

IN CONFIDENCE

SCIENCE AND ENGINEERING RESEARCH COUNCIL
RUTHERFORD APPLETON LABORATORY

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After Alvey
A Note for the IEE meeting 11/4/86
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1. INTRODUCTION

Here is a discussion paper based on some other internal documents which are relevant to the After Alvey discussion.

2. THE ROLE OF GOVERNMENT

2.1 The Public Pipeline

The UK Government plays an influential role in all aspects of IT. Government influences:

- * national IT policy
- * national targets and expectations for IT developments
- * national awareness and attitudes
- * education and training
- * public research and development
- * public purchasing and procurement
- * sponsorship and support of industry
- * national and international regulations and standards
- * the legal framework for the applications of IT.

Responsibility for these roles is split between many Government departments, including DTI, MOD, DES, DHSS, Home Office and CCTA. The IT roles played by government can be viewed as a pipeline which models the industry (figure 1).

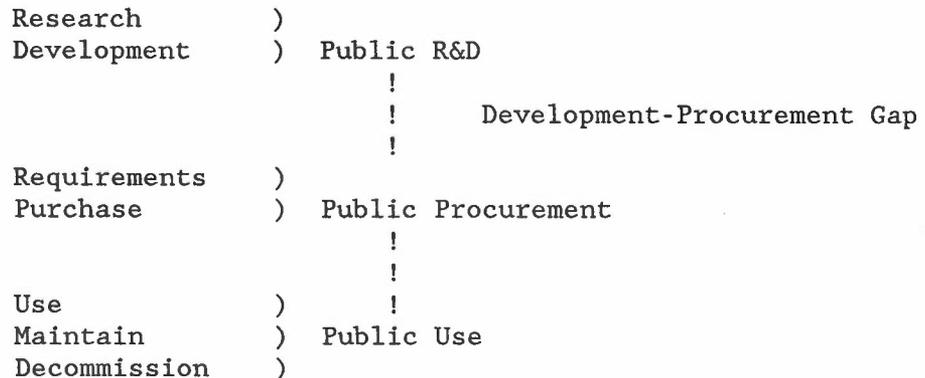


Figure 1 The Public Pipeline

Public funds finance almost all of the long term research in IT and novel applications. Thus government, directly or indirectly, controls the feedstock of the IT industry's pipeline. Much mention is often made of the rapid pace of innovation in and IT. Some products often only have a lifetime of 2-3 years before they are superseded by some new innovation. It should be realised, however, that it often still takes 10-15 years for a novel idea to move from original conception to the product stage. The rapid product evolution is fuelled by the international scale and pace of the continuous Research and Development pushing through into the product domain.

This pipeline and the skills and infrastructure it represents take many years to build up; they need constant maintenance. If the flow is broken, by 'stop/go' funding of research for instance, then gaps in the product stream will occur. Such gaps cause firms to lose markets. These then cannot be recovered because it is either too expensive or impossible to win back these markets.

The need for long term continuity in research and development is recognised by America and Japan. In the UK there is a history of 'stop/go' funding and a fatal tendency to stop funding too soon after the initial stage of research. The UK tends not to push an idea far enough into development so that industry can have a suitable demonstration of the idea's worth, in order to justify further product development investment, or declare the idea demonstrably unsuitable for exploitation.

The Alvey Programme has been a major step forward in bridging the gap between academia and industry, between research and development. In 1983 Alvey was a 'go' force. Due to a lack of forward planning the momentum generated by Alvey is about to be lost as Alvey cannot fund new projects from 1986 onwards. Thus the feedstock of the pipeline is being 'stopped'. This is yet another example both of sporadic Government involvement and of UK inability to push research into development. Such discontinuities are extremely harmful to UK research and industry generally.

2.2 The Development - Procurement Gap

Government departments who sponsor research and development, such as DES and DTI, do not have major IT procurement requirements. Those departments who procure large quantities of IT, such as MOD and DHSS, do not sponsor much research which is not focussed on specific departmental requirements. There is no continuity of departmental support or involvement through the 'research and development to customer' pipeline. This discontinuity means that no one person or agency can 'champion' an idea from its conception through to commercial demonstration or availability. The formal and informal barriers between departments constitute the well known research-development and demonstration gap; they also form a development-procurement gap (figure 1). This renders impotent a major lever to help the IT industry; namely the imaginative use of public procurement to pull new ideas into the marketplace.

The Government's lowest compliant bid philosophy works against suppliers risking innovation, because innovation requires the costs of investment in tools, methods and training. Thus, stagnation and risk aversion pervade those sectors of the software industry which are dominated by Government procurement.

Lack of IT appreciation and skills is worse within Government than it is in Industry. This tends to make many Government attempts to support industry ineffective or even counter-effective.

There is neither widespread perception of a coherent UK IT policy nor of national targets. Views differ from forecasts of unlimited growth to forecasts of the UK becoming a 'slave' of international IT suppliers. National awareness of IT appears to lag behind other nations, in spite of action taken by government departments in recent years.

The UK's competitors are raising the stakes in the competition for the world IT market. Massive foreign government research and development programmes are backed by sensible public purchasing policies, effective technology transfer programmes, publicly assisted marketing and better educated populations. In the face of this competition, the UK must respond decisively if it is to meet these challenges.

2.3 Technology transfer

Technology transfer is the vital stage in the public pipeline where new ideas sponsored by publicly funded R&D need to be helped across into the industrially funded product development and exploitation stages. The UK has created for itself something of a development gap which impedes the exploitation of good UK research. Further, both the industrial and government sectors have no obvious single place to which they can look for advice on emerging software technology. In contrast to the USA's SEI, MCC and SPC and Japan's ICOT, the UK has no single organisation whose remit is technology transfer and which possesses the resources to do this vital job. The pace of technology transfer should be accelerated.

I suggest that Government set up a new technology transfer organisation, similar in concept to the USA's Software Engineering Institute. This new organisation should be a physical concentration of technical skills to give a national focus for IT and applications technology transfer. It should also provide DTI, MOD and other departments with much needed technical muscle.

2.4 Public Sector Research and Development

The majority of IT research is public sector funded. R&D is an essential part of the 'public pipeline'; it is the source of new ideas and, vitally, it is the main source of intelligence about overseas research.

Individual departmental budgets are too small to compete with the massive funding of America and Japan. Only by inter-departmental cooperation, and informed selectivity, can UK research and development keep pace with our international rivals.

The need for long term continuity in research and development is recognised by our international competitors. The UK has a history of 'stop/go' funding which causes serious losses of efficiency, ideas, morale and highly skilled people.

I suggest that interdepartmental coordination of research funding should:

- * prevent discontinuities in funding, thus giving researchers enough lead time to plan properly for expansion, contraction or direction changes
- * quickly answer the question 'what happens after Alvey?' to avoid another discontinuity
- * increase collaboration on R&D between industry, government and academia.

2.5 Training

The public pipeline requires skilled manpower at all levels and in all roles if it is to function efficiently. The IT skills shortage in industry has drained the public sector of most of its skilled IT manpower. This lack of skill seriously affects the quality of work, advice and decision making in the public-sector today.

I suggest that both the public sector and industry implement a programme of in-service training.

3. PUBLIC SECTOR RESEARCH AND DEVELOPMENT 'AFTER ALVEY'

The majority of IT research is public sector funded. R&D is an essential part of the 'public pipeline'; it is the source of new ideas and, vitally, it is the main source of intelligence about overseas research.

Individual departmental budgets are too small to compete with the massive funding of America and Japan. Only by interdepartmental cooperation, and informed selectivity, can UK research and development keep pace with our international rivals.

The UK R&D effort should be viewed as providing the feedstock for the UK contribution to the European community in which the major collaborative programmes should be executed.

The industrial, academic and inter-departmental cooperation exhibited by the Alvey Programme is an encouraging sign that the UK IT community can work collaboratively at both technical and organisational activities.

I suggest coordination of the research and development programmes of all departments to ensure that serious discontinuities do not occur as a result of either starting new programmes (which take time to become effective) or stopping existing programmes without adequately planning what should replace them (or not) so that enough time exists for the R&D community to cope smoothly with the change.

I suggest that the Alvey style collaboration on IT R&D issues be continued and expanded to include those agencies and departments (such as UGC, DHSS) who are not currently involved.

It is vital that the 'What happens after Alvey?' question be resolved as soon as possible. The UK must avoid a 'stop/go' approach to R&D. This causes loss of morale, loss of irreplaceable staff to overseas competitors, breakdown of collaborative working relationships, rundown of infrastructure and a large loss of momentum. With the ever increasing pace of international competition a smooth, continuous transition from the current Alvey Programme to its successor is vital. The plan for such a successor is needed urgently.

I make the following suggestions for the organisation of a successor to the Alvey Programme

- * it must be collaborative between government, industry and academia
- * it must have its own budget, derived from government departments, but under its own control
- * it must have the ability to fund at a flexible level, say from 10-100% depending on the size of the company, the size of the project and the balance of research content versus product development. This could be achieved within an overall, bottom line budgetary constraint of a 50-50 split between government and industrial contribution.

- * it should have the remit to fund research and commercial demonstrator projects.
- * it should fund product innovation research as well as 'enabling' technology.
- * it should be able to fund the development of advanced training courses and materials to speed the dissemination of new ideas.
- * its HQ should be collocated with the technology transfer organisation to ensure adequate technical support and close cooperation between R&D and technology transfer. Both should reside in an R&D establishment to provide a stimulating technical environment in contrast to the arid sterility of the administrative civil service environment.

I suggest that, in overall terms, industry should increase the level of its short and medium term R&D so that the academic community can restore the balance of its work in favour of the longer term work whilst maintaining the industrial collaboration links built up by the Alvey Programme.

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