Hardware

3.2 There is a clear trend to increased power (eg processing capability, memory size) and functionality in the IT products for the domestic market. Personal computers are following a similar evolution to that already observed for mainframes, minicomputers and, most recently, business microcomputers. The move from 8-bit to 16-bit and even 32-bit processors is well underway and the availability of ever-denser VLSI is making large memories and highly-complex support chips increasingly common. At the same time, the software incorporated in these machines is also evolving, with increasingly-sophisticated and easy to use interfaces for control of the computer's functions (ie the growing emphasis on "user-friendliness") and powerful application packages aimed at extending the usefulness of home computers beyond the simplistic games arena. There has been a fall off in demand for home computers, but the advancing technology will continue to allow the transfer of techniques and equipment from professional applications to the domestic sphere, and this will also benefit the educational user. There is the emerging promise of the integration of videodisc technology with these computers, both as massive data storage units and as a source of video images to be mixed with computer graphics and hence further enhance communication between machine and human. Direct voice entry has also been demonstrated (in a limited fashion), and as this capability matures and becomes generally available, it will extend the process visible in developments like the "mouse" input device, in further removing the barrier of the keyboard.

3.3 It is not clear what special needs, if any, exist or may develop in the educational sphere for equipment which will not be met by developments for the domestic market (which, in turn, is fed by developments for business users). There is also uncertainty as to the extent to which any special needs which may exist would be met for education alone, since the relative size of the educational market makes it less attractive to equipment (and even software) producers. While this is unlikely to be a significant problem on the hardware side, there may be difficulties with the different formal and informal study environments in which educational software is used and the suitability of educational software for use with groups, individuals, within the home, etc, will depend on the flexibility provided through more complex programming. This, in turn, will rest on the use of advanced software development techniques and tools, if it is to be cost-effective.

3.4 The information transferred between IT systems and between these systems and human beings comes in many forms - for example, programs and data, sound and vision. A variety of delivery systems for one or more types of information exist, and more are becoming available. We have broadcast radio and television services and - increasingly - cable, and a variety of local storage media including audio and video cassettes, fast-access magnetic media and videodiscs. A strong trend in this area will be the move away from specialisation in the type of information provided by each delivery system. We see today, through systems like telesoftware, the use of broadcast services for the dissemination of data, and of course audio cassettes are in widespread use for the storage of domestic computer programs. On the broadcast side, cable technology will provide a capability for carrying all kinds of information in a unified communication structure, while for local operation videodiscs and the rewriteable optical storage systems into which these are being developed, will provide a similar capability. This integration will be particularly important for communications between human and machine. The limited capabilities of current systems to present information in pictorial form (eg in computer graphics) will be enhanced by the ability to mix a machine-generated display with a stored picture containing a great deal more detail, especially with the increasing resolution of displays.

3.5 There will also be the growth of new delivery systems such as Direct Broadcasting by Satellite. The most significant from the point of view of educational applications probably will be the expansion of computer networking into new areas, particularly the home. The introduction of home networks,

allowing control and communication involving domestic articles like cookers and central heating systems, will further increase the awareness of the general public about IT and its uses, and will make the idea of communication over networks more acceptable. Growth in networking, for fun and serious uses, will introduce new possibilities for education both for information access and for group interaction. The growth in interest in the use of distance learning (eg in Aston and Heriot-Watt universities, and in the Open Tech programme) points to the importance of this aspect of IT for education. Electronic publishing, for example, could offer a cheaper and more effective method of distributing support material than text on paper.

## Software

3.6 Improvements in the process of specifying, designing and validating software in a rigorous and disciplined environment (ie "Software Engineering") are beginning to offer real returns in the efficiency of software development, and to increase significantly the complexity of projects which can be tackled economically. Although productivity improvements may be most visible over the entire lifetime of software (i.e. through reduced maintenance effort due to the higher quality of the programs produced), there will have an effect on the scale of the educational task which may be attempted with the aid of computers and IT-based systems generally. In conjunction with this, improved understanding in the area of human-machine interaction will effectively widen the window through which the user can interwork with the computer system. It may be possible to overcome many of the shortcomings of present-day educational software, where the complexity of handling the range of learning behaviour exhibited by different students overwhelms conventional programming approaches. Currently, there is little attempt to match the operation of the program to the cumulative pattern of learning exhibited by the user. Instead, the programs deal with common student reactions to the educational material included, or classifies many reactions together or, perhaps, simply ignores some possibilities. Even more importantly, the programs are unable to assess the degree of learning exhibited by an individual student and the areas of difficulty where further help is needed. New approaches derived from artificial intelligence work offer the opportunity to deal with these problems of responsiveness without attempting to program for each individual case specifically as one must with conventional software.

## The Educational Dimension

3.7 Looking a decade or so ahead, the individual student can be expected to own/operate a personal computer terminal of considerable intrinsic processing power and storage capability - perhaps 100 to 1000 times more powerful than is common today. This will be fully portable and will have a built-in flat-screen display with capability for very high resolution colour graphics. Input may still be via some tactile device (ie keyboard, mouse, graphics tablet etc) but the capability for speech recognition may also be present. In any event, command input will much less constrained than at present, as the personalised terminal will have learned the idiosyncracies of the owner's vocabulary and habits of communication. Speech generation will certainly be economical to provide and hence computer output will be possible through voice as well as via the screen. It will be common for several screens to be used, or at least for a single screen to be divided into several display windows, to allow multiple display outputs to be provided simultaneously, together with sound/voice output. Some form of hard copy device will probably be incorporated too. It is also possible that the display technology used might allow a degree of three-dimensional display. The operation of the terminal will allow the integrated reproduction of video and audio together with generated computer output. This will be controllable interactively and will depend upon optical disc technology as the storage medium for all the types of information required. The optical disc system may well be integrated with the portable terminal, but even if it is still too bulky to allow this to be done, it can be used to enhance the basic capabilities of the terminal when it is installed as a fixed facility. On the software side, large and complex programs will be needed to exploit the power of the hardware available. Improvements in software support tools for use during software development, and in software engineering techniques generally, will allow substantial and educationally-sound programs to be created. However, the demands of users and the capabilities of IT-based learning systems of the kind described, may outstrip the software which can be afforded.

#### Affordability

3.8 The question of costs and available finance is, of course, central to consideration of any effective use of IT within education. Financial constraints on our educational system affect the purchase of expensive IT equipment and it is to the credit of all those involved in education, and particularly the schools, that such significant and successful efforts have



been made to ensure that students have access to IT as an important part of their education. We look later at some specific ways in which the good results of existing initiatives can be built upon, but it is clear that the successful use of IT generally in education will depend upon adequate funding being available to encourage its development. The specific equipment projections made in this report imply similar costs to current personal computers, given expected increases in complexity and reductions in costs, and their widespread use for education may depend upon a trend towards student ownership such as is seen in the US, where some university courses now assume possession of one of the more powerful personal computers in use there. The situation with regard to software may follow similar lines, but there remains a significant problem in the financing of educational software development in the absence of a mass market for these programs. Currently, the DTI Schools' Software Support Scheme is a step in encouraging the takeup of existing educational software and this will need to be maintained and developed as the applications for such software widen.

3.9 There are many instances at present where teachers have themselves produced educational software for use in schools and elsewhere, some of which is amongst the best that is currently available. It is obviously desirable that this should continue, but one barrier in the future will be the increasing complexity of the programs required to take full advantage of the hardware capabilities and of the educational applications which can be tackled in this way. This will force an increasing investment in software specification, design and implementation expertise for the development of educational software, which will be beyond the abilities of teachers who are only involved in programming on a casual basis. However, improvements in software tools generally and, specifically, the development of software tools aimed at the educational user could reduce the scale of this problem and could extend the range of educational software applications which such users could feasibly produce themselves. The difficulties of developing current educational programs actually on the target microcomputers, for example, sharply constrain the size and complexity of the program which can be developed, and this problem is compounded by lack of tools to manage, say, the production of graphics within such programs. If such constraints are not to force educational software development to become a highly-expensive activity involving teachers at the specification stage and a professional software development team for the actual production of programs, then teachers must have available powerful support tools to assist them in developing their own sophisticated educational programs and the courses within which these programs are used. An area for future

research and support should therefore be the definition and development of a "teacher's workbench" for this purpose. This will bring enormous returns in the variety, quality and relevance of educational software available for use throughout education and training.

- Societal Influence

3.10 Looking outside of the immediate educational environment, IT will be a pervasive influence throughout our lives generally. Computer terminals of the kind already mentioned will be able to operate in conjunction with a wide variety of computers and other IT equipment throughout business and in the home. Indeed, such a portable terminal could be the personal controller used by the owner for management of his or her living environment generally, and the educational aspects of its operation may simply be a part of its normal range of functions. The increased use of IT in the home (again particularly computers) may make the inclusion of an educational element in games and entertainment easier, and increases in leisure time may make education as entertainment commonplace. The role of formal education vis a vis the home may shift because of the increasing availability of home-based resources, and schools may have an increasing part to play in the social life of the community, as co-ordinators as well as providers of education. These possibilities go beyond considerations of technology per se and are part of the effects which this technology, inside and outside of the education system, will have on the role of formal education in the community.

Public Attitudes to IT

3.11 More widely, the public perception of IT will influence its use in education. The threat of unemployment through the automation of jobs and the separation of policies aimed at wealth creation from those intended primarily to increase employment in the post-industrial society, may lead to public disenchantment with the social consequences of the spread of IT. On the other hand, if the release of human resources implied by the widespread application of IT leads to a blossoming of new business opportunities, then the use of IT in education will be encouraged. We strongly support the view that the spread

of IT will be of benefit to society and expect that this will bear fruit in public enthusiasm for its use in education.

- Learning Machines

3.12 As IT develops, the question arises of what limitations exist on its application to education. There will be those who doubt the feasibility of IT systems capable of reproducing the skills of good - or even bad - teachers and others who, even if such systems were possible, would question the results of their use and would regard a learning environment of this kind as sterile or soulless and equivalent to the "programming" of our young people. Developments in both hardware and software indicate that, in terms of sheer processing power and complexity, machines to rival the human brain are likely within the next decade. Of course, raw processing power is not the only, or even the main, consideration when comparing human and computer abilities - the use made of the information processed is a more important matter. Here it is the software aspects which dominate and, particularly, the area of artificial intelligence research and related fields, such as cognitive psychology and neuroscience. These disciplines have made great strides in understanding - at least in part - how we think and apply our knowledge and experience in solving problems. More importantly, perhaps, in the present context, there have been impressive demonstrations of how human expertise, even when not articulable by the expert concerned, can be captured and reproduced. The methods used in such Expert Systems do not mimic human intelligence but instead employ the enormous information-processing capability of computers to achieve similar results. Abilities once considered to be essentially human, such as chess playing, have been reproducible in software for some time, and systems have been developed (in limited domains) which can out-perform the human expert. Indeed, it is the skills which we take for granted (such as visual perception) which are the most difficult to simulate. In many cases, areas of expertise which we would have unhesitatingly defined as essentially human have proved relatively easy to demonstrate on automated systems. With this in mind, it seems unwise to reject the possibility that many aspects of teaching skills will eventually be reproduced in some way.

Automated Learning

3.13 The role of the teacher is not confined simply to the communication of information, of course, or even to assisting the student in assimilating and categorising that information in order to gain real understanding and knowledge. There seems a real possibility however, that it will be feasible in the longer term, to provide these aspects of a teacher's role through an IT-based learning system. Given the sensitivity of the matter and the complexity of the problem itself, it would appear that any transition to such a situation would be a slow process, but it emphasises that the effect of the introduction of IT into education will be to begin a process of change which will continue almost indefinitely. To say that such things are possible, however, is not necessarily to say that they are desirable. What of the concern that there is some loss of humanity with such use of IT-based systems? Firstly, it must be pointed out that students using such systems are not "being taught by a machine", they are learning from those who created the courseware which is embodied in the hardware and software of the system. This is not a meaningless distinction. The creators of the courseware have the same task as an ordinary teacher - to respond to the needs of the students in guiding them through the curriculum under consideration. Their task is made more difficult by the fact that they have, in one sense or another, to anticipate the range of student reactions at every point of the course material to which a "real" teacher can respond as they occur. The mechanical nature of the intervening hardware and software only intrudes where it is inadequate to meet the demands of the teacher and the student but, as the technologies involved develop, this difficulty will decrease. We do not envisage that machines will replace human teachers but we do expect them to provide valuable assistance throughout education and to allow the teacher to concentrate on helping the student to make the most of what IT can offer.

- The Need for Funding

3.14 Considering the nature of the formal educational system in the UK, much of the initiative in creating and responding to changes in education must involve Government, and this is reflected in our recommendations. We are delighted at the various Government initiatives which have already done a great deal to encourage the spread of IT equipment, software and services throughout

the educational system and would seek to build upon this success to ensure that these initiatives mature into a comprehensive application of IT to relevant areas of education. This implies a continued commitment to the use of IT and also, we believe, to a commitment to explore new opportunities and applications which become available through technological development and the growing awareness of educationalists concerning the relevance of IT.

Recommendation: There should be an additional budget, on a continuing basis, for IT-based applications in schools, colleges, universities, etc, to maintain the momentum of the investment already made in IT. In addition, demonstrator projects should be set up, to establish what can be done with IT and to stimulate innovation within both the educational system and the IT industry, including the development of a set of software tools to enable teachers to develop educational software and courseware more easily than at present. As well as the general support for IT, a small number of educational establishments, at all levels, should be sufficiently funded to develop applications of IT beyond that possible with the limited resources available generally.

#### 4..... What Will IT Change?

##### - Access

#### The Changing Role of Formal Education

4.1 IT will have a sufficiently wide field of application in education that it may have the eventual effect of removing formal education from its position at the centre of our educational system. The acquisition of information and knowledge (and, eventually, the assimilation of this information with existing knowledge and understanding of the relationships within this growing knowledge structure) could be carried on outside, as well as inside, educational establishments, with the support of IT-aided learning systems. Although initially such systems may not be adequate to support many of the functions of the existing formal education system, their capabilities will improve as the performance of their underlying hardware and software technologies continue to advance. Eventually, the issue of the desirability or otherwise of employing such systems as alternatives to conventional education must be faced. Of course, even if there is a significant shift away from some aspects of education within the formal system, there remains the role of schools, etc, as places of social interaction where the students learn the ability to work with others, both in terms of the specific subjects which are taught in this way and in the wider sense of a general ability to interwork successfully with the rest of society. Other social skills and attitudes, concerning communication abilities, individual morality and sense of personal worth, can only be fostered in a group. Clearly, the educational establishments provide a valuable function as meeting places to allow this kind of social intercourse to go on and teachers have a vital role in assisting such general personal development of their students, but IT will also affect this aspect of education.

4.2 In reacting to the widening of education beyond the boundaries of the formal system to a much greater extent than happens today, educational establishments and those who work within them will have to see their role within the community as much wider than is the case at present. Schools, particularly, because they are more numerous than places of Further and Higher Education, will become social centres for those of all ages. Many of their functions in

this expanded role will continue to have an educational aspect - adult education, sports and "out of hours" education using the IT systems themselves - but there will also be uses to be made of the accommodation and facilities which have less of a connection with education - clubs, organisations and self-help groups will naturally turn to their local school for a meeting place. This process is already underway, of course, but it will be accentuated over the next decade as schools and other educational establishments adjust to find a continuing role, while the size of the schools population shrinks and the reducing numbers make their way into tertiary education. IT will accelerate this process because of the improvements in the efficiency of education which it will bring. Another possibility in this area offered by IT is that the social interaction provided by the physical gathering of students at schools and colleges might find alternative expression through groupings linked electronically by cable, computer networking, or some similar IT-based mechanism. Much has been made of the shrinking need for offices - and even cities - in a world where one may communicate anywhere at a keystroke. The same argument applies to interaction within education. With sophisticated processing and communication facilities available to every student in the future, one may envisage an individual belonging not to one educational group drawn from a small geographical area and, perhaps, of very similar ages and social backgrounds, but to different groups in each study field, with members separated by large distances and of widely-differing types, but sharing an interest in the common subject, perhaps from a particular viewpoint. There are disadvantages as well as advantages to this, many of the educational advantages of a group would be lost if there was little difference in point of view amongst those involved - but a greater element of choice would be possible concerning those with whom students were to share educational experiences.

#### Control of the Process

4.3 For good or bad, the impact of IT on education will not be wholly under the control of the traditional educational establishments and organisations. The major alternative force to these bodies will be the growing recognition that education offers significant commercial opportunities now that IT provides a way to develop mass-produced "education delivery systems". This is a crude way to describe IT-based learning systems and it is important to keep in mind that, although such systems may be constructed and sold as standardised items, there is no need for them to provide or support a standardised education, because of the flexibility and adaptability which has been discussed.

Nevertheless as noted in the previous ITAP report "Making a Business of Information", technological developments make the concept of education as a consumer product a real possibility. Formal education will thus face the challenge that, on present evidence, the home offers a larger, and therefore more commercially-attractive, market for such systems than does the existing educational system. Without imputing base motives to potential vendors of such systems, the home market is also more attractive because of the comparative lack of sophistication in the consumers concerned. Educationalists must ensure that they are aware of the dangers for the quality of education that this represents, and must be ready to respond to appeals for advice on appropriate systems and courseware. If properly handled, the growth of a commercial education market based on IT is an opportunity for those in the formal education field to consolidate their position as individuals at the heart of education, even as the system of which they are part is displaced from this position, by building on their knowledge and experience of good practice. But it requires awareness and acceptance by them that alternatives to formal education are on their way. If this opportunity is missed, formal education may lose a great deal of its influence to largely-commercial interests and this may have calamitous consequences.

- Timescales

4.4 IT, with its short cycle times, will have a major influence on educational timescales, forcing a much shorter cycle for change than the decades which apply at present. Something of this effect (although in a slightly different context) can be seen in the continuing concern about skills shortages in the IT field, and the pressure for fast-acting measures to deal with these. There is a general trend towards shorter cycles for change as a result of the introduction of IT (with its short cycle times of less than five years). Education will prove no exception. It will follow the parallels in other areas where IT has already established itself and where readjustments to cope with an increased pace of change have been necessary (eg banking, transportation, military strategic planning).

4.5 Education will be affected by the development of IT both through the new opportunities which will be created within the educational system and also by the growth of supplements, and even alternatives, to formal education outside of this system. The Open University is perhaps the most striking example in the



UK of an educational body which exploits the opportunities of IT (in this case, broadcasting in particular) to allow it to provide an educational service significantly different to that offered by conventional educational institutions. Other bodies are developing a role in education and training, and the work of the Manpower Services Commission, in particular, is acting as a catalyst in this. These influences outside of the traditional institutional structures will, to a large extent, force the pace of change and it is clear that educationalists must seize the opportunities offered by IT, in order that the growth of alternative educational methods is moderated by sound educational principles and that educationalists maintain the relevance of their own approach to education in a fast-changing world. There is widespread acceptance of the concept that we are entering an era where we need to acquire skills and knowledge throughout life, because of the rate at which existing abilities become outdated. The application of IT to education highlights that the profession of teaching will not be exempt from this need.

#### - Applications

##### Continuing Education

4.6 The pace of technological change in society is increasing sharply and no one can now expect the skill and knowledge which they possess at the beginning of their working lives to be adequate until they retire. IT is the main technological spur for the changes but it can also assist in dealing with them, by supporting the retraining and education of those affected. IT-aided learning can be provided more widely and more cheaply than conventional techniques and, since it can be possible for the student to learn at an appropriate speed and at convenient times, there is more freedom to organise education around other activities, including work. In the future, we are all likely to find ourselves accepting and expecting the need to regard education as a continuing process throughout life. IT will allow us to fulfill the need without the massive expense and disruption of our lives which would otherwise result.

4.7 Employers will have to recognise their responsibility in providing adequate retraining for their staff and individual workers will need to embrace the opportunity to update their skills. The commitment to continuing training and education must not be one-sided, so that neither employer nor employee bear

the full load. Employers must regard this as one aspect of maintaining an attractive work environment which will encourage valuable employees to remain with them, while employees must be prepared to recognise the personal benefit which they gain by accepting that some studying should be done out of working hours, etc. This process must apply, of course, to the education system itself, with provision for the continuing training of teachers in teaching technique, subject material and the support (such as that provided by IT) available to them.

#### Recreational Learning

4.8 There is enormous potential in the application of IT-aided learning for recreational purposes. At present, some personal computer games include an educational element (although this is more frequently related to the improvement of manual dexterity than intellect!) and other forms of IT have found educational applications (for example, video recorders used in sports coaching). We expect such applications to expand enormously, and hope for a much more positive attitude to learning as a result. The experience of encouraging the student to learn by making education more pleasurable will bring benefits also to other forms of learning through a better understanding of how to motivate the student. Initially the packages available are likely to be trivial (like many current educational programmes) or expensive (like a recent example where commercial flight simulator equipment has been used for amusement rides) but improvements and falling costs in the technology will bring more and more that is both stimulating and useful within the means of practically everyone. IT-aided education could be a major leisure industry of the future.

#### An Education Industry

4.9 The end result of this process of widening interest in IT-aided education is likely to be the growth of a service industry to provide some forms of education. Job-related training is already carried out on a commercial basis and IT has been enthusiastically embraced here with films, video cassettes and interactive video discs firmly established as important support tools. At the same time, television has created an interest in educational broadcasting through documentaries, nature programmes, and, of course, schools and Open University broadcasts. This association of education and leisure will be developed as cables systems increase the availability of special interest programming, and as other areas, such as educational software for personal

computers, grow in importance. The availability of non-UK educational software in the UK will have implications for our national cultural identity, while the export of our educational attitudes through the overseas marketing of British educational IT could bring this country advantages similar to those gained from the education of foreign nationals here.

4.10 With such a shifting balance of relationships, there is ample opportunity for wrong decisions to be made and harmful conflicts to develop. It is essential that the process of change within education, resulting from the increasing availability of IT-aided learning techniques and systems, is co-ordinated to ensure that a new equilibrium is achieved as quickly, and with as little upset, as possible. All those involved with education must recognise the need to participate in this process. More effective education and training through the use of IT-aided learning will produce competitive advantage due to a better-educated workforce and the UK must ensure that other countries, particularly those without a well-developed educational system at present, do not apply these techniques while we stand by and lose the lead which we have developed in this area.

#### - The Need for Awareness

4.11 IT will cause a shift in the traditional balance of the teacher/student relationship. Beyond the student/teacher and student/student relationships within the formal education system, the student has available sources of information and attitudes from family, friends and existing IT systems - principally television - which alter the way in which teacher and student interact. IT will continue to change the existing balance, initially by providing an effective alternative to the teacher for the transfer of information. It is clear from the experience so far in the use of microcomputers in schools, that IT can motivate students strongly, giving it a powerful advantage. Obviously, the gathering of information is only part of the learning process. There is also a need for guidance and assistance for the student. The teacher will fill a vital role as the manager of the learning process even in an educational environment where IT is the main source of raw data.

4.12 The changing role of teachers in such an environment will shift the

emphasis on the skills which they bring to their work. Much is said and written about teacher training, but the pejorative overtones of this term when applied to the vital role which teachers perform is unfortunate. There is a need for heightened awareness amongst teachers at all levels and in all disciplines of the opportunities which IT can provide for them to exercise their teaching skills effectively. This goes beyond the training of new teachers and retraining of those already in post to use IT equipment, although this is an important prerequisite of the effective application of IT in teaching and learning. If the investment in IT resources for education is not to be nugatory, it is essential to educate the teachers themselves in being good teachers, where this is not already the case. By freeing the teacher to give more time and attention to teaching, IT will also highlight any individual deficiencies which exist. This must be met by an imaginative and extensive programme of assistance for new and, perhaps more importantly, existing teachers. This should apply at all levels of the educational system, but particularly in the schools where great demands are being placed on individual teachers to use IT with little support available.

Recommendation: The need to back up the provision of IT equipment and services with adequate support must be recognised. Training, retraining, consultancy, etc, must be regarded as essential elements in the realistic introduction and use of IT in education, and continuing Government funding must be made available for these aspects. At the same time, teachers themselves must take a positive attitude to the use of IT in education, through involvement in updating skills and in identifying areas in which IT is useful and relevant (or, indeed, in which it is a hindrance) to their work.

## 5..... How Will IT Fit In?

### - IT and Society

5.1 The advancement of Science and Technology and in particular the very rapid development of Information Technology is leading to the establishment of what many have called the Information Society. There is no doubt that by the year 2000, knowledge will be the key strategic economic resource within the developed countries of the world, and the richer the knowledge base of any given country the more chance that an enterprise culture will exploit it for the common good. This together with the explosive growth in the total body of knowledge makes it vitally important that we efficiently manage the knowledge base of our society. Such management involves gathering storing and processing that knowledge; making it available to all sectors of current society who can benefit from it; making it available to future citizens through educational and training processes; and ensuring that those knowledge assets are enlarged through well conceived research and development strategies. It is clear that in all of these activities our education and training institutions and systems have a key role whether in the public or the private sectors, in the formal education system or in other arrangements, in the teaching institutions or at work or at home, in the childhood and youth of our citizens or at their no less vital later stages of development.

5.2 The new technology for handling information and knowledge is profoundly affecting all activities in our society. All aspects and sectors of industry, of trade and commerce, of Government administration, and of professional activities in law and medicine and so on. The skills and knowledge required in all of these activities are changing at an unprecedented pace and important changes in training and in professional ability requirements are taking place in ever growing profusion.

- IT and Education

5.3 Educationalists not only have an important part in bringing about these changes, but they are themselves the subjects of them. Like other professions and trades they too must change their professional training and adapt to the changes in the society which they serve. They must retrain existing teachers at a pace and a frequency never before required, and which is certain to increase. Again like other professions they must make the double adaptation - to the changed demands being made upon them by a developing society and to the use of the new tools and techniques which technology is offering to them in their work, and which we believe will help them to overcome time and distance problems in delivering education, to improve the quality of the service offered to students, to improve the administration of the whole educational process, and to improve the efficiency with which they manage the learning process.

- Education and Change

5.4 Advancing technology is only one of the factors affecting our educational system. Other influences can be summarised as follows:-

- The explosion in available knowledge is making the task of providing effective education increasingly demanding.
- The growing need to recognise that education must be a continuing process throughout life ill fits our present education attitudes and institutions.
- Demographic facts are causing contraction of some educational establishments and concomitant restrictions in spending are hard to manage in our present institutional structures.
- Extensive changes in the curriculum and in related examination systems are adding to the problems to be faced.

- Teachers are torn between the need to emphasise their professionalism, as pointed out by Lady Warnock in her recent Dimbleby address to the BBC, and the difficulties of the current pay dispute.
- The difficulties in attracting and retaining in teaching professional staff of the appropriate quality in many subjects are understandably increasing - to the regret and increasing anxiety of industrial and commercial managers.
- Traditional boundaries between academic disciplines are becoming increasingly inappropriate as new combinations of knowledge are required in our developing society.

5.5 Our review of the changes which IT is bringing to education shows not only the importance of the changes which IT itself is causing but shows how other influences for change are highlighted by the technological developments. And it demonstrates how the technology is accelerating the pace of change throughout education and training.

- The Need for Enquiry and Debate

5.6 We recognise that much thought and attention is being given to some of these difficulties, notably to the supply of scarce skills - not least, ironically in the IT area itself. The work of the Butcher Committee on IT Skills Shortages, and of the IT Skills Agency which was set up as a result, has focussed on the immediate problems in this area but, despite the possibility of a shift in attitudes in the relationship between education and industry, this is essentially a fire-fighting exercise. We do not question the importance or usefulness of this work, or the additional university and polytechnic places which have been funded through the related Engineering and Technology Programme, but they are part of a pattern for which overall coordination and long-term planning is apparently absent.

5.7 We note that the Committee of Vice-Chancellors and Principals, in its response to the Green Paper on Higher Education in the 1990's, called for widespread analysis and debate on the future Higher Education needs of the UK. We strongly support this call but we think it should be extended to include the

whole of education and training, to ensure that a proper balance can be attained throughout and that the growth of new alternatives can be accommodated.

5.8 We note the difficulties which confront the Department of Education and Science in the development and co-ordination of an overall policy for education given the distributed network of local education authorities and the important regional differences, especially those in Scotland and Northern Ireland.

5.9 We note in Government the separate handling of training (as opposed to education) through the Manpower Services Commission.

5.10 We note also that much of the initiative from Government with regard to the application of IT within education has lain outside of DES - notably with DTI.

5.11 We think that consideration of the influence of IT on education cannot be separated from the larger picture of change throughout education. To recommend further separate Government initiatives in the development of the use of IT within Education would be to fall into the same difficulties as those experienced by all other limited initiatives. We, therefore, do not do so. It is clear that the nature of society within the UK (and indeed in other developed countries) is vastly different from that which was considered at the time of the 1944 Education Act and that it is the changes which have taken place since that time which are subjecting our present educational system to extraordinary stress.

5.12 It is equally clear that a major investigation of all aspects of the changing educational needs of the UK and of the changes to existing arrangements which will be necessary to meet those needs will have to be undertaken if a sound and lasting system is to be developed. Recognising the far-reaching implications of an enquiry of this nature, and the level of debate which will be required if its conclusions are to be sound, we believe that eminent figures in education, Government, industry and commerce should be brought together as a matter of urgency to consider this matter.

5.13 We do not lightly recommend such an enquiry. But we are convinced that our educational system will be a major, perhaps the dominant factor in ensuring the economic prosperity of the UK in a world-wide information society, and that it is therefore a matter of profound national importance to make soundly-based plans to allow us to achieve the right system at the right time.



5.14 We are aware that others have made recommendations. The House of Lords Select Committee on Science and Technology, for example, called for a National Education and Training Board in its report "Education and Training for New Technologies", although this was intended to have a narrower focus than we propose and did not find favour at the time. More recently, the Advisory Council for Applied Research and Development (ACARD) have responded to the Green Paper on Higher Education in the 1990's with a recommendation that a new advisory body should consider how the whole educational system can better respond to national needs, and our own recommendation firmly supports their line.

5.15 It is clear that there is widespread and growing concern about the many problems which education and training in the UK is facing. We believe that an enquiry is urgently needed which will consider all aspects of the subject and which will lead, if necessary, to the establishment of a standing advisory body in this area. Education is the means by which we ensure our future development, prosperity and cultural identity. If our education system decays our nation will decay with it.

Recommendation: A Commission of Enquiry should be appointed with a remit to consider the educational system which this country will need for the next century.

More specifically the commission should be asked

- To examine the changes which are taking place in our society and in the light of those changes (and those taking place in other countries) to determine the future education and training needs of the UK.
- To consider how those needs can best be met recommending where necessary changes
  - To our current institutional structures
  - To the locus of policy formulation for education and training

- To level and sources of funding
- To the collaboration between academia and industry commerce, the professions and Government in the determination of requirements, in research and in the deployment of knowledgeable people to the teaching role.
- To consider how the establishment of a sound domestic education and training policy can support UK activities overseas in terms of both cultural influence and commercial exports.
- To recommend any new legislation or changes to existing legislation necessary to implement the policies which are proposed.
- To consider the need for a permanent body to keep national education and training policies under review in the light of the now ever-increasing pace of technological and societal changes.

LIST OF ORGANISATIONS CONSULTED IN THE PREPARATION OF THE REPORT

BBC  
Brighton Polytechnic  
British Universities Film and Video Council  
Channel 4 Television  
Chiltern Advisory Unit for Computer Based Education  
Club 403  
Control Data Corporation  
Council for Educational Technology  
Department of Education and Science  
Department of Trade and Industry  
Ginn & Co  
HMI  
London University Audiovisual Centre  
Longman Publishing Ltd  
Manpower Services Commission  
Microelectronics in Education Programme  
Open Tech Programme  
Scottish Council for Educational Technology  
Schools Curriculum Development Council  
Scottish Education Department  
Scottish Microelectronics Development Programme  
Society of Education Visitors  
Sinclair Research Ltd  
The Hatfield Polytechnic  
The Open University  
TVOntario  
University of Cambridge  
University of Kent

IND POL Utomaha Tech PT4



CF 2

**ROCC Computers Limited**  
Kelvin Way, Crawley, West Sussex, RH10 2LY  
Telephone. Crawley (0293) 31211 Telex. 877369

Ref: MJA/skg

7 April 1986

Rt. Hon. Margaret Thatcher  
The Prime Minister  
10 Downing Street  
London SW1

*Prime Minister*

*W*  
*7/4*

*ms*

*Dear Prime Minister,*

Thank you for your letter of the 4th April 1986 and your kind words.

I am sure you have made the right decision in standing down ITAP and merging its work with ACARD. In addition, the new IT advisory boards in the Department of Trade and Industry should now provide a continuous, formal service of advice from industry.

ITAP was a brave innovation recognising an industrial development that was rapidly coming of age. ITAP was essentially an 'ad hoc' group that worked primarily because of chemistry between a few people who showed an intense common interest, and secondly, because there was a Government environment that wasn't frightened of change.

ITAP was an agent of change. It was interesting, enjoyable and sometimes great fun. Only time will tell if it made a really useful and memorable contribution.

Yours sincerely,

*Michael J Aldrich*  
Michael J Aldrich

Ind Pol: Info Tech  
PE4



10 DOWNING STREET

*From the Private Secretary*

**MR. STARK**  
**CABINET OFFICE**

The Prime Minister has seen Sir Robert Armstrong's minute of 2 April about the future of the Information Technology Advisory Panel. She has agreed that the work of the ITAP should be subsumed within that of ACARD in the way proposed in that minute and she has written to the members of the Panel accordingly.

Timothy Flesher  
4 April 1986

8RW

A 72/86

file

Bm



cc 10  
(only this one  
with list of other  
recipients)

10 DOWNING STREET

THE PRIME MINISTER

4 April 1986

*Jean M. Aldrich*

Since the formation of the Information Technology Advisory Panel (ITAP) in 1981, you and the other ITAP members have carried out a series of important and influential studies which have been most helpful to Government and the United Kingdom in general.

Your published reports on "Cable Systems" and "Making a Business of Information" have been widely read and discussed both in this country and abroad, and I am informed that you are about to report on the information technology in education and training. Within Government, your confidential advice on a number of issues has proved both thought-provoking and useful in the formulation of policy towards IT.

Partly as a result of ITAP's own work, however, the environment within the United Kingdom for IT has now evolved considerably from that which existed at the time when I asked you and your fellow Panel members to come together. IT is now established as an important market sector and the advisory bodies have been set up within the Department of Trade and Industry.

I have therefore concluded that it would be best to stand down ITAP, and to include its work within that of ACARD in order to ensure that independent advice is still available

*JKW*



at the centre of Government.

May I close by thanking you for the efforts which you have put into the work of ITAP over the past years. I am most grateful for the time and energy which this has involved and for the quality and relevance of the advice which has resulted.

Yours sincerely  
Margaret Thatcher

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M.J. Aldrich, Esq.

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10 DOWNING STREET

THE PRIME MINISTER

4 April 1986

*Dear Mr. Cohen,*

Since the formation of the Information Technology Advisory Panel (ITAP) in 1981, you and the other ITAP members have carried out a series of important and influential studies which have been most helpful to Government and the United Kingdom in general.

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*SRW*

at the centre of Government.

May I close by thanking you for the efforts which you have put into the work of ITAP over the past years. I am most grateful for the time and energy which this has involved and for the quality and relevance of the advice which has resulted.

Yours sincerely  
Nayanshanker

I.H. Cohen, Esq., C.B.E.



10 DOWNING STREET

THE PRIME MINISTER

4 April 1986

Dear Mr. Jarvis,

Since the formation of the Information Technology Advisory Panel (ITAP) in 1981, you and the other ITAP members have carried out a series of important and influential studies which have been most helpful to Government and the United Kingdom in general.

Your published reports on "Cable Systems" and "Making a Business of Information" have been widely read and discussed both in this country and abroad, and I am informed that you are about to report on the information technology in education and training. Within Government, your confidential advice on a number of issues has proved both thought-provoking and useful in the formulation of policy towards IT.

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at the centre of Government.

May I close by thanking you for the efforts which you have put into the work of ITAP over the past years. I am most grateful for the time and energy which this has involved and for the quality and relevance of the advice which has resulted.

Yours sincerely  
Margaret Thatcher

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C.A. Davies, Esq.

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10 DOWNING STREET

THE PRIME MINISTER

4 April 1986

*Dear Mr. Hawkey,*

Since the formation of the Information Technology Advisory Panel (ITAP) in 1981, you and the other ITAP members have carried out a series of important and influential studies which have been most helpful to Government and the United Kingdom in general.

Your published reports on "Cable Systems" and "Making a Business of Information" have been widely read and discussed both in this country and abroad, and I am informed that you are about to report on the information technology in education and training. Within Government, your confidential advice on a number of issues has proved both thought-provoking and useful in the formulation of policy towards IT.

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*86W*

at the centre of Government.

May I close by thanking you for the efforts which you have put into the work of ITAP over the past years. I am most grateful for the time and energy which this has involved and for the quality and relevance of the advice which has resulted.

Yours sincerely  
Margaret Thatcher

---

Dr. D.F. Hartley



10 DOWNING STREET

THE PRIME MINISTER

4 April 1986

*Jean M. Read.*

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Your published reports on "Cable Systems" and "Making a Business of Information" have been widely read and discussed both in this country and abroad, and I am informed that you are about to report on the information technology in education and training. Within Government, your confidential advice on a number of issues has proved both thought-provoking and useful in the formulation of policy towards IT.

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grew



at the centre of Government.

May I close by thanking you for the efforts which you have put into the work of ITAP over the past years. I am most grateful for the time and energy which this has involved and for the quality and relevance of the advice which has resulted.

Yours sincerely  
Raymond L. Diller

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C.N. Read, Esq., C.B.E.

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Prime Minister:

Ref. A086/1015

PRIME MINISTER

Sir Robin Nicholson recommends that ITAP should be wound up and its work subsumed by ACARD. Sir Robert Austley agrees. Agree these proposals and to write to ITAP members accordingly?

Yes no

Information Technology Advisory Panel

The Information Technology Advisory Panel (ITAP) was set up under your instructions in June 1981 to provide external, market-oriented advice on Government policy towards information technology (IT), and the original membership has remained substantially unchanged since that time. ITAP have published two influential reports on "Cable Systems" and "Making a Business of Information", and will shortly be submitting another report intended for publication. This will examine the role of IT in education and training, and the implications for our educational system of the spread of IT-aided learning. ITAP have also provided confidential advice to Government on sensitive issues affected by, or involving, IT.

W  
2/4

2. Despite this useful work, there are signs that ITAP has lost some of its vigour recently and has been unable to maintain the close relationship with the Department of Trade and Industry which was a hallmark of their earlier work when Mr Baker was Minister of State with responsibility for IT. In addition, the evolution of IT into an established market sector has led to a considerable overlap of interest between ITAP and the Advisory Council for Applied Research and Development (ACARD), and with advisory bodies available to the Department of Trade and Industry. Sir Robin Nicholson has explored this situation with the Chairmen of both advisory groups and, after consultation with interested Departments, has concluded that ACARD should now explicitly assume ITAP's responsibilities in connection with IT and ITAP should be dissolved. The expertise of the individual ITAP members is recognised as valuable, however, and it is proposed (with the support of Sir Francis Tombs as ACARD



Chairman) that the ITAP Chairman can be appointed to one of the vacant positions on ACARD, and that an ACARD study group should be formed under him to take forward ITAP's current work on the implications of technological change for policy making in the information field. This group, which would be disbanded when its study is completed, could include ITAP members together with new individuals to widen the range of interests and opinions represented.

3. I hope that you will be minded to approve these proposals with which I agree. I attach a draft letter to the ITAP members to inform them of what is proposed and to thank them for their work over the years.

CONQUEROR RTA

ROBERT ARMSTRONG

2 April 1986

SMZAHU

DRAFT LETTER FROM PRIME MINISTER TO THOSE ON THE  
ATTACHED LIST

Information Technology Advisory Panel

Since the formation of the Information Technology Advisory Panel (ITAP) in 1981, you and the other ITAP members have carried out a series of important and influential studies which have been most helpful to Government and the United Kingdom in general.

Your published reports on "Cable Systems" and "Making a Business of Information" have been widely read and discussed both in this country and abroad, and I am informed that you are about to report on the information technology in education and training. Within Government, your confidential advice on a number of issues has proved both thought-provoking and useful in the formulation of policy towards IT.

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fellow Panel members to come together. IT is now established as an important market sector and the advisory bodies have been set up within the Department of Trade and Industry.

I have therefore concluded that it ~~is time to~~ stand down ITAP, and to <sup>analyse</sup> ~~subsume~~ its work within <sup>include</sup> ~~it~~ that of ACARD in order to ensure that independent advice is still available at the centre of Government. *would be best to*

May I close by thanking you for the efforts which you have put into the work of ITAP over the past years. I am most grateful for the time and energy which this has involved and for the quality and relevance of the advice which has resulted.

M J Aldrich  
Chief Executive  
ROCC Computers Ltd  
Kelvin Way  
Crawley  
Sussex RH10 2LY

I H Cohen, CBE  
Managing Director  
Mullard Ltd  
Torrington Place  
London WC1E 7HD

C A Davies  
Managing Director  
Information Technology Limited (ITL)  
Technology House  
Victoria Road  
Winchester  
Hants SO23 7DR

Dr D F Hartley  
Director  
Cambridge University Computing Services  
Corn Exchange Street  
Cambridge  
CB2 3QG

C N Read CBE

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Hardly surprising results.

DWS  
S/U

PRIME MINISTER

I thought you would be interested to know that the Computing Services Association have reported that the survey they carried out in July of 132 companies out of a total membership of 216 has produced interesting and optimistic results.

Companies were asked to predict the business outlook in their major business areas. They were asked whether the outlook was better or worse compared with the previous year and they were largely optimistic as shown in the table.

PERCENTAGE OF COMPANIES OUTLOOK

| Business Sector   | Better % | Worse % | Unchanged % |
|-------------------|----------|---------|-------------|
| Processing        | 45       | 20      | 35          |
| Consultancy       | 83       | 0       | 17          |
| Bespoke Software  | 67       | 3       | 30          |
| Software Products | 86       | 3       | 11          |
| Total Systems     | 74       | 4       | 22          |

GEOFFREY PATTIE

4 November 1985

NO1/NO1ABQ

SUBJECT cc OPS  
Master

FILE



PRIME MINISTER'S

PERSONAL MESSAGE

SERIAL No. T 170 A/85

10 DOWNING STREET

THE PRIME MINISTER

3 October 1985

*Dear Mr. President,*

INTERGOVERNMENTAL BUREAU FOR INFORMATICS

Thank you for your letter of 23 July which asked that the United Kingdom join the Intergovernmental Bureau for Informatics.

I have given very careful consideration to this.

The United Kingdom recognises the importance of Information Technology to the economic well being of all countries and agrees that the provision of expertise in Information Technology is of crucial importance to countries of the Third World. For this reason the United Kingdom has been actively involved in work being undertaken by UNESCO in their Intergovernmental Informatics Plan which concentrates on Information Technology education and training in developing countries. The United Kingdom Council for Computing Development (UKCCD) has since its establishment in 1981 actively supported the development of Third World countries own computing capability. In addition to these efforts the United Kingdom has used its bilateral links with developing countries to offer aid and advice in the area of Information Technology.

/In 1981

*de*



In 1981 we gave full consideration to the question of membership of the IBI. We took into account our own bilateral and multilateral efforts in this field and concluded that membership of the IBI would duplicate these efforts. The result of this detailed examination was that the United Kingdom decided against membership. Developments since 1981 have given us no reason to change our decision. I regret to have to tell you therefore that the United Kingdom will not be able to accede to your request to join the IBI.

I am sorry to have to return you a disappointing reply but am sure you will understand that it is only after very careful thought that I have come to this conclusion.

With my best wishes.

Yours sincerely  
Raymond Shalton

---

His Excellency Monsieur Abdou Diouf

*File No*



10 DOWNING STREET

*From the Private Secretary*

INTERGOVERNMENTAL BUREAU FOR INFORMATICS

Thank you for your letter of 2 October with a proposed reply to President Diouf's letter to the Prime Minister on this arcane subject.

I think that the Prime Minister would want to reply personally to a letter from a Head of State. She has therefore signed the enclosed letter and I should be grateful if you would arrange for it to be delivered.

CHARLES POWELL

Peter Ricketts, Esq.,  
Foreign and Commonwealth Office.

*de*



Foreign and Commonwealth Office

London SW1A 2AH

2 October 1985

*Dear Charles,*

Intergovernmental Bureau for Informatics (IBI)

I enclose a letter from the President of Senegal to the Prime Minister, received through HM Ambassador at Dakar, which asks the UK to join the IBI (the Intergovernmental Bureau for Informatics). It has taken some time to concert a draft reply because of the need to consult other Government Departments. We have warned our Ambassador of the likelihood of delay.

The conclusion of those Whitehall Departments involved in Information Technology Policy is that there has been no development which should cause the UK to reconsider its decision taken in 1982 not to join the IBI. In all probability President Diouf has written to the Prime Minister not on his own initiative but at the request of the IBI Director General, who will be seriously concerned for the financial viability of the IBI following France's decision to leave. President Diouf will not be unduly surprised or dismayed by the negative response and he will not be affronted if the Ambassador replies on the Prime Minister's behalf. I therefore suggest that we ask the Ambassador to reply on behalf of the Prime Minister declining the President's request in terms of the enclosed draft.

The IBI was established in 1961 as the International Computation Centre under the auspices of the UN and UNESCO, but it became the present non-UN body in the 1970s. It claims with some justification to be the only intergovernmental body specialising in IT. Most of the IBI's activities are focussed on providing assistance to developing countries, usually in the form of consultancies. Much of the work and orders for hardware and software goes to French companies. In 1981, the IBI had a membership of about 30, all developing countries except for France, Spain and Italy, with France providing the major part of the IBI budget. The UK has consistently taken the line that membership of the Bureau could not be justified as good value for money (the annual subscription would probably be more than £1.5 million); and that the UK's interests are better served by active participation in other international organisations such as the UN and OECD. Indeed, we believe that the IBI's influence is waning following the resignation from membership of Brazil, Mexico and (from the end of 1986) France.

/ Contact



Contact with the IBI has been kept to a minimum in recent years. Although UK representatives have attended some IBI events in a private capacity, the UK has never participated officially in any of their activities. Earlier this month Mr Nasim Ahmed, a consultant to the IBI Director General, called on Mr Pattie at the Department of Trade and Industry and pressed the UK to join the organisation. Mr Pattie firmly declined.

Yours ever,  
Peter Ricketts

(P F Ricketts)  
Private Secretary

C D Powell Esq  
10 Downing Street

DRAFT: minute/letter/teleletter/despatch/note

TYPE: Draft/Final 1+

FROM:

~~HMA DARR~~ AM

COBAY

Reference

DEPARTMENT:

TEL. NO:

SECURITY CLASSIFICATION

TO:

Monsieur Abdou

HE President Diouf

Your Reference

Top Secret

Secret

Confidential

Restricted

Unclassified

Copies to:

PRIVACY MARKING

SUBJECT:

INTERGOVERNMENTAL BUREAU FOR INFORMATICS

.....In Confidence

CAVEAT.....

1. ~~The Prime Minister has asked me to reply to your letter of 23 July 1985 which asked that the United Kingdom join the Intergovernmental Bureau for Informatics.~~

*I have given very careful consideration to this.*

2. The United Kingdom recognises the importance of Information Technology to the economic well being of all countries and agrees that the provision of expertise in Information Technology is of crucial importance to countries of the Third World. For this reason the United Kingdom has been actively involved in work being undertaken by UNESCO in their Intergovernmental Informatics Plan which concentrates on Information Technology education and training in developing countries. The UK Council for Computing Development (UKCCD) has since its establishment in 1981 actively supported the development of Third World countries own computing capability. In addition to these efforts the UK has used its bilateral links with developing countries to offer aid and advice in the area of Information Technology.

Enclosures—flag(s).....

3. // In 1981 <sup>we</sup> ~~HMG~~ gave full consideration to the question of membership of the IBI. <sup>we</sup> They took into account <sup>our own</sup> ~~their~~ bilateral and multilateral efforts in this field and concluded that membership of the IBI would duplicate these efforts. The result of this detailed examination was that the <sup>"</sup>UK decided against membership. Developments since 1981 have given <sup>us</sup> ~~HMG~~ no reason to change <sup>our</sup> ~~their~~ decision, and I regret to have to <sup>tell</sup> ~~inform~~ you therefore that the <sup>"</sup>UK will not be able to accede to your request to join the IBI.

I am sorry to have to return you a disappointing reply but I am sure you will understand that it is only after very careful thought that I have come to this conclusion.

With my best wishes.

PRIME MINISTER

2 August 1985

ELECTRONICS INDUSTRY

Electronic companies' shares have fallen significantly over the last six months due, inter alia, to a cyclical down-turn in the semi-conductor market; the commercialisation of supplies to the newly privatised British Telecom; and the maturing of the domestic computer market. It is very possible that the Government may be approached to assist in a restructuring of the industry - shades of 1968, Tony Benn and the IRC.

The computer industry problem reflects a perfectly natural evolutionary process where Government intervention would be counter-productive. Likewise the down turn in the semi-conductor market is a worldwide phenomenon and consequently outside national control.

The commercialisation of BT is of course at the Government's behest. It is delivering a well deserved knock to BT's suppliers who for many years have operated with only mock competition, indeed an illegal ring operated in the fifties. All four major domestic suppliers are encountering problems in varying degrees: GEC and Plessey (both financially strong), and the rather weaker STC and Thorn who acquired ICL and INMOS respectively. (It shows how right Government was to persist in selling them!)

Thorn's problems have been the most obvious and their Chief Executive has recently been dismissed. The storm flags are now going up at STC. We hear rumours of a boardroom battle and Kenneth Corfield's days could be numbered. We know John Clark of Plessey is seriously worried, whilst Arnold Weinstock at GEC seems to be escalating even his normally high level of demands on Government.

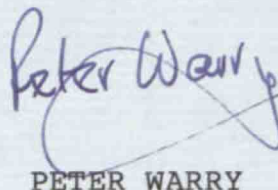
## Restructuring

The argument for restructuring is that concentrating our domestic resources onto a single supplier for each major BT equipment area would enhance our ability to compete internationally. It would permit BT to take the bulk of its supplies in each area from a single internationally competitive domestic producer whilst still allowing some foreign supplies to keep them honest.

This is not something in which the Government should become involved. Some rationalisation may make sense (although as many as 50,000 jobs could be lost) but it diminishes competition and our innovative ability. The IT revolution is on the verge of becoming a reality and it would be strange to be promoting industrial dinosaurs just when the economies of scale may start moving in the opposite direction.

Nor is there any financial case. GEC has too much money already and Plessey's gearing is just 2%. STC and Thorn may be harder hit but they will not go under, even though their shareholders would take a justified knock for letting the management of the company drift.

The Government should stay out and let the market determine the outcome. If, however, George Jefferson wants to help along some rationalisation in the interests of BT, and is able to get the agreement of OFTEL and the companies concerned, then Government should not stand in his way.

  
PETER WARRY



SUBJECT cc OPS  
Master

0019 PR/SG/BOM

*Le Président de la République*

*Dakar, le 23 JUIL. 1985*

PRIME MINISTER'S  
PERSONAL MESSAGE  
SERIAL No. T 141 B/85

L'évolution des structures économiques et sociales de nos pays impose de plus en plus à nos administrations la maîtrise de l'information à travers l'Informatique.

Cependant, des problèmes tels que la sécheresse, la détérioration des termes de l'échange, la lutte contre la faim, l'équilibre des besoins alimentaires par le développement de l'agriculture, le ré déploiement industriel, l'équilibre des échanges commerciaux et le paiement de la dette extérieure absorbent les efforts consentis dans le cadre de la coopération bilatérale entre les gouvernements des pays en développement et des pays développés comme le vôtre.

Le Sénégal est convaincu que l'Informatique, judicieusement utilisée, constitue un "outil" apte à améliorer la croissance et la productivité des pays en développement.

/-) Son Excellence Madame Margaret THATCHER  
Premier Ministre  
de la Grande Bretagne

L O N D R E S

.../....

Cependant, la maîtrise de cette technologie nouvelle, notamment ses implications organisationnelles, financières et humaines ne peuvent être supportées entièrement par un pays en développement. C'est pourquoi, le Sénégal estime que la maîtrise et le développement de l'Informatique nécessite un cadre de concertation entre les pays développés et les pays en développement.

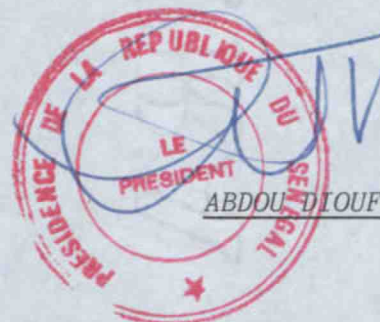
A cet égard, le Bureau Intergouvernemental pour l'Informatique (I.B.I.) dont le siège est à ROME constitue ce cadre dans lequel la coopération internationale dont votre pays est un ardent défenseur peut favoriser le développement de l'Informatique dans le sens de nos intérêts communs.

Les Etats membres de l'I.B.I. ont à plusieurs reprises exprimé le souhait que des Etats comme le vôtre intègrent l'Organisation.

C'est pourquoi, j'ai jugé opportun de vous inviter à vous joindre à l'I.B.I., Organisation dans laquelle, j'en suis certain, votre pays par un apport de sa maîtrise de la technologie du traitement de l'information, son sens de l'organisation et de la méthode, et ses ressources humaines, pourrait être d'un grand apport pour la communauté internationale, notamment les pays du Tiers-Monde.

Je vous prie de croire, Madame le Premier Ministre, en l'assurance de ma haute considération.

*Très haute estime et cordial hommage*



TRANSLATION

STS 550/85

6019 PR/SG/BOM

The President of the Republic

Dakar, 23 July 1985

The development of the economic and social structures of our countries increasingly necessitates the use by our administrations of information technology for information management.

However, problems such as drought, deterioration in terms of trade, the struggle against famine, the development of agriculture to meet food requirements, industrial redeployment, the balance of trade and the payment of foreign debt are absorbing the efforts made within the framework of bilateral cooperation between the governments of the developing countries and developed countries such as yours.

Senegal is convinced that information technology, judiciously used, is a suitable "tool" for improving the growth and productivity of developing countries.

Her Excellency Mrs Margaret Thatcher  
Prime Minister  
of Great Britain  
LONDON

However, mastery of this new technology, particularly its organisational, financial and human implications, cannot be achieved by a developing country entirely on its own. Senegal therefore considers that mastery and development of information technology necessitates a framework of concerted action between the developed and developing countries.

In this respect, the intergovernmental Bureau for Information Technology (I.B.I.), which has its headquarters in Rome, provides the framework in which international cooperation, which your country ardently defends, may promote the development of information technology along the lines of our common interests.

The member states of the I.B.I. have repeatedly expressed the wish that States such as yours should belong to the organisation.

I therefore considered it to be appropriate to ask you to join the I.B.I., an organisation in which, I am sure, your country, through the provision of its expertise in information processing technology, its sense of organisation and method and its human resources, could make a great contribution to the international community, particularly the countries of the Third World.

[Complimentary close]

(signed with the message "Very high esteem and cordial homage")

ABDOU DIOUF

President of the Republic of Senegal.

CONFIDENTIAL  
COMMERCIAL IN CONFIDENCE

N/S/B 7  
18/6



DEPARTMENT OF TRADE AND INDUSTRY  
1-19 VICTORIA STREET  
LONDON SW1H 0ET

TELEPHONE DIRECT LINE 01-215 5422  
SWITCHBOARD 01-215 7877

Secretary of State for Trade and Industry

17 June 1985

The Rt Hon Nicholas Edwards MP  
Secretary of State for Wales  
Welsh Office  
Gwydyr House  
Whitehall  
LONDON  
SW1A 2ER

*D. Nick.*

SINCLAIR VEHICLES

Thank you for your letter of 6 June about the Regional Selective Assistance offered to Sinclair for the C5 vehicle project.

2 I fully understand why you would not feel able to pay a further tranche of assistance at present. However, negotiations over the refinancing of Sinclair Research Limited are at a particularly critical point and it would help to maintain confidence in Sinclair if you were able to delay telling the companies for a little while. I recognise that if you are pressed for payment you will have to tell them but I understand that since you wrote the companies have taken the pressure off.

3 We cannot say when the future of Sinclair Research will be settled but I have asked my officials to keep in touch with yours as the situation develops.

4 I am copying this letter to the Prime Minister, to Nigel Lawson, George Younger and to Sir Robert Armstrong.

NORMAN TEBBIT

JH5BCZ

Info. Tech. IND. POL. Pt 4.

510  
Y SWYDDFA GYMREIG  
GWYDYR HOUSE  
WHITEHALL LONDON SW1A 2ER

Tel. 01-233 3000 (Switsfwrdd)  
01-233 6106 (Llinell Union)

Oddi wrth Ysgrifennydd Gwladol Cymru



Prime Minister ②  
To note

AT 7/6

GENO

WELSH OFFICE  
GWYDYR HOUSE  
WHITEHALL LONDON SW1A 2ER  
Tel. 01-233 3000 (Switchboard)  
01-233 6106 (Direct Line)

From The Secretary of State for Wales

The Rt Hon Nicholas Edwards MP

6 June 1985

CONFIDENTIAL AND COMMERCIAL IN CONFIDENCE

Jan Nairn

ms

**SINCLAIR VEHICLES**

I think you should know right away that my Department will very soon have to tell Hoover and Sinclair Vehicles that we are unable at present to pay the second tranche of Regional Selective Assistance (amounting to £300,000) offered towards the C5 vehicle project. You will probably know that this battery-propelled vehicle is being manufactured for Sinclair by Hoover at Merthyr. Our Section 7 grant offer (totalling £1 million, of which £250,000 has been paid) was made to Hoover but on the basis of back-to-back arrangements between that company and Sinclair. The main pressure for release of the money is therefore coming from Sir Clive himself.

The very disappointing market response to the C5 is well known and it is also public knowledge that production at Merthyr amounts to no more than a token 100 a week. This figure has to be seen in relation to earlier estimates that production by now would have been running at around 5,000 a week. Employment, far from building up towards the promised 329, has in fact been cut back from 138 in March to 15 now. Against this background I have no alternative but to invoke those sections of the offer letter which allow me to with-hold grant payment if I judge that the project has changed substantially in nature or scale or is in jeopardy.

We are told by Hoover and Sinclair that they see good prospects of a pickup in sales and production later in the summer and what I propose therefore is that we tell the companies that we are holding over the payment application pending a review of orders, sales, production and employment towards the end of the summer. That sort of response would not be out of line with normal Section 7 procedures. A postponement of a final decision on this grant payment might also (depending on Sir Clive's views and his ability to mobilise further funds) avoid the collapse of Sinclair Vehicles during the present critical period when rescue of the much more important Sinclair Research is being attempted. My officials have been in touch with yours

/and with the ...

Rt Hon Norman Tebbit MP  
Secretary of State for Trade and Industry



and with the Bank of England and I fully recognise the sensitivity of all this in relation to Sinclair Research. I cannot be certain that our withholding this payment of £300,000 will not cause Sir Clive Sinclair to wind up the C5 project; still less can I judge what that might mean for Sinclair Research. It is mainly with the latter thought in mind that I felt I should let you know of the view I have reached on my own grant payment before I communicate it to Hoover and Sinclair.

/ I am sending copies of this letter to the Prime Minister and to Nigel Lawson and George Younger.

*for  
den*

*1000000*



SINCLAIR

11 12 1  
2 3 4  
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8 9 10

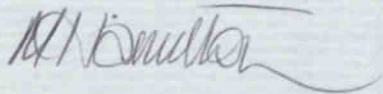
7 JUN 1985

PRIME MINISTER

**SINCLAIR RESEARCH**

Things have deteriorated since Friday night. Timex, who manufacture Sinclair's Spectrum Computer, and who have large stocks unsold, have obtained an export order for 60,000 but Barclays and other creditors believe that these would find their way onto the UK market depressing prices and margins here.

They do not believe therefore that this represents a solution to Sinclair's cash flow problems. Instead it is likely to precipitate a collapse. The Bank of England are continuing discussions in the hope of finding a solution and the Scottish Office are talking to Timex. DTI remain in contact but the Secretary of State takes the view that there is no prospect of the Government bringing about a rescue.



Duty Clerk

pp Andrew Turnbull

27 May 1985



10 DOWNING STREET

From the Private Secretary

Prime Minister

Sinclair Research

DTI rang to say

- (i) Rob Wilmet has agreed to join the super chip venture as a non executive chairman and has said he can find someone for managing director
- (ii) the creditors have appointed Coopers-Lybrand to review Sinclair's position
- (iii) a three month holding package has been agreed by the creditors pending establishment of longer term finance.

AT

24/5



File  
M

10 DOWNING STREET

From the Private Secretary

Prime Minister

We were warned a few weeks ago of potential difficulties at Sinclair Research, partly stemming from the company itself in the micro computer market and partly from difficulties to be related Sinclair Vehicles, which has been funded by Sinclair Research.

It became known today that Rob Wilmet has decided not to take up a role in Sinclair's plans to develop a super chip. This has shaken confidence among the creditors. Barclays, the lead bank, are holding a meeting and are trying to hold the other creditors together but the situation is perilous.

DTI will keep us informed

AT

22/5



FILE

VC

cc: Dr. Nicholson,  
CO

10 DOWNING STREET

THE PRIME MINISTER

7 May 1985

Dear Mr. Southgate,

Thank you for your letter of 18 April in which you explain that pressure of new responsibilities makes it impossible for you to continue as a member of the Information Technology Advisory Panel.

I know that membership of ITAP involves a considerable commitment of time and energy and I am grateful for the efforts which you, and the rest of the Panel, have made over the past four years. I fully understand that your appointment as Managing Director of Thorn-EMI will be a very demanding one and that the duties involved will not allow you to remain an active member of ITAP. I must therefore regretfully accept your resignation.

The advice provided by ITAP has been both perceptive and helpful, and your ideas and suggestions have often been imaginative and stimulating. I would like to thank you for your part in the work which ITAP have done since 1981 and I know that your influence will be missed in the future. May I also congratulate you on your new appointment and wish you every success for the future.

Yours sincerely  
Margaret Thatcher

C.G. Southgate, Esq.

REV



*Not Appts?  
GR?*

*CP?*

*GL please  
cede  
again*

W0345

MR ADDISON - No. 10

1 May 1985

*WR-type pl.*

RESIGNATION OF MR COLIN SOUTHGATE.

I attach a draft letter for the Prime Minister to send to Colin Southgate.

*RNSW*

ROBIN NICHOLSON

DRAFT REPLY FOR THE PRIME MINISTER TO SEND TO COLIN SOUTHGATE

INFORMATION TECHNOLOGY ADVISORY PANEL

✓ C3ACT

*Thank you for your*  
I ~~have received your~~ letter of 18 April in which you explain that pressure of new responsibilities makes it impossible for you to continue as a member of the Information Technology Advisory Panel.

*know*  
I ~~am aware~~ that membership of ITAP involves a considerable commitment of time and energy on the part of those concerned and I am grateful for the efforts which you, and the rest of the Panel, have made over the past four years. I can understand that your appointment as Managing Director of Thorn-EMI will be a very demanding one and that the duties involved will not allow you to remain an active member of ITAP. I must therefore regretfully accept your resignation.

Both I and my Ministerial colleagues have found the advice provided by ITAP on a variety of matters concerning Information Technology to be both perceptive and helpful. ~~The viewpoint which you possess is a valuable aid to us in gaining a complete picture of this important area and your ideas and suggestions have~~ *Your ideas have been most helpful* often been imaginative and stimulating.

*would like*  
I ~~wish~~ to thank you for your part in the work which ITAP have done since 1981 and ~~am sure~~ *I know* that your influence will be missed in the future. May I also congratulate you on your appointment and wish you every success in your new role.

C G Southgate Esq  
Managing Director  
THORN EMI  
THORN EMI House  
Upper St Martin's Lane  
London WC2H 9ED

Colin Southgate  
(Thorn EMI)



file 2/15/85

10 DOWNING STREET

*From the Private Secretary*

SIR ROBIN NICHOLSON

CABINET OFFICE

As we discussed, I enclose a copy of a letter the Prime Minister has received from Mr Colin Southgate of Thorn EMI who has sat on the Information Technology Advisory Panel. I should be grateful if you could let me have a draft reply for the Prime Minister's signature as soon as possible.

MRA

25 April 1985





# THORN EMI

THORN EMI House,  
Upper Saint Martin's Lane,  
London WC2H 9ED  
telephone 01-836 2444  
telex Thorn London 24184/5

18th April 1985

Rt. Hon. Margaret Thatcher MP  
10 Downing Street  
London SW1

Dear Prime Minister,

In June 1981 you honoured me by inviting me to sit on your Information Technology Advisory Panel. I have enjoyed immensely my time on the Panel and have hopefully contributed to all the reports, both published and unpublished, and I hope you feel the Panel has made a contribution to the debate on IT.

On Monday of this week my area of responsibility within THORN EMI was extended as I have been appointed Managing Director of the total Group. For the time being at least this will mean that it will be impossible for me to remain actively involved in ITAP as I will not be able to provide the level of commitment that I feel is necessary. I therefore regretfully wish to tender my resignation.

My role at THORN EMI now will obviously cover not only the technology side but all of their diverse operations which will naturally mean that I will have less time to spend on IT. However, I can assure you that I will maintain the company's commitment to this area which is, in my opinion, of vital importance to the UK as a whole.

Yours,  
Sincerely,  
Colin Southgate

COLIN G SOUTHGATE  
Managing Director

TVE/ie?

FILE

DCAADx



10 DOWNING STREET

*From the Private Secretary*

20 July 1984

PROPOSED INSTITUTE OF INFORMATION TECHNOLOGY

In the course of a brief meeting this morning, your Minister explained the proposal for a new Institute of Information Technology.

Mr. Baker said that the Institute would be privately financed, with shares held by participating companies and by members of the staff. It would be run by a Managing Director on company lines. The Institute was intended to be a centre of excellence, rather like the Massachusetts Institute of Technology, and would be "grafted onto" Cranfield for the purpose of validating degrees.

The plan was that the Institute would have some 5,000 students on short courses by the year 1990, along with about 500 post-graduates and 2,000 under-graduates. The short courses, and the work by post-graduates, would be financed entirely by companies or by the students themselves. The cost of each under-graduate place would be in the range £4,000-£5,000 a year. Your Minister was in touch with the Department of Education and Science about the possibility that they might place a six year contract with the Institute for the education of 800 under-graduate students a year. The Department was examining this proposal in the context of their consideration of switching funds from arts to sciences.

The hope was that the Institute would have a significant impact on the expected shortage of skilled manpower in information technology. The staff would be managers as well as teachers, and by paying the market rate it should be possible to attract people of the highest calibre. The prospectus for the Institute was due to be issued in early September 1984. The appointment of a Managing Director would follow shortly thereafter, with a view to the arrival of the first students in October 1985. No firm decision had been taken on the Institute's location, but a site at Milton Keynes looked promising.

NR

The Prime Minister warmly welcomed the proposal, which she felt marked an exciting new development in harnessing the expertise and the resources of the private sector in the interests of the economy as a whole.

David Barclay

Neil McMillan, Esq.,  
Department of Trade and Industry.

TUE



PRIME MINISTER

A PRIVATE ENTERPRISE UNIVERSITY OF TECHNOLOGY

Mr. Baker has asked to come and see you tomorrow to tell you about progress with his idea for a privately funded University of Technology.

What he has in mind is an independent institution concentrating on electronics disciplines. He has identified six companies which have expressed interest in such a project on the basis that it would run as a commercial venture. Thus teaching fees and research charges would need to be set at a level which provided a respectable return on investment.

Mr. Baker is not likely to seek more than very general support from you at this stage. But you will wish to bear in mind that there could be implications in his idea for the Department of Education and Science, in relation both to their policy responsibilities and to their expenditure programmes.

DMS

ant

19 July 1984

MR BARCLAY

19 July 1984

A new Institute of IT

The Prime Minister may like to have a copy of the proposals for the new Institute when she meets Kenneth Baker.

I understand that there has been very little contact between DTI and DES about the proposal. Keith Joseph is firmly in favour of the idea; but he will need to talk in much more detail with Sir Henry Chilver and others before he can tell how much public money will really be involved. (The so-called 'science-switch' funds, about which Kenneth Baker has talked, have not yet been approved by Treasury.)

I recommend that the Prime Minister should support the principle but avoid any commitment of public funds at this stage.

*Oliver Letwin*

OLIVER LETWIN

PROPOSAL FOR INVESTMENT  
IN  
A NEW INSTITUTE OF INFORMATION TECHNOLOGY

July 1984

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## 1. EXECUTIVE BRIEF

This document sets out a basis for discussion of the formation and funding of a new, privately-based, university institute for education, training and research in Information Technology (IT).

### **Background**

The growth of IT and its applications will generate increasing demand for research, education, training, and technical skills which will outstrip the supply from existing conventional institutions of higher education in Britain.

There is a need for an IT industry focus on these issues, which can best be provided by an independent institute which will combine internationally recognised standards of research with the education and training of highly-qualified staff for the IT industry.

### **Proposal**

It is proposed to invite subscriptions from a consortium of investors, including major IT companies and the senior staff of the Institute, for £5.5m in ordinary share capital, and £4.5m in redeemable participating preference capital. The Institute will operate on business lines and will be controlled by a board of executive and non-executive directors.

### **Objectives**

The Institute will establish an international reputation as a centre of excellence. It will contribute to research, education, application, and marketing of all aspects of information technology. It will reinforce and strengthen the position of the IT industry in world markets.

## **Financial Summary**

Income is expected to rise to £21m per annum by year five. The Institute will then be self financing, producing a modest return on investment, and allowing redemption of the preference share capital within the following five year period.

The proposed financial structure will allow shareholders to participate in any subsidiary companies formed to exploit the results of the research and development programmes of the Institute.

## **Time Scale**

It is planned to form the Institute by October 1984. At an early stage the board will appoint a Principal and Managing Director. An initial senior staff group will be appointed by March 1985, and they will be required to have a full operating plan ready for implementation in October 1985.

The Institute will build up to 360 staff, of whom 130 will be associated with an undergraduate teaching programme.

At full operation the Institute will produce 800 first degree and 150 higher degree graduates and provide short courses for 5,000 students each year.

## **Benefits to Shareholders**

The Institute will meet the needs of shareholders for training of their existing staff, and provide high calibre graduates for future recruitment.

It will also provide opportunities for exploitation of research output through licence agreements, research and development facilities, opportunities for secondment of staff, a focus of industry interests, and a contribution to the development of the market for IT applications.

## **Initial Shareholders**

It is expected that the initial shareholders will include companies in telecommunications, component design and manufacture, software engineering, computer and infrastructure manufacture.

## 2. INTRODUCTION

It is proposed to invite major companies with interests in information technology to subscribe funds for the setting up of a new Institute of Information Technology.

Information technology is a major world industry with a forecast growth rate of order 10% per year over the next decade. If British companies are to exploit this market opportunity to the full, there will be a need for a high level of technical and inventive skills, and also for an industry-led dedication to the development of the market for IT applications.

The rapid increase in demand for information technology skills, coupled with a demographic decline in the numbers of potential candidates, will lead to a major shortage of such skills and to a strain on the traditional education system in Britain.

Eight companies have forecast their combined requirement for IT graduates in 1984 to be 4,300, against a current supply of 6,000. Taking into account the requirements of other companies, the public sector industries, and for teaching itself, it is estimated that there will be a shortfall in graduates in IT related disciplines of between 2,500 and 4,000 a year for the next few years.

This indicates an urgent need for novel educational programmes

- to re-direct and re-train existing graduates into IT subjects to meet the industry's immediate needs
- to attract a higher proportion of students into IT-related studies, typically maths, physics, electronic engineering and computer science
- to train more graduates and post-graduates
- to encourage better training of craft, business and marketing skills related to information technology.

There is also a need to provide an industry focus to co-ordinate and distill the research efforts in universities and large corporate research laboratories to encourage novel applications of information technology in a wide variety of industrial, commercial, leisure and consumer markets.

The new Institute of Information Technology will

- operate as an independent company

- contribute to increasing the volume of graduate, post-graduate and post experience teaching in the UK
- provide an industry focus on research and development in information technology and on its business application
- provide an independent tertiary education model breaking away from some of the constraints of the current university system
- make use of 'state of the art' teaching methods and high calibre staff to produce the highest standards of education
- provide co-ordinated training material for a 'vertical slice' of IT students in schools, technical colleges, training centres, universities, and IT companies
- generate new 'spin off' companies to exploit the application of the results of its own research and development programmes
- carry out contract research and development

### 3. TEACHING AND RESEARCH PROGRAMME

The Institute will establish a broad base in research, development and teaching of information technology. The work of the institute will encompass fundamental science, applications engineering, and the development of the market for IT.

#### **Teaching Programme**

The teaching programme will be aimed at both the producers and the users of IT, generating high quality, broadly-based specialists for the industry and creating awareness and understanding of IT applications in the consumer market.

A modular approach to teaching will permit a variety of courses to be offered, and allow a wide range of both technical and non-technical students to be accommodated. In this way the institute will provide for the integration of the different disciplines, skills and aptitudes which will be required as the applications of IT continue to broaden.

Interchange of staff between the Institute and IT companies will contribute to keeping the knowledge base and teaching programmes in line with the 'state of the art'.

The emphasis of the teaching programme will be related to assessments of the strategic and economic importance of the main sectors of Information Technology, the research needs of the industry and the commercial interests of the shareholders.

An initial view of the main sectors which should be covered by the programme includes components, communications, telecommunications, computers and peripherals, computer science, industrial applications, commercial and consumer applications, entertainment and leisure applications, and medical applications. These are defined in broad terms in Appendix 1.

#### **Research Programme**

The Institute will develop an international reputation as a centre of excellence in a number of core areas of information technology.

The research programme will be determined by the senior

academic appointments, but, for the purpose of illustration, three topics have been identified which will have an impact on the development and application of information technology over the next decade:

i) Artificial Intelligence

Research in AI would contribute to the fundamental science of information technology. AI will require the most advanced component technologies, software engineering and communications capabilities. It will have a major impact across the whole spectrum of IT with the introduction of speech recognition, pattern recognition and intelligent knowledge based systems, and will be at the centre of new product developments for the foreseeable future.

A leading-edge capability in AI could be used as a basis for collaboration with other research programmes and industrial organisations in the various fields of application illustrated in Figure 1.

ii) Production Technology

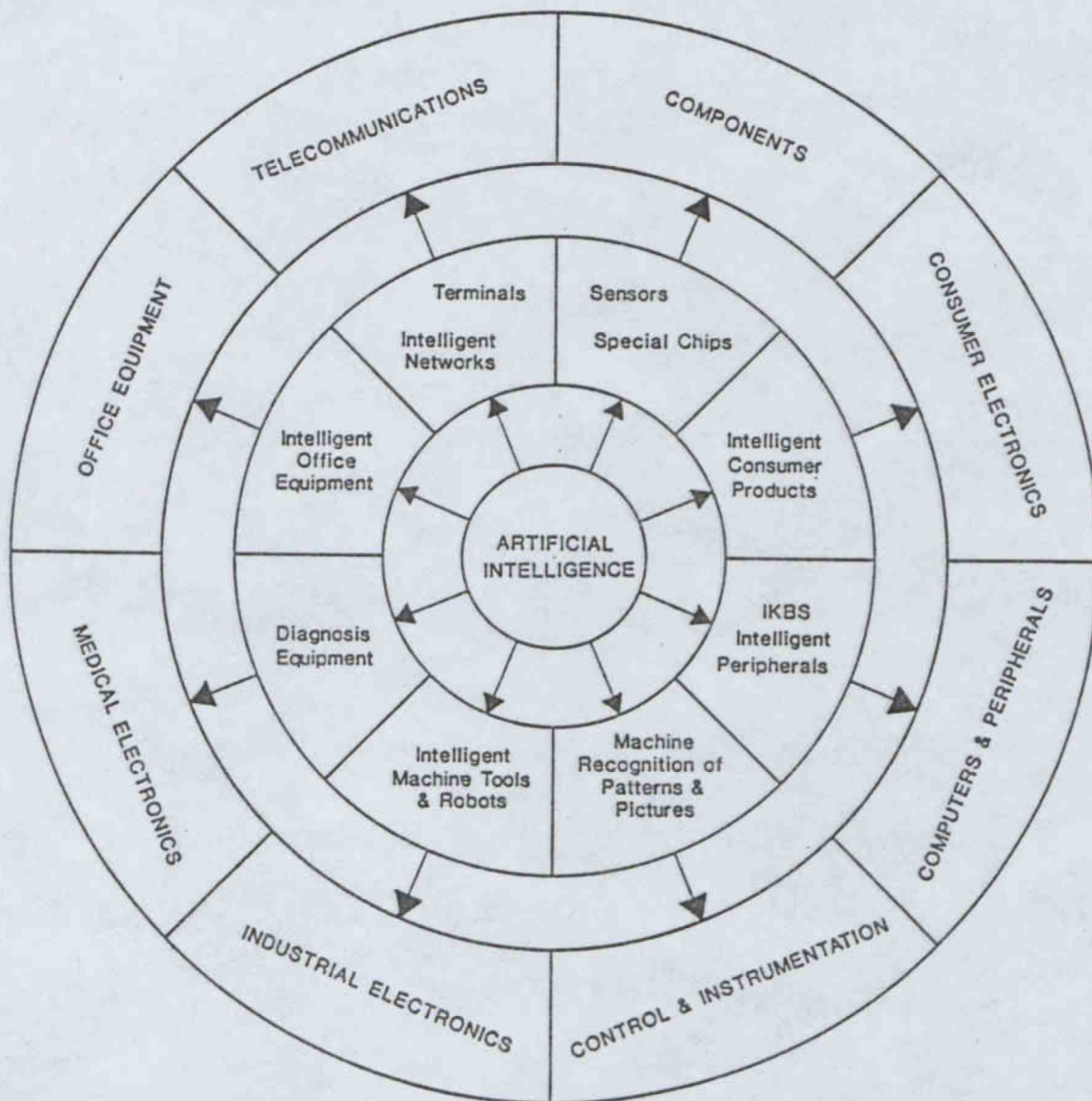
A focus on developing the production technologies which will be required by the IT industry would make an important contribution to applications engineering. The work would cover the development of new production methods needed as IT is applied to a wider range of products and markets, and the development of new production methods in other industries made possible by the application of IT.

iii) Market Development

The Institute could perform an important role in the development of the future market for IT applications, by increasing the level of appreciation and understanding of IT by the consumer through its teaching programme, and by placing a strong emphasis on the design and development of new products and new applications of IT in its R & D programme.

Figure 1

THE APPLICATIONS OF ARTIFICIAL INTELLIGENCE  
IN MAJOR MARKET SEGMENTS





## Distribution of Resources

Taking account of the various aspects of its teaching and research activities, a broad estimate of the initial distribution of the resources of the Institute gives:

|                         |     |
|-------------------------|-----|
| Science and Engineering | 40% |
| Applications            | 30% |
| Production Technology   | 15% |
| Market Development      | 15% |

#### 4. FINANCIAL STRUCTURE AND RESOURCES

##### Financial Structure

The Institute will be registered as a public limited company.

It can be seen from the cash flow forecast that establishment of the Institute will require a total funding in the order of £10m over the first five years of operation. It is intended to raise this funding from companies and investment institutions with a strong interest in information technology and its exploitation.

The financial structure of the Institute will be as follows:-

| <u>Authorised Share Capital</u> |                                                                   | <u>Issued Share Capital</u> |
|---------------------------------|-------------------------------------------------------------------|-----------------------------|
| £10,000,000                     | Ordinary Shares of £1 each                                        | 5,000,000                   |
|                                 | Employee Shares of £1 each                                        | 500,000                     |
|                                 | Redeemable Participating Preference Shares of £1 each (1990/1995) | 4,500,000                   |
| <hr/>                           |                                                                   | <hr/>                       |
| £10,000,000                     |                                                                   | £10,000,000                 |
| <hr/>                           |                                                                   | <hr/>                       |

A total of 10 per cent of the issued ordinary share capital will be available to senior employees either for full subscription at par or to seek approval under the 1984 Finance Act as an approved employee option scheme.

It is intended that subscription for the low coupon Redeemable Participating Preference Shares 1990/1995 will be made in the same proportions and from the same group as subscribe for the ordinary share capital other than employees. Participation will be in a range of profits and calculated to reflect the initial low coupon.

The delay in employee subscriptions and the overrun costs in 1987/88 and 1988/89 would be met by normal commercial borrowings.

From the cash flow projections it can be seen that calls to shareholders would be made in the following manner:

|                        |                                                                         | £           |
|------------------------|-------------------------------------------------------------------------|-------------|
| 4th Quarter 1984       | 1st Call on Ordinary Shares                                             | 2,500,000   |
| 2nd Quarter 1985       | 2nd Call on Ordinary Shares                                             | 2,500,000   |
|                        | 40 Employee Subscriptions                                               | 200,000     |
|                        |                                                                         | <hr/>       |
| 2nd Quarter 1986       | Call on Preference Shares                                               | 4,500,000   |
|                        | 30 Employee Subscriptions                                               | 150,000     |
|                        |                                                                         | <hr/>       |
|                        |                                                                         | 9,850,000   |
| 1987/88 and<br>1988/89 | Remainder of Employee<br>Subscription and Commercial<br>Bank Borrowings | 850,000     |
|                        |                                                                         | <hr/>       |
|                        |                                                                         | £10,700,000 |
|                        |                                                                         | <hr/>       |

It is envisaged that, following the start of trading, there would be 'consortium' relief available to the shareholders resulting from the aggregation of allowable trading losses and capital allowances, subject to the final timing of the capital expenditure programme.

It is intended that, where appropriate, successful application of new technology developed by the Institute will be carried out in separate 'spin off' subsidiaries, and that employees should have a direct participation in these subsidiaries either by direct subscription or by a distribution 'in specie' of the Institute's holding in the 'spin off' subsidiary. It would then be intended to seek the relief afforded by the 'demerger' provisions in the Finance Act 1980 in order to mitigate the effects of taxation on any such 'in specie' distribution.

## Resources

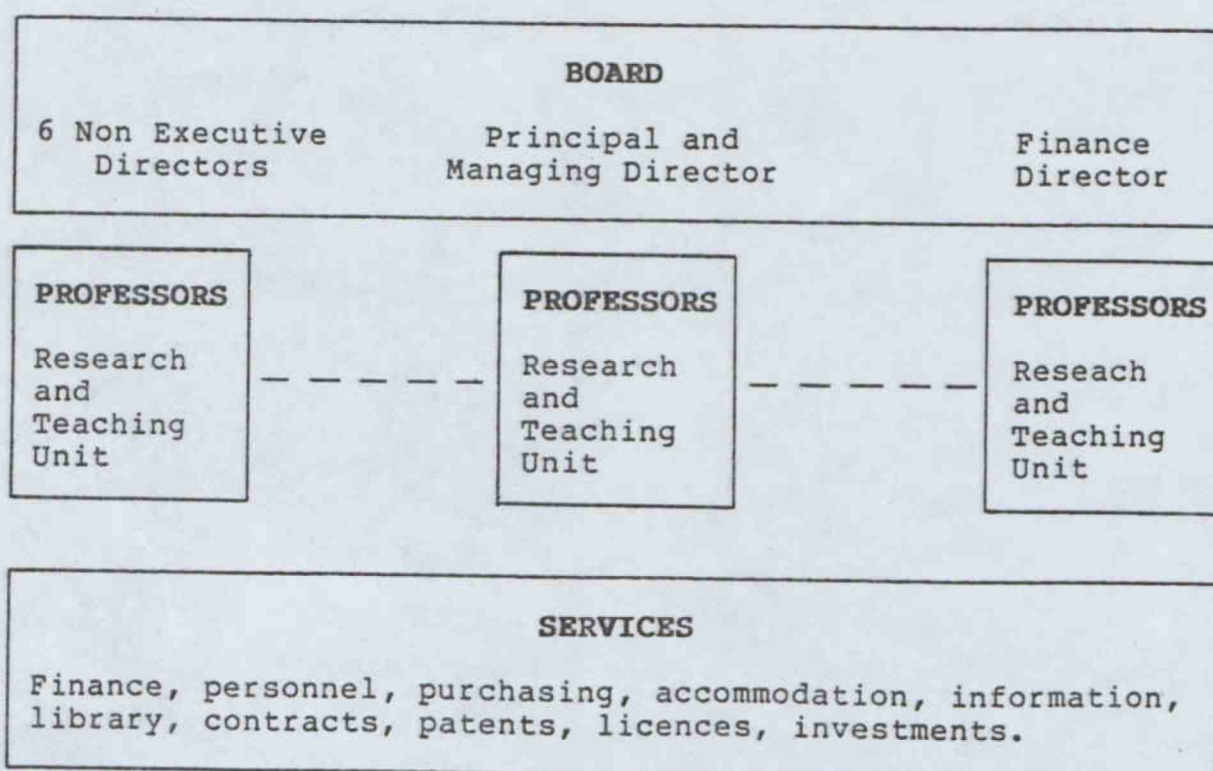
As an independent body, the Institute will be free to develop its own approach to research, organisation, and teaching.

It will be controlled by a board which will consist of six non-executive directors, the Principal and Managing Director, and a Financial Director. Board members will be elected by the shareholders for periods of up to three years. The Board will elect one of the outside directors as Chairman.

The Institute will combine the strengths of independent research and teaching groups each led by a professor, with appropriate supporting services.

The proposed organisation is shown schematically in Figure 2.

Figure 2



It is planned that the resources of the Institute will grow to 360 staff over the first five years of operation, covering research, teaching, marketing, product development, design, patents and licensing, contract management and financial administration.

Contracts of employment will be based on best industrial practice, and salaries will be linked to performance. Key staff will have an equity stake in the business, and all staff will have a share option scheme related to the performance of the company.

The reward levels will allow the highest calibre people to be appointed and rewarded appropriately. Other terms and conditions of employment will be commensurate with normal industrial practice and will include portable pensions.

Candidates for the position of Principal and Managing Director will be selected on the basis of their knowledge of international information technology research and application, their commercial experience of producing and marketing IT products, their track record in running similar organisations, and their experience of consultancy and research.

Professors and senior academic staff will be selected for pre-eminence in their specialist fields and their ability to lead creative research teams in their respective areas of activity.

The Institute will develop strong links with an existing university, and will seek close collaboration in both teaching and research projects, to the mutual benefit of both organisations.

#### **External Advisors**

The Institute will appoint amongst its advisors:

1. Auditors and Tax Accountants
2. Legal Advisors
3. Bankers
4. Patent Agents

There will also need to be a co-ordinating structure in the early period until a Principal and Managing Director has been appointed.

## 5. OPERATING PLAN

The Institute's research and teaching activities will run throughout the year. To ensure optimum use of capital equipment, and of contact time between student and teacher, the most up-to-date teaching methods will be used.

The transfer of teaching material will be achieved using a variety of state-of-the-art teaching technology. This will allow all the contact time between students and teachers to be devoted to specific issues relating to the students' needs or those of their employers.

A major emphasis will be placed on post experience short courses aimed at meeting the immediate needs of the IT industry. The people who will be taking the decisions in IT companies over the next 10 years are already working in the industry. The fees for these courses will be covered directly by the student or his employer.

The Institute will provide higher degree courses related to its own research programme. It is envisaged that students will be drawn from IT companies worldwide and not just from the shareholding companies. It is assumed that the fees of research students will be covered by normal grant and research income. The estimated cost of a postgraduate course is between £9,000 and £10,000 per annum.

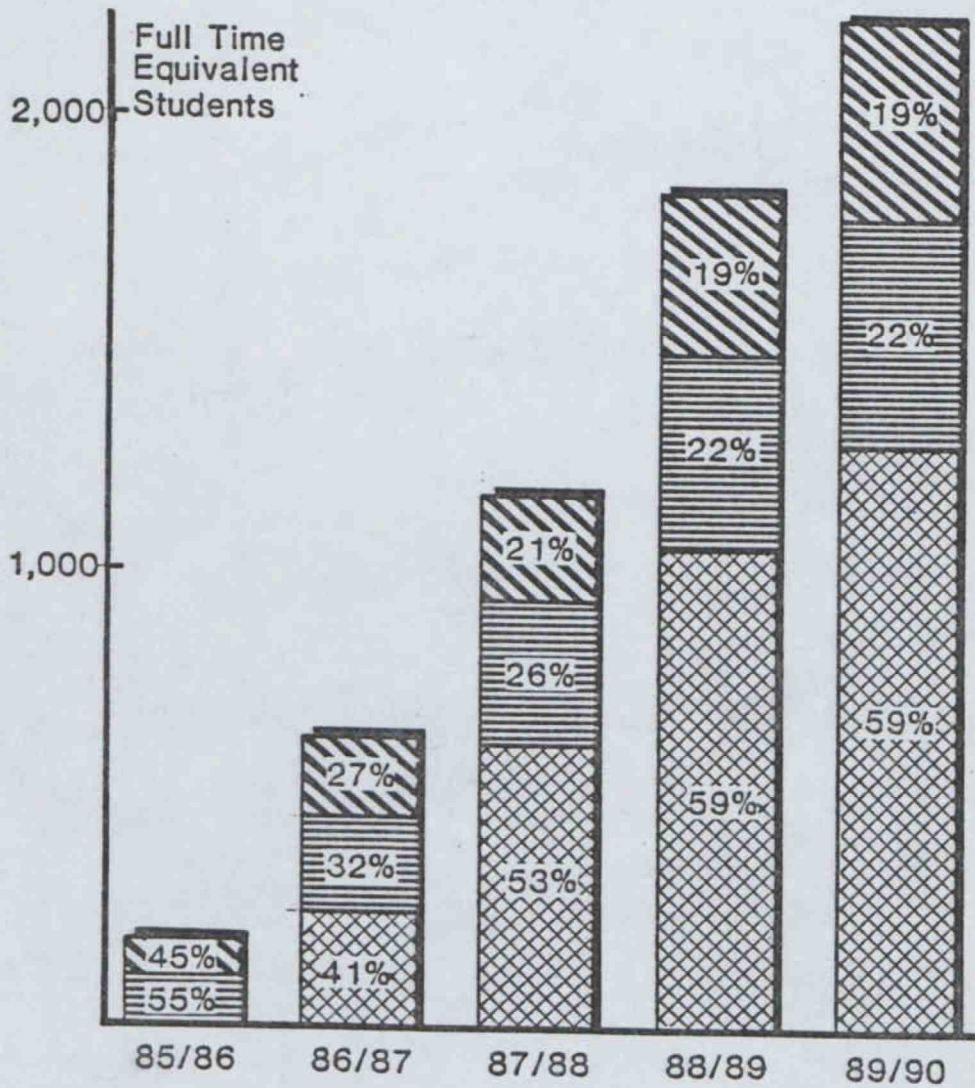
A programme of undergraduate teaching will be developed to start in the second year of operation, and will become the major component of the teaching programme by 1989/90. It is assumed that the fees of undergraduate students will be covered by local education authority grants and a contract from the Department of Education and Science. The estimated cost of an undergraduate course is between £4,000 and £5,000 per annum.




The relative growth of short course, higher degree and first degree programmes is shown in Figure 3.

The Institute will also influence the teaching of IT in schools, technical colleges and training centres by developing training modules for use in remote centres, and by providing a consultancy service on IT education to institutions of this kind.

Figure 3

GROWTH OF TEACHING PROGRAMMES



-  Short Course Students
-  Postgraduate Students
-  Undergraduate Students

## Student Numbers

The planned build up of student numbers is shown in Table 1.

Table 1

| STUDENT NUMBERS               | 1985/86 | 1986/87 | 1987/88 | 1988/89 | 1989/90 |
|-------------------------------|---------|---------|---------|---------|---------|
| Post experience short courses | 1,000   | 2,000   | 3,000   | 4,000   | 5,000   |
| Higher degrees                | 100     | 200     | 300     | 400     | 500     |
| Undergraduates                | -       | 400     | 975     | 1,700   | 2,025   |

## Staffing Levels

The corresponding level of staffing requirement is shown in Table 2.

Table 2

| STAFFING             | 1985/86 | 1986/87 | 1987/88 | 1988/89 | 1989/90 |
|----------------------|---------|---------|---------|---------|---------|
| Professors           | 10      | 15      | 22      | 30      | 38      |
| Assistant Professors | 33      | 61      | 98      | 124     | 147     |
| Support Staff        | 30      | 58      | 97      | 144     | 178     |
| TOTAL                | 73      | 134     | 217     | 298     | 363     |



## **Space Requirements**

Based on estimates of 20 square metres per full time student, the Institute will need 4,000 square metres initially, and to have facilities for expansion to 40,000 square metres by the time it reaches full operation.

## **Location**

It is important that the Institute should have a strong independent corporate image, and to achieve this it will be established in a single location.

Currently the most favoured location is the new city of Milton Keynes, which can provide all the infrastructure of accommodation and extra-mural activities which the Institute will require, and which has excellent communication links to all parts of the country. The city of Milton Keynes has been designed from the outset to take advantage of information technology, and the Institute would enhance the city's image in this respect.

It is envisaged that little or no investment will be made in the physical assets of accommodation, and that these would be rented, and managed by an external agency.

## **Relationship with Shareholders**

The initial shareholders will have a privileged relationship with the Institute which would include exchange of staff, exchange of equipment, sponsorship of students, supply of graduates, licences for new technology, and cost effective contract R & D.

## **Timetable**

July 84 to September 84

Establish interest and initial shareholders.

October 84 to March 85

Appoint the Principal and Managing Director and key staff, define education and research programmes, and define initial student numbers.

April 85 to September 85

Establish the physical base for the Institute, begin investment in capital equipment, recruit remaining staff, and attract student intake.

October 85 onwards

Establish initial courses, and develop the research and teaching operation of the Institute to full scale operation by October 1990.

**Long Term Plans**

In the longer term, when the urgent demand for increased numbers of people with information technology skills starts to decline, the Institute will develop its role as an international centre for the research and development of new applications for information technology, and a role as the industry focus for market development and education. It will continue to play a part in meeting the specialised teaching requirements of the industry for specialist short courses.

## 6. FINANCIAL SUMMARY

The assumptions on which the financial forecasts have been made, and the details of those forecasts, are contained in Appendices 2-5. These cover the estimates for the income of the Institute arising from research, teaching, investment and licencing, together with the estimate of the operating costs of the Institute and the cash flow and profit projections.

The resulting forecasts of profit and cash flow are shown in Table 3.

Table 3

| FINANCIAL SUMMARY      | £m | 1985/86 | 1986/87 | 1987/88 | 1988/89 | 1989/90 |
|------------------------|----|---------|---------|---------|---------|---------|
| Profit (loss) forecast |    | (1.2)   | (0.3)   | 0.8     | 2.8     | 4.3     |
| cumulative             |    | (1.2)   | (1.5)   | (0.7)   | 2.1     | 6.4     |
| Cash flow forecast     |    | (5.7)   | (3.3)   | (1.7)   | 0.3     | 1.8     |
| cumulative             |    | (5.7)   | (9.0)   | (10.7)  | (10.4)  | (8.6)   |

These figures indicate the best estimates currently available, and reflect a degree of uncertainty of plus or minus 15%.

### Capital Expenditure

Capital expenditure estimates have been made covering the initial equipping of the Institute. The estimates reflect the following assumptions:

- equipment required for special research and development programmes will be funded by the programmes.

- some equipment may be donated.
- some facilities will be 'hired' from other research establishments on an 'as needed' basis.

Table 4 shows the projected rate of capital expenditure.

Table 4

| CAPITAL EXPENDITURE £m              | 1985/86 | 1986/87 | 1987/88 | 1988/89 | 1989/90 |
|-------------------------------------|---------|---------|---------|---------|---------|
| Research and postgraduate equipment | 2.5     | 1.0     | 0.5     | 0.5     | 0.5     |
| Undergraduate equipment             | 2.0     | 2.0     | 2.0     | 2.0     | 2.0     |

## APPENDIX 1 : IT SECTOR DEFINITIONS

### **Components**

Solid state physics, semi conductor devices, chip design, VLSI, logic arrays, sensors, transducers, memory devices, microprocessors, displays, opto-electronic devices, bio-electronic devices, magnetic devices, manufacturing process technology, materials, micro-engineering.

### **Communications**

Terrestrial broadcasting systems, satellites, microwave links, radio links, mobile communications.

### **Telecommunications**

Wide area/local area networks for voice, text, data and image transmission, switching systems, fibre optics, subscriber equipment, communication standards and protocols.

### **Computers and Peripherals**

Mainframe, mini and micro computers, input/output and storage peripherals, distributed/real time computing, data communication, software, computer architecture, intelligent knowledge based systems.

### **Computer Science**

Software, man/machine interaction, database utilisation, information collection and storage, information processing.

### **Industrial Applications**

Sensors, actuators, signal processing, process and production control, computer aided design and testing, analogue and digital instrumentation, factory automation, robots.

### **Commercial and Consumer Applications**

Business computers, wordprocessors, voice, text, data and image transmission, local area networks, multifunction work stations, office automation, commercial transactions, teleshopping, funds transfer, view data, consumer products.

### **Entertainment and Leisure Applications**

Audio and video systems, digital and linear recording, home computing and information systems, education, leisure, and hobby activities.

### **Medical Applications**

Health monitoring, diagnostics, artificial aids for disabled, therapy equipment.

APPENDIX 2 : ESTIMATED INCOME

| ESTIMATED<br>INCOME      £m | 1985/86 | 1986/87 | 1987/88 | 1988/89 | 1989/90 |
|-----------------------------|---------|---------|---------|---------|---------|
| Research                    | 0.2     | 0.5     | 1.5     | 2.5     | 4.0     |
| Teaching:                   |         |         |         |         |         |
| short courses               | 1.5     | 3.0     | 4.5     | 6.0     | 7.5     |
| postgraduate                | 0.1     | 0.2     | 0.3     | 0.4     | 0.5     |
| undergraduate               | -       | 1.8     | 4.4     | 7.7     | 9.1     |
| Investment/<br>licensing    | -       | -       | -       | 0.5     | 0.5     |
| TOTAL                       | 1.8     | 5.5     | 10.7    | 17.1    | 21.6    |

Assumptions

1. No income from residential accommodation has been included.
2. Short course average duration 2 weeks.
3. Undergraduate contract fees @ £4,500 per student per year.

APPENDIX 3 : OPERATING EXPENDITURE FORECAST

| ESTIMATED COSTS      £m  | 1985/86 | 1986/87 | 1987/88 | 1988/89 | 1989/90 |
|--------------------------|---------|---------|---------|---------|---------|
| Accommodation Rent       | 0.2     | 0.6     | 1.2     | 1.8     | 2.2     |
| Accommodation Management | -       | 0.1     | 0.1     | 0.2     | 0.2     |
| Salaries                 | 1.8     | 3.2     | 5.1     | 6.9     | 8.3     |
| Equip/supplies/Services  | 0.5     | 1.9     | 3.5     | 5.4     | 6.6     |
| Start up costs           | 0.5     | -       | -       | -       | -       |
| TOTAL                    | 3.0     | 5.8     | 9.9     | 14.3    | 17.3    |

Assumptions

1. No allowance for residential accommodation has been included in costs.
2. Accommodation rental based on 20m<sup>2</sup> per full time student; £35/m<sup>2</sup> rent, £15/m<sup>2</sup> utilities.
3. Accommodation management based on 10% of the rental.
4. Salaries (related to performance):
 

|                      |              |
|----------------------|--------------|
| Managing Director    | £60,000 p.a. |
| Professors           | £40,000 p.a. |
| Other academic staff | £20,000 p.a. |



Support staff                    £10,000 p.a.

Employment costs                + 30%

5. Start up costs allow for planning, recruitment, legal costs, and pre 1985/86 salaries.

APPENDIX 4 : CASH FLOW FORECAST

| ESTIMATED<br>CASH FLOW    £m  | 1985/86 | 1986/87 | 1987/88 | 1988/89 | 1989/90 |
|-------------------------------|---------|---------|---------|---------|---------|
| Capital equipment             | 4.5     | 3.0     | 2.5     | 2.5     | 2.5     |
| Accommodation                 | 0.2     | 0.7     | 1.3     | 2.0     | 2.4     |
| Salaries                      | 1.8     | 3.2     | 5.1     | 6.9     | 8.3     |
| Equip/supplies/<br>services   | 0.5     | 1.9     | 3.5     | 5.4     | 6.6     |
| Start up costs                | 0.5     | -       | -       | -       | -       |
| Total outflow                 | 7.5     | 8.8     | 12.4    | 16.8    | 19.8    |
| Income                        | 1.8     | 5.5     | 10.7    | 17.1    | 21.6    |
| Net cash inflow/<br>(outflow) | (5.7)   | (3.3)   | (1.7)   | 0.3     | 1.8     |
| Cumulative cash<br>position   | (5.7)   | (9.0)   | (10.7)  | (10.4)  | (8.6)   |

APPENDIX 5 : PROFIT (LOSS) FORECAST

| PROFIT/LOSS<br>FORECAST      £m | 1985/86 | 1986/87 | 1987/88 | 1988/89 | 1989/90 |
|---------------------------------|---------|---------|---------|---------|---------|
| Income                          | 1.8     | 5.5     | 10.7    | 17.1    | 21.6    |
| Expenditure                     | 3.0     | 5.8     | 9.9     | 14.3    | 17.3    |
| Profit (loss)                   | (1.2)   | (0.3)   | 0.8     | 2.8     | 4.3     |

Figure 1

THE APPLICATIONS OF ARTIFICIAL INTELLIGENCE  
IN MAJOR MARKET SEGMENTS

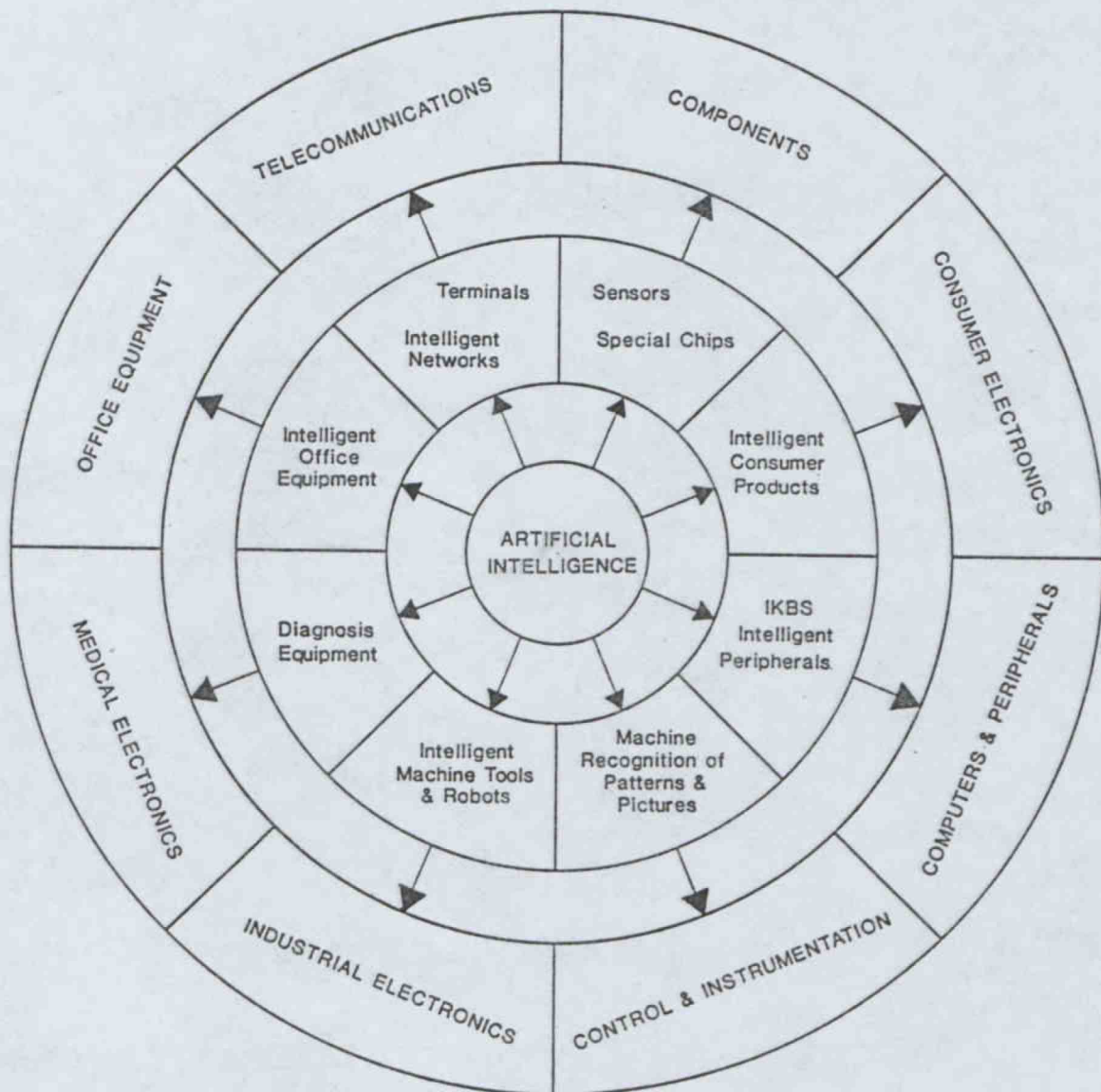
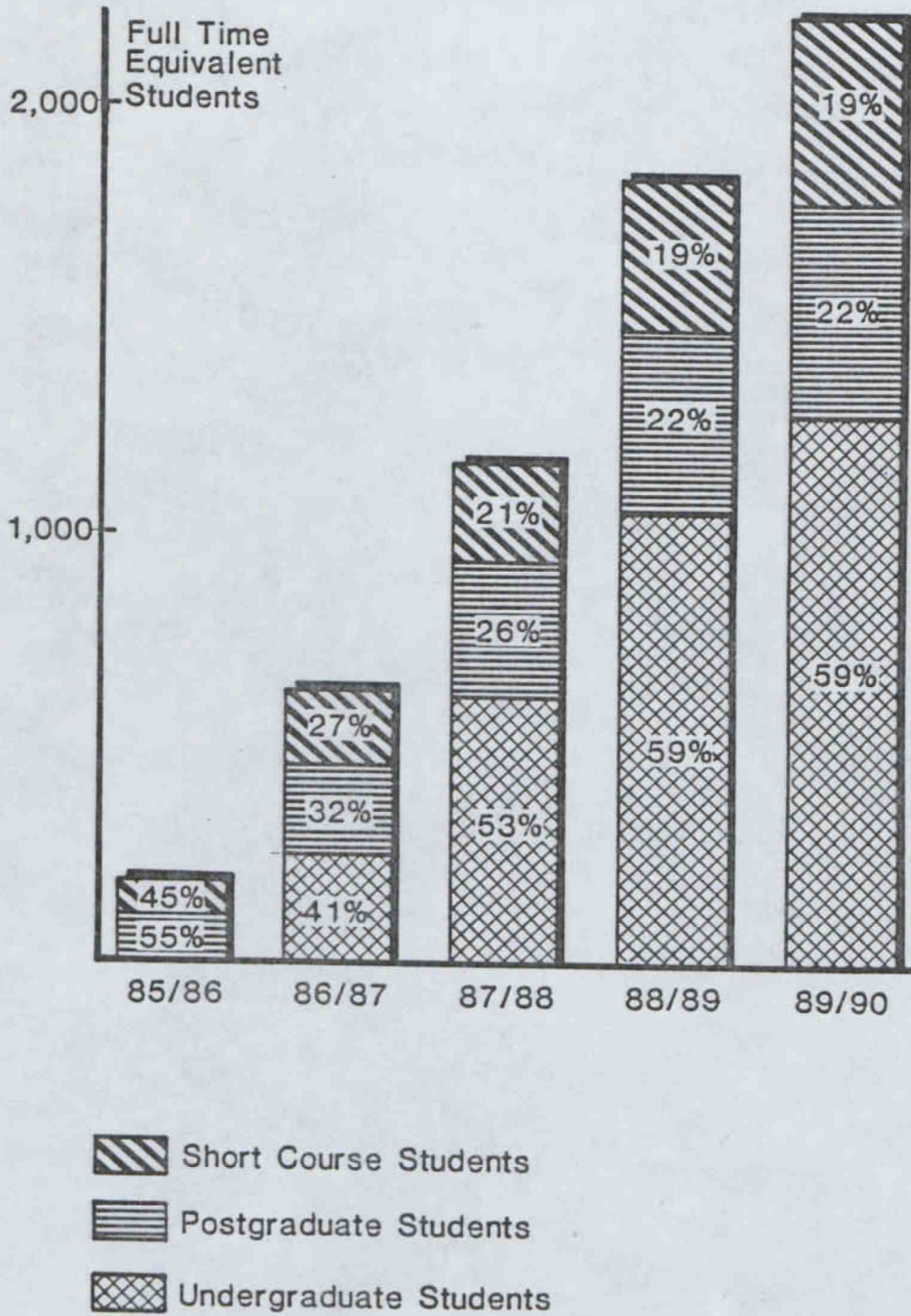


Figure 3

GROWTH OF TEACHING PROGRAMMES





JU677

PS / Secretary of State for Trade and Industry

DEPARTMENT OF TRADE AND INDUSTRY  
1-19 VICTORIA STREET  
LONDON SW1H 0ET

Telephone (Direct dialling) 01-215 5422  
GTN 215 .....  
(Switchboard) 215 7877

5 July 1984

R P Hatfield Esq  
Private Secretary to  
Sir Robert Armstrong  
70 Whitehall  
London SW1A 2AS

*Dumb  
6/7*

*Dear Richard,*

ITAP REPORT: "MAKING A BUSINESS OF INFORMATION"

Thank you for your letter of 22 June. The Secretary of State is content for you to proceed with a review of the committee machinery for dealing with IT issues and, as part of that review, to consider the appropriate machinery for dealing with "tradeable information". He would welcome an early opportunity to see the terms of reference which will be set for the review.

Copies of this reply go to the recipients of your letter.

*Yours etc,*

*Andrew Lansley*

ANDREW LANSLEY  
Private Secretary

IT : IND POL P+4.



DEPARTMENT OF TRADE AND INDUSTRY  
1-19 VICTORIA STREET  
LONDON SW1H 0ET

Telephone (Direct dialling) 01-215 5422  
GTN 215 .....  
(Switchboard) 215 7877

Secretary of State for Trade and Industry

2 July 1984

David Barclay Esq  
Private Secretary to the  
Prime Minister  
10 Downing Street  
London SW1

*sub  
4/7*

*Dear David,*

Thank you for your letter of 18 June on the Government's response to the ITAP Report, "Making a Business of Information". We will be examining further with the Cabinet Office the kind of support that Mr Baker will receive in his role as co-ordinator of government policy towards the tradeable information sector. As you will know from Richard Hatfield's letter to me of 22 June Sir Robert Armstrong proposes to include this examination in a wider review of the committee machinery for dealing with information technology issues. This point does not, of course, affect the text of the response and we have now put its publication in hand.

*Yours ever,*

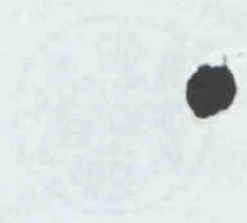
*Andrew Lansley*

ANDREW D LANSLEY  
Private Secretary

JH5ACG



IND. Pol. Info Teh Pt 4



RECEIVED  
INFORMATION  
SECTION

PROCESSED BY THE  
INFORMATION SECTION

15  
1964

PRIME MINISTER

*nbpm  
20/6*

ITAP REPORT "MAKING A BUSINESS OF INFORMATION"

I have seen Norman Tebbit's note to you of 12 June, covering the draft Government response to the ITAP Report "Making a Business of Information".

I endorse the terms of the draft response, and have only the following comments:-

- (i) The square brackets at the end of paragraph 15(6) should be replaced with the words  
".....and the Government has the arrangements under review".
- (ii) Paragraph 8, line 9 should read  
".....which is funded by the Departments of Education in England, Wales and Northern Ireland".
- (iii) Paragraph 10, line 7-8 should read  
"..... have helped virtually every primary and secondary school in the country to buy a computer... "

Otherwise, for my part, I would be content for the draft to be published.

Copies of this go to Norman Tebbit, Leon Brittan, Grey Gowrie, Peter Walker, Norman Fowler, Barney Hayhoe and Sir Robert Armstrong.

*14*

*28 June 1984.*

IND Por: Info Tech  
Pt 4

28 JUN 1984

11 12 1 2 3  
10 9 8

BF is this yours  
re? Kay  
28/6



Frederic

Secretary of State for Industry

Kay

letter from David Barclay  
dated 18/6 to A Landey re  
ITAP Report — our response  
will be late as SOS wishes to  
comment on Sir Robert Armstrong's  
correspondence on the same subject  
first prior to answering David's.

Bennie  
AS/SOS  
27/6



JMB  
22/6

70 WHITEHALL, LONDON SW1A 2AS

01-233 8319

*From the Secretary of the Cabinet and Head of the Home Civil Service*

Sir Robert Armstrong GCB CVO

Ref. A084/1804

22 June 1984

*Dear Andrew,*

ITAP Report "Making a Business of Information"

David Barclay's letter to you of 18 June records the Prime Minister's wish that the suggestion of a joint Cabinet Office/DTI secretariat should be further examined. The committee machinery for dealing with information technology issues is in any case in need of review and Sir Robert Armstrong therefore proposes that the appropriate machinery for "tradeable information" should be considered as part of that exercise. If your Secretary of State is content with this proposal, the Cabinet Office will set in hand the review, which would be co-ordinated by Dr Nicholson.

I am copying this letter to David Barclay (No 10), Hugh Taylor (Home Office), Elizabeth Hodgkinson (DES), Michael Reidy (Department of Energy), Steve Godber (DHSS), Mary Brown (MPO) and Mike Corcoran (Treasury) and to Dr Nicholson here.

*Yours*  
*R. P. Hatfield*

(R P Hatfield)  
Private Secretary

Andrew Lansley Esq

129 Pol  
Info Tm

22 JUN 1984

11 12 1  
9 1 2  
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7 4 4  
6 5 4



## CABINET OFFICE

*From the Minister of State*

Lord Gowrie

MANAGEMENT AND PERSONNEL OFFICE

Great George Street

London SW1P 3AL

Telephone 01-233 8610

David Barclay Esq  
10 Downing Street

21 June 1984

*nbpm  
DWB  
22/6*

*Dear David,*

ITAP REPORT 'MAKING A BUSINESS OF INFORMATION'

Lord Gowrie has seen Mr Tebbit's minute of 12 June and your letter to Mr Lansley of 18 June about the Government's response to the ITAP report.

Lord Gowrie is content with the response and, subject to the response to the point made by the Prime Minister, sees no objection to its publication.

I am copying this to the recipients of your letter.

*Yours,*

*Louisa*

MISS S C PHIPPARD  
Assistant Private Secretary

INDPOL  
Info Team  
Part 4

11 12 1984

22 JUN 1984

CONFIDENTIAL



NOTE FOR FILE

Home Office have no

comment on S/S DTI to

PM of 12/6 on ITAP

Report.

not  
1966



10 DOWNING STREET

From the Private Secretary

18 June 1984

rite  
SSM  
CC HO CO  
OAL  
DES  
Energy  
DHSS  
HMT

Dear Andrew,

ITAP Report "Making a Business of Information"

The Prime Minister considered over the weekend your Secretary of State's minute of 12 June about the Government's response to the ITAP Report entitled "Making a Business of Information".

Subject to any further comments from colleagues, the Prime Minister is content for the draft response which was attached to your Secretary of State's minute to be published. She agrees in particular that the Minister for Information Technology (Mr Baker) should take responsibility for co-ordinating policy towards the "tradeable information" sector.

65 / The Prime Minister does, however, have some doubts about the proposition in your Secretary of State's minute that the Minister should be supported in his new role by a joint Cabinet/DTI Secretariat. She would be grateful if this suggestion could be further examined in consultation with Sir Robert Armstrong.

I am sending copies of this letter to the Private Secretaries to the recipients of yours.

Yours ever,

David

David Barclay

Andrew Lansley, Esq.,  
Department of Trade and Industry

E.R.  
PRIME MINISTER (4)

ITAP Report "Making a Business of Information"

The major point in the attached papers is one of machinery of Government.

Mr Tebbit proposes, and Sir Robert Armstrong agrees, that Mr Baker should take lead responsibility at Ministerial level for policy on "tradeable information". According to ITAP this sector of the economy represented 5% of GDP in 1980, and had a positive balance of trade of £2.5 billion.

Content for Mr Baker to take the lead as proposed?

Sir Robert Armstrong would like to give further thought to the proposal in paragraph 5 of Mr Tebbit's minute for new official co-ordinating machinery. I suggest, if you agree, that we say simply that you would be content for this proposal to be examined further in consultation with Sir Robert Armstrong.

Yes not

I don't like the proposal very much  
not

DMB

14 June 1984

Ref. A084/1715

PRIME MINISTER


---

The Secretary of State for Trade and Industry has sent you a draft Government response to the report you received last year from the Information Technology Advisory Panel (ITAP). The report, "Making a Business of Information", and its main message about the benefits of greater Government and industry awareness of information as a commercial commodity, attracted favourable press comment at the time.

2. Mr Tebbit's proposed response turns down one or two of the Panel's detailed ideas, and does not go as far on copyright as they would have liked, but is generally a positive response to the report. Its main proposal, and one which will no doubt attract most attention, is the designation by you of the Minister for Information Technology as the Minister responsible for co-ordinating policy towards the 'tradeable information' sector.

3. I think this machinery of government change is right for both practical and presentational reasons. But there are one or two points you may like to consider when making your decision.

4. The ITAP report, and Mr Tebbit's minute, set out the main arguments for the proposal. Existing responsibilities are scattered: the Department of Trade and Industry, the Office of Arts and Libraries, the Home Office, the Treasury, the COI, the CCTA, and the Cabinet Office (Management and Personnel Office) all have responsibilities which touch on the tradeable information area. The Department of Education and Science and the Department of Employment have important roles on the educational and training side. Nearly all Departments collect or hold information which may have some commercial application. The responsibilities are related to wider Departmental remits and, as such, cannot sensibly be detached and brought under a single Minister. On the other hand a coherent Government approach



is very difficult if the different responsibilities are exercised without regard to what is happening elsewhere. The obvious solution is to give one Department the responsibility for co-ordinating policy and activities, and to underpin this responsibility with appropriate machinery.

5. I think the Department of Trade and Industry is the only practicable choice. The Minister for the Arts would be a possible alternative in principle; he has significant responsibilities for the Libraries sector. But his office is too small to develop the range of contacts and expertise required. The Department of Trade and Industry on the other hand has a large number of the relevant responsibilities (copyright, publishing, advertising, films, information technology etc) and the necessary weight and expertise. There will however be a considerable co-ordinating task for Mr Baker even within his own Department, and it will be important to watch that the industrial and 'hardware' aspects do not crowd out the more significant service industries side to this.

6. For that reason I think it would be right to give the co-ordinating machinery a little more thought. The use of Cabinet Office machinery seems right, but I am not sure that the model Mr Tebbit suggests for his proposed interdepartmental Committee - the Space Committee (MISC 46) - is a very good one, judging by experience of that Committee so far. The committee machinery for dealing with Information Technology issues is however in need of review, and I should like, if you agree, to suggest that we consider the appropriate machinery for "tradeable information" as part of that exercise.

7. Finally, as Mr Tebbit says, you will need to be careful that Mr Baker's new role is not misrepresented as one of 'Minister for Information'. You may remember that one earlier press report on the ITAP proposals suggested that they were proposing an "overlord for media control". It is quite possible too that the Freedom of Information Campaign led by Mr Des Wilson will try to make something of the move. They might for example contrast the Government's decision to act in the 'tradeable

information' area, where this is money to be made, with their lack of response on the free access of ordinary people to Government information. I am sure any criticism can be dealt with robustly, but it is a point you may want to watch in the way the proposals are presented.

RTA

ROBERT ARMSTRONG

14 June 1984

IND POL : IT : PE4



COMPTON





PRIME MINISTER

ITAP REPORT "MAKING A BUSINESS OF INFORMATION"

You asked my Department to co-ordinate the preparation of the Government's response to the report published last October by your Information Technology Advisory Panel (ITAP), and entitled "Making a Business of Information". A ... copy is attached.

2 This report deals with the growing commercial markets now being stimulated by developments in technology. ITAP define a new "tradeable information sector" which embraces activities hitherto largely regarded as separate: these range from video cassettes, films, printing and publishing to on-line computer databases and financial information services. The report calls for both public and private sectors to pay more attention to such information as a commercial commodity, and to take steps to exploit internationally our current relative position of strength. ITAP acknowledge that the private sector must bear the main responsibility for developing businesses but go on to make a

JH3ANJ





number of proposals to Government, aimed at establishing an environment in which new developments in this tradeable information sector will be encouraged.

... 3 The attached draft Government response welcomes the report as a valuable contribution to public thinking on this important area of economic activity (ITAP put this at 5% of GDP; and our positive balance of trade at £2.5 billion in 1980). We can be very positive in accepting ITAP's main message that, as a result of technical developments over the last decade, we are now at the beginning of a major expansion in information related activities and services.

4 One of ITAP's main recommendations to the Government is that it should review its current scattering of responsibilities in this newly defined sector and identify one major Department as having lead responsibility for co-ordinating policy, together with explicit Ministerial commitment to the importance of this sector. ITAP are not calling for any reallocation of existing Ministerial responsibilities within this tradeable information sector; or for the designation of a Minister of Information, a term which we should clearly studiously avoid lest it be coupled



with the current campaign by some for a Freedom of Information Act.

5 I believe that we should accept ITAP's proposal, and that the simplest way would be to suggest that Kenneth Baker as Minister for Information Technology, should have this co-ordinating responsibility. Although several other Departments have policy responsibilities for particular activities within this sector (Home Office - broadcasting; OAL - libraries and certain information services), and other Departments are heavily involved as providers or handlers of information, it is DTI that deal with the bulk of the activities in this sector - publishing, films, on-line databases, copyright. This additional responsibility would take nothing away from the duties and responsibilities of existing Ministers, but add to the Minister for IT the extra task of co-ordinating Government policies across this sector, and carrying forward some specific actions identified in our draft response. The administrative arrangements to be used could be similar to those already used by him in relation to the co-ordination of Government activity in Space, with a joint Cabinet Office/DTI secretariat.

RIA has some doubts about this model - see para 6 of his minute.

Dunlop  
14/6

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6 We can give a positive response to most of ITAP's other proposals. In many areas we already have action in hand: these include the pursuit of international technical standards; our database promotion scheme; Alvey programme work on "expert systems"; and continuing programmes for stimulating development of some of the underlying technologies. In other areas our draft response proposes further action, the principal one being an undertaking to set an example by reviewing two Departments initially in order to examine what further scope exists for exploiting commercially the information they have at their disposal, perhaps jointly with the private sector. The draft response lists a number of areas in Government where this already happens. The selection of the two Departments would be one of the first tasks of the nominated co-ordinating Minister in consultation with colleagues.

7 There will be considerable disappointment that we cannot give firmer promises of action on copyright, but it has not yet been given a sufficiently high priority for an early place in the legislative timetable.

8 There are no resource consequences of any significance as a result of our accepting the ITAP report's proposals.

JH3ANJ



If you and colleagues to whom I am copying this letter endorse the attached draft Government response I will arrange for its **early publication.**

9 Copies of this go to Leon Brittan, Grey Gowrie, Keith Joseph, Peter Walker, Norman Fowler, Barney Hayhoe and Sir Robert Armstrong.

NT

N T

12 June 1984

Department of Trade and Industry

JH3ANJ



DRAFT 1 JUNE 1984

GOVERNMENT RESPONSE TO THE ITAP REPORT ON "MAKING A BUSINESS OF INFORMATION"

1 The Government welcomes the report by the Information Technology Advisory Panel (ITAP) on "Making a Business of Information". As was the case with their report on cable, ITAP have rightly focused on a new and potentially significant area of business activity and the Government hopes that their report will encourage people to seize the opportunities highlighted.

2 As ITAP recognise, the supply and dissemination of information is an enormously diverse and wide-ranging activity of which tradeable information activities through the media of modern technology is a modest though explosively growing part. The boundaries of this sector cannot be drawn with any precision and it is difficult to measure the activity within. Nevertheless, the report's main message - that as a result of technical developments of the past decade or two we are at the beginning of a major expansion in information related activities and services - is fully accepted. This response outlines the Government's proposed policy framework for ensuring that the UK is well placed to develop and exploit any business opportunities which may result.

The Significance of the Information Sector

3 Despite the problems of measurement there is no doubt that the information sector worldwide has grown significantly. The communications sector is estimated to have an annual turnover of £15 billion; the market for financial information is still growing at more than 20% per year; and a recent US estimate put the world



market for databases at \$13 billion, of which 80 per cent was in the USA. There are estimated to be about 1,900 on-line databases available worldwide from some 270 service providers, and involving over 900 database producers: 77 million references are now available for on-line search and this number is growing by about 8.7 million annually.

4 In Europe, bibliographic on-line data retrieval services have been growing at around 30% per annum; whilst in the UK some 100 databases are produced by 70 organisations. About £4m to £8m was spent on on-line search services in the UK in 1983. In the more traditional book publishing field total UK sales plus receipts from royalties amounted to £1.3 billion in 1983, and 48,307 UK book titles were published in 1982. Some 43,000 people are employed in the UK in library and information services, and some £600 million is spent on these staff and on stock. To these must be added entertainment, consultancy and related services which ITAP have rightly identified as constituting parts of the tradeable information sector.

5 Significant opportunities are being created both for new businesses and new activities based on the provision of information. Reuters, for many years a well known and respected supplier of news and information, has seen a dramatic acceleration in its turnover and profit since 1979 when it introduced its on-line financial information service. Today, Reuters' non-newsagency activities account for 90% of the company's revenue, with a considerable proportion earned overseas. The development of the market for Prestel, the growing routine use of database and bibliographical searches, and on-line travel bookings are all further examples of the impact of new methods of transmitting information.

#### The Importance of Technology

6 The information sector will only flourish in the UK if the right technology is available to underpin it and the level of awareness and understanding of that technology is sufficiently high to enable new information services to reach a wide range of users. It is for this reason that Government has attached a high priority to stimulating the development and application of the new



information technologies. Since 1979, a wide-ranging programme of support has been pursued under the Department of Trade and Industry's general Support for Innovation scheme and also through some specific schemes of support aimed at fibre optics, flexible manufacturing systems, robotics and software, and other areas. The Alvey programme of support for the basic enabling technologies involves collaboration with industry and the academic world; whilst the Esprit programme draws on EEC funds and involves collaborative ventures on a European scale.

7 Information Technology Year 1982 successfully increased the general level of awareness of new technology whilst the Government's programmes for liberalising telecommunications and for the development of cable systems and DBS are creating significant new opportunities for the UK's electronics industry. These policies have benefitted our IT companies by creating a more favourable environment but they have also helped to provide the essential technologies for the new information service companies and a basic community of users demanding these services.

8 The impact of new technologies is already very widespread, and has prompted wide ranging changes in the way people use, handle and store information. This is true not only in the obvious commercial areas such as offices or in the City, but also in libraries and information services. The British Library has far reaching plans for enhanced services based on the most up-to-date information technology and is likely to be a major innovator in this field. In schools one of the activities of the Microelectronics Education Programme (MEP), which is funded by the Department of Education, has been to establish databases and other materials to provide pupils with information handling skills. In higher education many departments, particularly of communications and design, are modifying their curricula to provide students with experience in the



information technologies. An example of this is a recently published report on the future strategy of the Royal College of Art, which recommended special courses in advertising, packaging and presenting information over the mass media and the creation of a new department for electronic arts. Such developments are in keeping with the spirit of ITAP's report.

#### Focusing on the Information

9 The Government agrees, however, that more attention needs to be paid to the information itself. The UK is well placed to play a key role in this new sector: the widespread acceptance of the English language, particularly as the first scientific and technical language; our strong cultural and historical traditions; our strengths in the relevant technologies; and improvements in the quality of our telecommunications networks are all factors which place the UK in a strong position.

10 The Government also shares ITAP's view that education and training makes a vital contribution to the development of this sector. We have already introduced a number of schemes and initiatives designed to enable schools to keep pace with changes in the way information is handled. The Department of Trade and Industry's Micros for Schools schemes will by the end of this year have helped every primary and secondary school in the country to buy at least one microcomputer, and ~~many~~<sup>most</sup> have purchased several more. The Microelectronics in Education Programme is training teachers in the new technologies, developing databases, and producing software and other materials for a wide range of subjects, not just those previously associated with computing and numeracy. Similar programmes exist in Scotland. The British Library has an extensive programme of research, the results of which are aimed at training schoolchildren to appreciate the value of information and





and to handle it efficiently in both traditional and non-conventional forms. A significant amount of high quality course material and software, developed by both MEP and commercial software producers, publishers and broadcasting authorities, is now becoming available. We are already capitalising on this through direct contacts with overseas educational authorities and by supporting the efforts of British companies in selling hardware and software to export markets.

11 The Government acknowledges the importance of information in the economic, social and cultural activities of the country. In developing its policy towards this new sector, the Government accepts that many information needs will, for years to come, be met by conventional handling techniques; that the public sector will inevitably retain a significant role in information provision and use; and that much Government and local authority information will continue to be provided on a free or subsidised basis. It will be important to take into account the needs of these other users of information whilst seeking to establish a framework within which commercial interests can seize opportunities and to add value by processing and delivering information in forms which satisfy the needs of the market.



### The Government's Role

12 As ITAP rightly insist, the principal responsibility for exploiting the new business opportunities in the information sector must lie with the private sector. But the Government accepts that it too has a significant role to play by creating an environment which enables the private sector to take full advantage of these new opportunities for profit. To some extent, this process has already begun through the Government's general programme of support for IT. At an international level, the UK is playing its full part in the discussions within GATT and elsewhere on reducing the barriers to the international flow of trade in services. The difficulties of reaching a satisfactory international consensus in this field should not, however, be underestimated. We are also supporting developments such as Euronet-Diane, which allows for the exchange of information and makes other countries aware of our achievements and abilities.

13 The barriers to international trade are considerably reduced where there is harmonisation and acceptance of national and international standards. The Government has been vigorously supporting the development and promotion of technical standards in several key areas. This activity results from the establishment of the Focus Committee on IT standards and its identification of viewdata, local area network and computer system interworking standards as priority activities. One result of the recommendations has been the establishment of a specialist IT Standards Unit within the Department of Trade and Industry which is accelerating the development of LAN standards and OSI (Open Systems Interconnection standards for computer system interworking) both nationally and internationally. The first standards are now available and, more significantly, products which incorporate them are now appearing in the marketplace. The Government has been able to extend this activity to cover Europe and, through the EEC, a programme of development and harmonisation of IT standards has been initiated which will include the development of a network of test facilities for the standards and their use in public procurement. This programme parallels one on the harmonisation of Telecommunications standards which is also being progressed through the EEC. We will continue to attach high priority to this work.

14 The Government is directly supporting the development of a number of information-based activities through a series of specific schemes, demonstration projects and other initiatives. The Department of Trade and Industry has introduced an assisted purchase



scheme for teletex equipment to enable users to benefit from the advantages of this method of high speed text communication. More recently, plans have been announced for an experimental teletex-based document delivery service, Project Hermes, aimed at giving users, publishers and other information providers, experience of ordering, delivering and receiving text based information in electronic form. We have also introduced a £5 million extension to the DTI's Support for Innovation scheme to support the development of new commercial databases. While we share ITAP's view that developments in software for searching databases are important, it has to be recognised that rapid technological developments in storage, for example on videodiscs, could mean that new retrieval software developed for conventional databases was made obsolete within a short time. Significant changes lie rather further ahead, as "expert systems" are developed, and the Government is supporting work in this area through its Alvey programme.

#### The Government as Supplier and User of Information

15 The Government recognises, too, that as a major supplier and user of information it influences the growth of the tradeable information sector more directly through the manner in which Departments request or supply information. Many commercial bodies are already making a business out of packaging and selling information originating from Government - for instance in statistical and market information - and we list below some of the activities currently under way:-

- (1) HMSO is making available to commercial interests a considerable range of information in electronic or machine readable form, including Statutes in Force, Hansard and other publications. Some of these publications will be capable of on-line retrieval;



- (2) HMSO is also developing a long term strategy for electronic publishing, the first stage of which is the development of a series of "Business Packages" to be published on magnetic discs. Each package will contain a comprehensive store of information on a particular industry and will permit users to access this data on their own microcomputers;
  
- (3) The Department of Trade and Industry has held preliminary discussions with the insurance industry and with publishing interests to determine whether the Department's database of information drawn from the annual returns of authorised insurance companies might be provided in a more convenient machine readable form;
  
- (4) In the Public Record Office, the archiving for permanent preservation of machine readable public records was considered in 1981 by the Committee on Modern Public Records (the Wilson Committee). In its response to the report, the Government accepted the Committee's recommendation that a nucleus of a data archive centre should be established as soon as possible. A study of the feasibility of establishing such a centre in the Public Record Office was satisfactorily concluded in 1982 and the Office is at present taking advice, through CCTA, with a view to drawing up plans for a Modern Record Data Archive (MRDA) during 1984/85;
  
- (5) In the Central Statistical Office the Government is now using the latest IT techniques to make information



available to users more quickly and conveniently. Its economic time series databank is marketed and distributed to computer bureaux and the public in computer readable form by SIA Computer Services;

- (6) ITAP also recommend that the experience of the Open University should be exploited vigorously in overseas markets and that the Government should encourage it to be entrepreneurial in its approach, for instance by allowing it to retain all its overseas earnings. The OU is already active in offering advice and consultancy to overseas universities, and runs short courses for their staff. It is anxious to sell its learning materials worldwide, and has set up a separate marketing arm - Open University Educational Enterprises Ltd - to do this. At present part of the earnings of this company can be retained by the University [ ] and the Government is considering whether these financial terms are appropriate ];



- (7) The Patent Office is discussing with Pergamon-Infoline the possibility of making patent information available for mounting on-line. We expect these discussions to be followed up with other database producers and to embrace trademarks information. It is envisaged that in 2 - 3 years time the Patent Office's ADP system will be capable of providing on-line access to examiners and the public and it should then be possible to develop services which will be a useful supplement to those provided by the private sector. In particular, on-line access to a computerised Register of Patents should be of much greater convenience to the public than the present manual system, permitting the provision of additional on-line searches such as lists of patents or applications under the name of any given inventor or applicant;
- (8) The Companies Registration Office in England and Wales is currently conducting a major study into the feasibility of advancing the computerisation of the Office. The main difficulty in making available company documents for on-line access is one of cost. Section 426 of the Companies Act 1948 requires the Office to maintain access, on an equal basis, to exact and complete copies of all records irrespective of the size of the company or age of the record. As the archives currently comprise around 300 million pages, it would not be cost effective, nor indeed technically feasible to make copies available on viewdata. Nevertheless, CRO recognises that there may be a demand for a service based on the extraction and subsequent viewdata presentation of selected



information relating to companies of significance. Such a service would be run in parallel with the existing service and could only be developed gradually as an extension of CRO's current development plans. More generally the CRO would positively encourage the private sector to make commercial use of its information, and several organisations are already developing selective systems based on the Registrar's records;

- (9) In other areas, consideration is being given to setting up joint ventures between Government and private sector interests to carry forward the idea of using Government held information as a basis for business. In some Departments, such as the Health and Safety Executive, DHSS and Property Services Agency, complete databases are already mounted; and in others, including DoE, contributions are being made to wider international databases.

#### Further Action

16 Whilst the examples cited above provide ample evidence that the Government is already doing a great deal to exploit commercially the information that is available, we are resolved to examine what further scope exists. To this end we intend setting in hand a detailed review of two Departments on a pilot basis in order to explore the potential for making more information available on a commercial basis, either directly or in collaboration with the private sector. On completion of this review we will decide whether and, if so, how to extend this approach to other Departments.

17 As part of this review we will also examine what further scope exists for Departments to handle more information in machine readable



form, in order to set an example, as ITAP propose. Where practicable this is already common practice and in taking further steps in that direction the Government needs to take account of the burden imposed on businesses, particularly small ones.

18 The ITAP report also touched on several other matters which are the concern of Government. One of these concerned statistics for the tradeable information sector. This is part of a more general problem concerning service industry statistics. The Government is considering how these can be improved, without putting an undue burden of form-filling on the sources of information. Since one of the key characteristics of such newly developing sectors is the rapid erosion of traditional distinctions, finding acceptable operational definitions for the collection of statistics from these sectors within a general framework will not be easy. Nevertheless, steps are being taken to assess the importance of software in the economy. Questionnaires are being sent out by the Business Statistics office to provide a snapshot of the computer services industry. A parallel enquiry will seek to provide analogous data on the in-house activities of the private sector.

19 Another relates to the Government's review of Copyright legislation. This is, rightly, an area of very great importance to the new information industries. Two legislative measures to counter video piracy were enacted in the last two sessions of Parliament, both with Government support, and there are already indications that these are having effect. Copyright issues arising from the expansion of cable television and direct broadcasting by satellite are being dealt with in the current Cable and Broadcasting Bill. However, it is the general area of copyright protection that is crucial to providing the right framework within which new technologies can develop and can be accommodated. We therefore intend to bring forward as soon as possible a comprehensive programme of copyright reform, balancing the legitimate interests of suppliers and users.





20 The Government also agrees with ITAP that there would be advantage in a more concerted approach to the issues affecting the information sector. It therefore welcomes the ITAP recommendation that the representative bodies for the different parts of the private sector should be brought together in some appropriate structure, and supports the initiatives already taken to create an effective organisation. For its own part the Government recognises the need for appropriate co-ordination of the different parts of Government with responsibilities in this area. A number of Government Departments are involved, and many of these reside in the Department of Trade and Industry, whilst the Minister of Arts has a general responsibility for co-ordinating library and information services which do not fall within the responsibility of any other Government Department, and specific statutory responsibility in relation to public libraries and the British Library; but there is no specific responsibility for encouraging the growth of this wider sector identified by ITAP. The Prime Minister has therefore decided to give [ ] in the Department of Trade and Industry special responsibility for co-ordination of activities concerning the tradeable information sector. Whilst individual Ministers concerned will retain their existing responsibilities within this area of activity this new arrangement will provide for a greater degree of inter-departmental co-ordination of policies, and provide a focus for carrying forward specific actions detailed above.

21 Finally the Government has considered whether it would be appropriate to adopt the ITAP suggestion of an Information Year, on the lines of IT '82. Since IT '82 so raised the level of awareness generally about the nature of the new technologies it is doubtful whether this would be a particularly effective approach. [ ] will, however, have the responsibility of considering



what promotion would be appropriate to mount, as part of the Government's continuing task of furthering the interests of the tradeable information sector.

22 The invention of the printing press revolutionised the dissemination of information. The current revolution in technology is ushering in a second revolution in the processing and dissemination of information as potent as the first. The UK must build on its undoubted strengths to seize the opportunities for capturing a substantial portion of future world trade in these new businesses.

IND PO: Info Tech Pt 4



10 DOWNING STREET

Ms. Tuxford  
13th March, 1984

INFORMATION TECHNOLOGY CENTRES

Thank you for your letter of 8th March.

I saw the advertisements and thought they were splendid.

I would like to help to give still more publicity to the work of IT Centres and look forward to seeing your factual report in due course. Meanwhile I am receptive to any ideas you may have.

STEPHEN SHERBOURNE  
Political Secretary

The Rt. Hon Kenneth Baker, MP



DEPARTMENT OF TRADE AND INDUSTRY  
1-19 VICTORIA STREET  
LONDON SW1H 0ET

TELEPHONE DIRECT LINE 01-215  
SWITCHBOARD 01-215 7877

*From the Minister of State  
for Industry and Information Technology*

RT HON KENNETH BAKER MP

Stephen Sherbourne Esq  
10 Downing Street  
LONDON SW1

8 March 1984

INFORMATION TECHNOLOGY CENTRES

I am enclosing an advertisement which appeared in last Friday's Daily Telegraph, Daily Express and Times, issued by Acorn, the makers of the BBC microcomputer. It really is an unsolicited - and unpaid - testimony for the success of our IT Centres.

The Prime Minister announced the first tranche of these in 1981, and subsequently approved the increase of the scheme to 150 centres. 130 of these are already operating, and we have outstanding applications from local groups for nearly 50 more. If we can find the resources within our existing budget, we would hope to be able to increase the number of centres to meet this demand. If we can, I hope you will consider recommending to the Prime Minister the announcement of an extension of what I think is an extremely useful and successful scheme and perhaps also visit one of the IT Centres operating already.

It is I believe one of the most valuable and cost effective initiatives we have taken and the placement rate of trainees is very impressive, over 70% of those attending the courses have got jobs afterwards. I am having a factual report prepared by my officials on the scheme, which I will let the Prime Minister have later.

KENNETH BAKER

M35/M35AAF

# Four of industry's bright new hopes. At 16, they thought they had no hope at all.

At the age of 16, these kids found themselves with two options.

They could continue at school, with the prospect of further attempts at 'O' levels. Or join the dole and risk going nowhere on £23 a week.

Taking the second option led them to a third. The chance of an education in computers at an Information Technology Centre.

It paid £25 a week, almost a 10% rise. And with their vast experience of Space Invaders, they were more than qualified to meet the ITEC's BBC Microcomputers.

But there's no need to play the irate taxpayer. They didn't have to burden the State much longer.

Wendy Thompson, Tyneside. Even at her ITEC, they say Wendy was a wild one.

If something captures her imagination, however, she'll give it 100%. And with the BBC Micro, she became seriously hooked on computing.

Not only was she rapidly employed for her newly discovered programming and data processing skills, she was soon writing her own specialised programs.

For instance, she has now written a program which will teach backward children to spell.

Yet, she doesn't have an 'O' level to her name.

Wilmot Jeremiah, London. After a year at ITEC, Wilmot was snapped up by a company called Digitalent.

He had learned how to program a computer. How to take it apart. And what exactly made it tick.

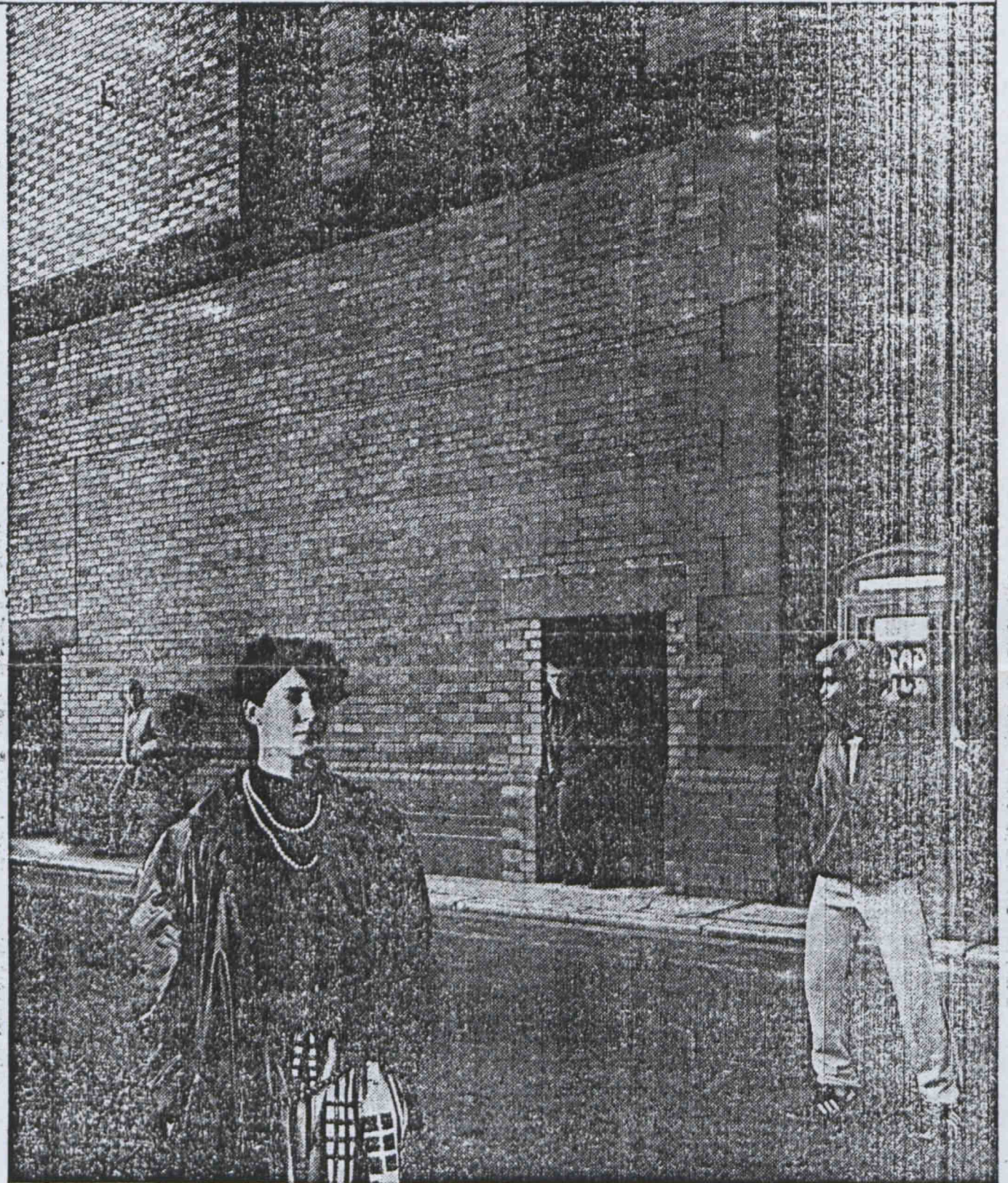
Today, he's helping to develop a music synthesizer which will be able to receive its sound repertoire from a BBC Micro.

And at well under £1,000, it will compete with synthesizers costing over £10,000.

Chris Langford, West Midlands.

In the picture, he's got his back against the wall.

Having spent six months at ITEC, however, a specialist engineering company called V.G. Instruments had no qualms about giving him a try. Chris is helping to run the production and technical data functions.



And his boss says he has all the makings of a professional.

Steve Hill, Sheffield. He's the character in the doorway.

Now, after a year at ITEC, Steve's working for a company called Economatics, specialising in control technology.

In layman's terms, that means developing appliances which are controlled by computer.

Like 70% of the youngsters on the ITEC scheme, Steve Hill has found more than a niche for himself in industry.

Starting from scratch, he has built the foundations of a worthwhile career.

Nevertheless, he does have other ambitions. While he's something of a microchip wizard by day, he's an embryonic rock star by night.

Maybe he should get together with Wilmot Jeremiah and his music synthesizer. Meanwhile, perhaps you should get together with the BBC Micro.

At £399, it has more capacity to become a formidable computer system than any other machine in its price bracket.

And as our young friends have testified, for a start in computing, it's just the job.



For local stockists, ring 01-200 0200. The BBC Microcomputer System is designed, produced and distributed by Acorn Computers Ltd. For a copy of this advertisement, ring 0993 79300.



A  
19/10

70 WHITEHALL, LONDON SW1A 2AS

01-233 8319

*From the Secretary of the Cabinet and Head of the Home Civil Service*

Sir Robert Armstrong GCB CVO

Ref.A083/2942

18 October 1983

*Dear Sir,*

Information Technology Advisory Panel Report "Making a  
Business of Information"

Your letter to Jonathan Spencer of 11 August conveyed the Prime Minister's agreement to the publication of the Information Technology Advisory Panel Report "Making a Business of Information". Publication duly took place on 5 October and I attach a copy of the printed text.

I am sending a copy of this letter and of the report, to Private Secretaries to the Home Secretary, the Chancellor of the Exchequer, the Secretary of State for Education and Science, the Secretary of State for Trade and Industry and the Minister for the Arts.

*R P Hatfield*

(R P Hatfield)  
Private Secretary

T J Flesher Esq



70 WHITEHALL, LONDON SW1A 2AS

01-233 8319

*From the Secretary of the Cabinet and Head of the Home Civil Service*

Sir Robert Armstrong GCB CVO

Ref. A083/2784


5 October 1983

*Dear David*  
*Sub 5/10*

ACARD Report "New Opportunities in Manufacturing:  
The Management of Technology" *See Pt 3*

--- Your letter to Jonathon Spenser of 11 August conveyed the Prime Minister's agreement that the report by the Advisory Council for Applied Research and Development (ACARD) should be published. Publication took place on 4 October. I enclose a printed copy for information.

I am copying this letter, and the report, to the private secretaries to other members of the Cabinet.

*Yours*  
  
(R P Hatfield)  
Private Secretary

David Barclay Esq



NO. 100  
Info Tech.  
A-4



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10 DOWNING STREET

*From the Private Secretary*

DR. NICHOLSON  
Cabinet Office

The Prime Minister has now seen your minute of 10 August about the future of the Information Technology Advisory Panel. She has agreed to the proposals set out in the minute and, in particular, that the Panel should continue, that Sir Henry Chilver should become an ex officio member, that Mr. Charles Read should be appointed as Chairman and that the membership should be rotated.

I am sending a copy of this minute to Neil McMillan (Kenneth Baker's Office) and Richard Hatfield (Cabinet Office).

TIM FLESHER

12 September, 1983

APPOINTMENTS IN CONFIDENCE



10 DOWNING STREET

Prime Minister:

Sorry to come back  
to you on this but  
were you content with  
Adam Nicholson's proposals?

DA

7/9.

Agreed mb



DEPARTMENT OF TRADE AND INDUSTRY  
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PS/Secretary of State for Trade and Industry

1 September 1983

Timothy Flesher Esq  
Private Secretary to the  
Prime Minister  
10 Downing Street  
London SW1

Dear Tim



2/9

IT ADVISORY PANEL REPORT

Thank you for your letter of 11 August enclosing a copy of the IT Advisory Panel Report "Making a Business of Information".

2 Our initial reaction to the report is that it is a stimulating and important document which places a welcome emphasis on the increasing significance of the information sector.

3 The report understandably places a particular importance on the role of Government and, in preparing our response, we will need to consider whether some of the recommendations might not be more appropriately addressed to the private sector. The report also suggests that Government should seek to provide information in a way which promotes new types of information services, but ITAP appear to have significantly under-estimated the financial and manpower implications of Government providing this type of service.

4 My Secretary of State agrees that this Department should take the lead in preparing a Government response. In carrying out this work, we will, of course, consult with other Departments which have an interest in this subject, including the Office of Arts and Libraries.

5 Copies go to the recipients of your letter.

Yours etc  
Steve Nicklen

STEPHEN NICKLEN  
Private Secretary

Ind. Pol.  
IT, Pt 3

DEPARTMENT OF TRADE AND  
INDUSTRIES  
100 WATERLOO STREET  
TORONTO, ONTARIO  
M5H 1A5



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DTI to TF 31/8/83

PART 4 begins:-

DTI to TF 1/9/83



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