Covering CONFIDENTIAL

ADVISORY COUNCIL FOR APPLIED RESEARCH AND DEVELOPMENT

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

26 June 1985

Dear Prime Minister

I enclose comments on the 1985 Annual Review of Government Funded R & D prepared by the Advisory Council for Applied Research and Development (ACARD).

The Council are seriously worried by the picture presented in this year's Annual Review. Expenditure on R & D by UK private industry appears to be declining (though we are all hampered by the lack of information available on this), and Government's R & D expenditure plans show a drop of 8% on civil R & D by 1987/88. Our competitors are all increasing their investment in R & D. The competitiveness of our wealth creating industry is likely to be damaged in the medium- and long-term if the UK's science and technology base declines. Additional Government action is, we think, necessary to stimulate greater investment in civil R & D in the UK: industry and Government must work together to restore the investment which we think is lacking.

We are concerned that current Government mechanisms make it difficult to manage and fund R & D programmes of national importance which are of interest to many Government Departments. New mechanisms are needed. In order to improve the synergy between Departments' R & D programmes, we have proposed a set of objectives against which all proposals should be judged: the fundamental principle is relevance to wealth creation.

The 1985 Review shows a comparatively static picture of Government R & D

expenditure. The Council believe that Departments should carry out more evaluation so that they can decide which programmes should be terminated in order to release funds for new R & D projects. Treasury should encourage Departments to review their programmes and adapt to changing needs, by allowing them freedom to re-allocate R & D funds.

The Council find their work on the Annual Review one of their most challenging tasks. We are hopeful that the interdepartmental debates, which were stimulated by our comments on the 1984 Review, will result in more effective utilisation of Government R & D funds. We therefore look forward to receiving reports on the opportunity costs of the present high levels of defence R & D, and on the balance between support for manufacturing and agriculture. We hope that you, your Ministers, and officials will respond with rapid action to our major concerns expressed in the attached comments.

Yours sincerely
Henry Chilver

SIR HENRY CHILVER

Encs.

C

COMMENTS ON THE 1985 ANNUAL REVIEW OF GOVERNMENT FUNDED R & D BY THE ADVISORY COUNCIL FOR APPLIED RESEARCH AND DEVELOPMENT

Introduction and structure of this paper

Before setting out our comments on the data presented in the 1985 Annual Review of Government Funded R & D, we describe the Government's responses to our observations on the 1984 Review. In Section 2 we have concentrated on the total expenditure on R & D in the UK, by Government and the private sector, and have compared this with spending on R & D by other countries. Section 3 contains some of our major comments on the 1985 Review: we believe there is an urgent need for greater coordination of Departmental R & D programmes and, even more important, that there should be far greater "cross fertilisation" between them. We have proposed criteria and objectives which should guide Government in the allocation of its limited R & D funds. In Section 4, we consider selectivity and evaluation of R & D expenditure. We decided to focus on R & D of direct relevance to manufacturing and service industries in looking at the 1985 Review, and our comments on this, and on the need for expenditure to ensure that the results of R & D programmes are exploited to create national wealth, follow more general points in Section 5.

Section 1: Background

1.1 Until the Government announced its intention to prepare Annual Reviews of Research in July 1982 (Cmnd 8591), there was no overall review of Government's R & D plans in the yearly debate on public expenditure plans. The second Annual Review in 1984 provided a clear picture of Government expenditure on R & D in the UK and provided a better understanding of the facts. The Annual Review process has stimulated informed debate within Government, and in industry and academia.

1.2 ACARD has submitted advice on the distribution and effectiveness of Government spending on R&D as reported in the Annual Review, (in accordance with Cmnd 8591). In 1984 we drew particular attention to the costs of defence R

& D; not only that a high proportion of the Government's R & D expenditure was devoted to defence R & D, (often associated with specific procurements), but also that the comparatively large effort in the UK on defence pre-empted technically skilled manpower from other sectors of the economy. We understand that the important issue of the high opportunity costs, to the UK economy as a whole, of this level of defence effort, is being considered interdepartmentally and we welcome the Government's attention to this matter. It remains true, however, that Government expenditure on defence R & D accounts for more than half its total spending on R & D, and it is important that the returns to the UK economy as a whole from this enormous research effort are maximised. We will monitor recent attempts by the Ministry of Defence (MOD) to improve civil spin-off from defence R & D,(for example, setting up foci to stimulate exploitation of inventions at its own research establishments, and encouraging greater competition between potential industrial contractors, as well as prompting companies to adopt efficient, novel manufacturing methods). We may need to return to this important topic when we consider the 1986 Annual Review, taking into account the response made by Government.

1.3 Elsewhere in our advice on the 1984 Review, we commented on the balance between Government spending on R & D and the application of technology in the agricultural industry and manufacturing, and questioned the relationship between Government expenditure and the contribution of each sector to national wealth. We are pleased that the Chief Scientists of Government Departments turned their attention to these matters, and we look forward with interest to their response to our comments. We were also grateful for the opportunity for some of our members to discuss Government spending on industrial R & D with the Chief Engineer and Scientist, Department of Trade and Industry, (DTI), following up our comments on what we considered to be an absence of concentration of DTI spending.

1.4 The 1984 Annual Review included a detailed study of marine science and technology. The commentary on this expenditure was brief. We chose not to comment on marine work because we wished to limit our remarks to fundamental matters concerning the distribution of funds. However, we hope that Chief Scientists are using the data to improve interdepartmental collaboration and sharing of facilities in these fields, and we hope to see evidence of more efficient management of these projects in the future.

1.5 Our comments on the 1985 Review, presented here, build on the dialogue with Government Departments which has been stimulated by our previous advice. In Autumn 1984 we established a Sub-Group of the Council, to consider UK Government spending on R&D in an international context and to relate public and private sector R & D expenditure with other aspects of our national economy. (The members of the Sub-Group, to whom the Council is extremely grateful, are shown in Annex A).

Section 2: Overall trends in R & D expenditure in the 1985 Review

2.1 Before commenting in detail on UK Government expenditure on R & D, we think it is desirable to consider the wider picture within the UK - taking into account both public and private expenditure on R & D - and some international comparisons.

2.2 We view with alarm the evidence in the Annual Review which shows that UK spending on civil R & D is dropping while that of all our competitors in the Organisation for Economic Cooperation and Development (OECD) is growing. We are convinced that a healthy R & D base is an essential pre-requisite for industrial innovation and international competitiveness. The nation's wealth creating activities will be severely disadvantaged in future if its R & D diminishes in quantity or quality. We urge Government to consider the consequences of this worrying trend and to act at least to maintain the nation's research and technology base. Lack of profit in UK companies in the last few years has reduced expenditure on R & D and, even at the best of times, few UK companies spend as much as their overseas competitors on R & D.

2.3 The DTI conducted a limited sample survey of the 75 industrial companies which spend 80% of the total private sector R & D bill, regarding their R & D expenditure, in 1983. The results can only be used to give broad trends but are the only data publicly available for recent private sector R & D expenditure. The survey indicates that between 1981 and 1983, R & D expenditure fell by 6% in volume terms. While R & D in some sectors (e.g. electronics) rose, that in other sectors (particularly in mechanical engineering and aerospace) fell. Recent poor industrial performance by many sectors is, to some extent, the result of insufficient past investment in R & D: this is a vicious circle.

2.4 Total Departmental R & D expenditure, on a constant cost basis (including

the funding of private sector R & D) rose by 3% between 1982/83 and 1983/84 to restore the 1981/82 level, and rose by a further 3% to 1984/85. Future plans are for expenditure to remain at the 1984/85 level in 1985/86 followed by a 6% fall to 1987/88. There is evidence from international comparisons to indicate that Government contributions to civil R & D expenditure in the UK is lower than that in many competitor countries.

2.5 OECD statistics presented in the 1985 Annual Review show that:-

i. the UK spends, in total, about one-eighth of US expenditure on R & D, and about one-third of that in Japan and two-thirds of that of West Germany. The total expenditures include defence R & D which is a higher proportion of the total spend in the UK than in other OECD countries.

ii. US total expenditure on R & D is growing at a faster rate than in the UK, and Japanese R & D expenditure is growing faster than in both the UK and USA.

iii. industry in the UK carries out substantially less R & D than does industry in Japan and the United States (the ratio of expenditure being 1:2:7)

iv. total Government spending on R & D, as a percentage of GDP, is higher in the UK than in France, West Germany, Italy, Japan and the US, but UK government funding of non-defence R & D, as a percentage of GDP, is only about three quarters of French, and less than half that of German, support.

2.6 We do not agree entirely with the statement in the 1985 Annual Review that "there is clearly no `correct' level of overall Government expenditure on R & D" : we think that careful assessment of competitor nations' programmes can give us a guide to the levels of expenditure which are needed to keep the UK in line. (Our best companies make sure that they invest a similar proportion of turnover in R & D as their competitors; the country should watch its competitors). However, as we have already said, we are more concerned that the total national investment in civil R & D (ie Government plus private sector spending) is sufficient to allow us to compete. Our view is that the UK has fallen behind its competitors in its support of civil R & D and we need therefore to see a greater increase in civil UK R & D expenditure in order that

we can catch up our lost ground. The Government's statement in July 1982 (Cmnd 8591) that R & D expenditure in the UK, as a proportion of GDP, is sufficient, is no longer valid. If, as we recommend, the UK's total investment in civil R & D increases, funds must be channelled into research teams of the highest quality: quantitative criteria are not enough, quality must be maintained or improved.

Section 3: A consistent strategy and objectives for Government R & D

3.1 We understand that the mechanisms by which Public Expenditure Survey (PES) plans are formulated tend to limit discussions to bilateral ones between the Treasury and each Department in turn. This means that after each Departmental Minister has discussed major spending programmes with Treasury Ministers, there is likely to be a short debate on the size of the total Departmental budget for R & D with, at most, a brief discussion of the R & D priorities. We suspect that the condensed timetable for settling budgets prohibits any real debate about the Departmental requirements for R & D. What is more, the present mechanisms do not provide a framework for reviewing the R & D programmes of all Departments together, so that the most pressing national research or development needs can be identified. It is possible that, if a Department's total expenditure programme is over-stretched, funds might be diverted from that Department's R & D budget to cover other Departmental needs. Our concern is that R & D budgets which are cut in this way may be those of greatest national importance: they may be of far greater relevance to ,say, industrial wealth creation, than programmes which are continuing to receive support under another Department's R & D budget. Consideration of the totality of Government's R & D expenditure would encourage collaboration between Departments to fund R & D of common interest and which was of particular importance to the UK economy.

3.2 As R & D projects are completed, the released funds are not necessarily made available for new R & D programmes (rather, they just "disappear" into Treasury's hands for redistribution on any Government programme). This procedure discourages Departments from terminating R & D programmes; they tend to prolong them because funds are usually found to continue or extend existing projects. A new mechanism must be found to make it easier for Government to plan and execute R & D programmes which are of relevance to the responsibilities of more than one Department. Projects in space technology, for example, and nationally important projects which pull through new technology,

such as the Severn Barrage, are difficult to finance and manage under the present arrangements. We suggest that Government considers setting up a central fund to foster R & D programmes across Departmental boundaries.

3.3 At present, there is clearly no overall Government policy for R & D - each Department decides its own R & D priorities given its responsibilities. It is vital that Departments' separate decisions are complementary. We are concerned that policies for R & D may be inconsistent from one Department to another. In order to encourage Departments to support a mixture of R & D programmes which is of optimal benefit to the nation, we propose the following common criteria against which R & D programmes should be assessed:

> The primary objective of government R & D spending should be, through economic prosperity, to improve the standard and quality of life of its people, achieved by efficient industries which provide the UK with a strong internationally competitive base. In order to maximise national wealth, the available human and material resources should be used to their full potential.
>
> This objective would be met through R & D funding to encourage:-
>
> the development and use of improved production processes
>
> the development, production and marketing of new products and services, particularly those with high added value.
>
> the creation of new industries
>
> more efficient use of energy and raw materials
>
> the increased utilisation of the labour force
>
> the enhancement of skills

3.4 There will be a continuing need for basic research from which these aims can be achieved. Research and Development to meet the UK's defence needs and other requirements should be designed to make a significant contribution to the primary national objective of wealth creation. Research to support the

regulatory role of Government, (for example on environment and public health), should likewise be related to that designed to enable industry to develop prosperously. Attention should always be given to aspects of R & D policy which provide industrial opportunities for the UK.

3.5 For example, when the many Government Departments with responsibilities and interests in the question of reducing pollution from motor vehicles planned complementary R & D programmes, as much attention should have been given to supporting projects which would have assisted UK industry to develop catalysts, or lean burn engines, which they could have sold in international markets, (and hence generated national wealth), as to studies of the effects of the pollutants on health and on the environment.

3.6 We are also concerned that R & D policies within one Department may not be related to other policies designed to effect the same end point. For example, many of DTI's policies are designed to improve the international competitiveness of UK industry and this is one of the Department's principal published aims. It is therefore appropriate for R & D programmes which are, for instance, designed to improve the efficiency of a widely used manufacturing process, or to develop a novel material of potentially wide applicability and which will provide a competitive edge to UK products, to take priority over R & D for other purposes which are lower down the Department's overall priorities list.

Section 4: Selectivity & Evaluation

4.1 Government R & D expenditure is beginning to be targetted towards objective criteria - a move which we welcome. We welcome the Advisory Board for the Research Councils' initiatives which have stimulated each Research Council to prepare a corporate plan identifying programmes which need to grow, in the national interest, and some which should be stopped because their original objectives have been reached, or because the difficulties have proved to be overwhelming, or because something more promising has been identified.

4.2 Some Departments have well-established machinery for deciding on priorities for R & D spending. For example, DTI receives advice from industrialists and academics on Requirements Boards, as well as from this Council, and that Department has a major planning discussion each year to decide on the

priorities for R & D expenditure under the Science & Technology Act.

4.3 A thorough evaluation of R & D projects is essential before decisions can be made on which programmes should continue, and on which should be stopped in in order to release funds for new projects. It is as important to evaluate what has been achieved, at several stages during the project, and at the end, than to evaluate the potential benefits and economic significance of programmes at the planning stage.

4.4 We welcome DTI's efforts to increase the evaluation of the results of its R & D programmes by expanding the R & D appraisal team. We would like to know more about other Departments' methods of evaluating the effects and effectiveness of their R & D programmes and their impact on the economy. Such investigations should help Departments to adapt their R&D programmes more rapidly (and without recourse to extra funds) to meet changing public requirements. We would like to know whether evaluation work is commissioned by Departments' independent advisers, such as the Ministry of Agriculture, Fisheries and Food (MAFF) Priorities Board and the Department of Energy's Advisory Council on Applied R & D for Fuel and Power (ACORD). Evaluation of the kind we think necessary would make it even more essential for the objectives of R & D programmes to be carefully set out, in quantified terms, as R & D is begun - otherwise it will be impossible to judge whether the initial aims of the programme have been achieved. In section 3 we have elaborated the principal objectives to which the statements of objectives of each individual programme and project should be related and on which they should be built.

Section 5: Comments on aspects of Government R & D in the 1985 Annual Review

a) General

5.1 In the light of the objectives we have set out above, we have considered the pattern of Government funded R & D as set out in the 1985 Annual Review. The summary tables in the 1985 Review (Tables 2.2 and 2.3) show that, over the seven years shown, there is only a slight change in the distribution of funds to Departments and other agencies, although the movement we can detect is generally in line with our 1984 comments. However, defence R&D expenditure is increasing as a proportion of the total so that, by 1987-88, 53% of the Government's R & D expenditure will be on defence, though in absolute terms

defence spending is expected to peak in 1985-86.

5.2 We have looked carefully at the changes within the R & D allocations of each Department, expecting the summary tables to mask considerable shifts in individual research programmes and projects. Although we feel that changes in emphasis have been occurring, even the disaggregated tables (in Part II of the Annual Review) do not provide much evidence to confirm that impression. This may result from use of an inappropriate classification scheme. We understand the good reasons for using Frascati definitions of R & D, but there is a need for more informative categorisation. Even the detailed study of marine science and technology in 1984 failed to produce data which could readily be utilised to assist Government's decision making and planning.

5.3 We would expect, if the objectives set out in Para 3.3 were being actively pursued, that the tables would show some distinct changes in expenditure patterns, as new opportunities arise. We expect to see changes in the distribution of funds for several reasons: the pace of scientific discovery is faster in some fields than in others; some areas of R & D could be identified as relevant to many technologies (they are generic); important market trends also affect technology; in some fields the UK has a lead over other countries and it may be desirable to maintain that lead, particularly in areas expected to find rapid application in goods or services. We would not necessarily expect an area of science which was growing very rapidly 5 years ago to maintain the same momentum today: activity might have passed a peak or the field might be even more active now. We would expect R & D to increase in fields where new market opportunities were emerging.

5.4 We fear that, with current procedures, we are unlikely to see changes because Departments will simply seek to maintain their R & D budgets at the same level from one year to the next. At present there is a reluctance to terminate existing programmes and release funds for reallocation.

(b) R & D of direct relevance to manufacturing industry.

5.5 Much of Government's spending on R & D relevant to manufacturing industry is managed by the Department of Trade and Industry (£363m in 1984-85). The Science and Engineering Research Council (SERC) also funds many research programmes which should yield results useful to industry; SERC spent £268.5m in

1984-85 and of that, £70m was allocated by the Engineering Board which supports work of industrial relevance in the short term; research funded by the Science Board tends to be of longer term relevance to industry. The MoD's development programme (£1.7bn in 1984-85) involves many industrial companies.

5.6 The Council welcomed the initiation by the Minister of State for Industry & Information Technology, of a review of DTI's package of schemes to stimulate industrial R & D: Support for Innovation. We are keen that there should be a major change in emphasis in line with the Secretary of State's announcements in March. We will be watching to ensure that greater emphasis is given to technology transfer activities and that grants are used for research projects with fairly high risk (rather than for the later phases of development), and for collaborative research; also that smaller firms benefit.

5.7 We are very concerned that the 1985 Annual Review shows a planned reduction in DTI expenditure on the vital work associated with improving technology from a planned peak of £395M in 1986/87 to £295M in 1987/88: a decrease of 25%. We question whether this is appropriate when manufacturing and service industries are so important in wealth creation. We recognise that it would be preferable to get the overall economic climate right in the UK so that companies invest their own funds in R & D for future products and processes. However, Government policy has not, so far, been sufficiently effective in stimulating such industrial investment.

5.8 We welcome the plan to change the emphasis in DTI's R & D expenditure towards providing information and consultancy advice to companies about available technology, since gaining a competitive edge by virtue of efficient manufacturing methods, energy saving, improved design for manufacture and better choice of materials, is likely to stimulate UK competitiveness in international markets.

5.9 We understand the Government's reluctance to provide grants to help companies with the final development of products for which there is a clear market opportunity. However, attitudes among financial institutions in the UK frequently operate to prevent companies from undertaking high risk development programmes. The long term value of investment in R & D is not always reflected in the share price: prices are too easily influenced by short term profitability. Moreover, in some circumstances, the profits to be made may

understate considerably the advantage to the UK as a whole from having a certain technological capability. Hence there is a need for a stimulus from Government - otherwise the UK will continue to see its R & D and innovative ideas picked up and utilised by other countries to generate the wealth which should have been ours.

5.10 We are in favour of a concentration of R & D support on particular industries such as the high added value sectors. We appreciate that DTI have decided to utilise R & D funds to support technologies rather than industries, but we feel that their R & D support still appears to be insufficiently backed by other types of assistance to industry. In deciding on which areas to concentrate, the role of service industries, which now represent over two-thirds of employment in the UK, should not be neglected.

c) Technology Transfer

5.11 The concept of technology transfer covers three issues

i. the transfer of technology from Government funded programmes to the commercial sector for wider exploitation (issues relevant to such transfer were discussed in the ACARD/ABRC report "Improving Research Links between Higher Education and Industry" published by HMSO in June 1983);

ii. the spread of new technology from early users to other users

iii. the transfer of technology from one country to another

5.12 One reason for our concern with technology transfer is that, only when developments generated by the use of Government funding are widely disseminated and diffused will the UK see the maximum benefit from this expenditure. It has often been argued that the UK is relatively weak in moving from initial advance and invention to the next stage of exploitation and widespread use, but it is only with the widespread use of new technology that the UK will really obtain benefit from R & D spending. As a small country, it is impossible for us to pursue all potential lines of research, so the monitoring and importing of technology from overseas can make a major, positive contribution to our industrial efficiency.

5.13 In this year's Annual Review, Departments were asked to comment on their technology transfer activities even though these fall outside the "Frascati" definition of R & D. MAFF support some valuable transfer activities through their Agriculture, Development and Advisory Service (ADAS). We acknowledge the potential benefits of this service to farmers and growers, but would like to see a detailed evaluation of the take-up of new technology and methods, and of their ecomomic effects. The research advisory services cost £190M per annum, and we would look for a yield (in terms of increases in production etc) of at least 5 times that amount from such work to justify its continuation. The DTI have spent about £50M a year on some important awareness campaigns (such as microprocessor awareness). We consider that such spending could be of major benefit to the UK economy, and DTI's assessment of the returns to the economy of their Manufacturing Advisory Service indicate benefits worth 12 times the cost. We are concerned that no Department announced expenditures aimed at encouraging transfer of technology into the UK from overseas, though DTI's new plans include encouraging adoption of international best practice.

5.14 In order to assess the real needs of UK industry for advice and help in taking up existing and new technology, we have suggested that DTI should consider an experiment in which they focus funds and assistance on companies in a small region of the country. By providing a saturated level of support, it should be possible to determine the technology needs of companies and to explore the most effective means of assisting them. The results from a 2 year experiment of this kind could then be extended so that DTI's regional offices and consultants could offer an increased and effective service to industry country-wide.

5.15 The Ministry of Defence have set up a new mechanism (the privately owned Defence Technology Enterprises) to transfer R & D from its own research establishments to the private sector. We welcome their recognition of the potential value of some defence-related R & D to civil industry and we await an evaluation of the results of this initiative which we plan to review in 1987.

5.16 Our view is that technology transfer work has been reduced as R & D budgets have come under pressure and that it has been receiving little attention despite its importance. Transfer of Government funded R & D into wealth creating sectors will only be really effective when the criteria we

suggest above, whereby the economic prosperity of the UK is paramount in guiding Government funding of R & D, are applied.

5.17 Another vital part of technology transfer involves the movement of people between universities, research laboratories and manufacturing industry, and vice versa. We are considering initiating a study of current trends in "people" transfer to identify any particular problems facing the UK.

6. Conclusions

6.1 We are convinced that R & D is an essential part of building a successful industrial base for the country because internationally competitive products and services must build on the opportunities offered by new technology and improvements in manufacturing processes.

6.2 We believe that the total expenditure in the UK (Government, plus private sector spending) on R & D in the civil sector has fallen behind that of competitor nations to such an extent that urgent action, by both Government and industry, is needed to prevent the UK becoming even less competitive in future. We can no longer accept the Government's statement in 1982 that the total R & D expenditure in the UK as a percentage of GDP is sufficient.

6.3 This Council recommends that Government machinery for managing R & D be changed so that Departmental programmes are more complementary and synergistic: we have proposed central aims and criteria by which all R & D programmes should be assessed. Changes are also needed to encourage more flexibility in Government's R & D programmes.

6.4 Departments should put more effort into evaluating the benefits of their R & D programmes, using the assessments to decide which projects and programmes are yielding national benefit at an appropriate rate of return and should continue to receive Government support, and to stop other programmes.

6.5 The UK must exploit its own R & D, and that of others, more effectively.

6.6 As the Annual Review process continues to develop and evolve, more and more data are sought from Departments. We think that the process is, nevertheless, helping to raise the level of understanding in the UK about the real role of R & D in improving the country's international competitiveness. Decision making is nevertheless still hampered by the lack of information about private sector spending on R & D.

SRW

10 July 1985

The Prime Minister has asked me to thank you for your letters of 26 June, which enclosed ACARD's comments on the 1985 Annual Review of Government Funded Research and development, and of 2 July, about private sector investment in R & D.

She will be considering carefully with her colleagues the points you make, and letting you have a full reply in due course.

(MARK ADDISON)

Sir Henry Chilver, F.R.S.

PRIME MINISTER

FINANCING INNOVATION IN THE UNITED KINGDOM

Sir Henry Chilver, Chairman of the Advisory Council for Applied Research and Development, has written to you expressing his general concerns about the extent to which UK companies are investing for the future. His letter is attached.

It seems sensible that the letter should be considered at the enlarged E(A) on 10 July which is looking at R&D generally. The meeting will of course have before it ACARDS's comments on the Fifth Annual Review of R&D. Sir Robin Nicholson would then provide advice on a reply to Sir Henry's letter, in the light of the E(A) discussion.

Content that Sir Henry's letter should be circulated for discussion at E(A) on 10 July?

Yes no

Mark Addison

MARK ADDISON

4 July 1985

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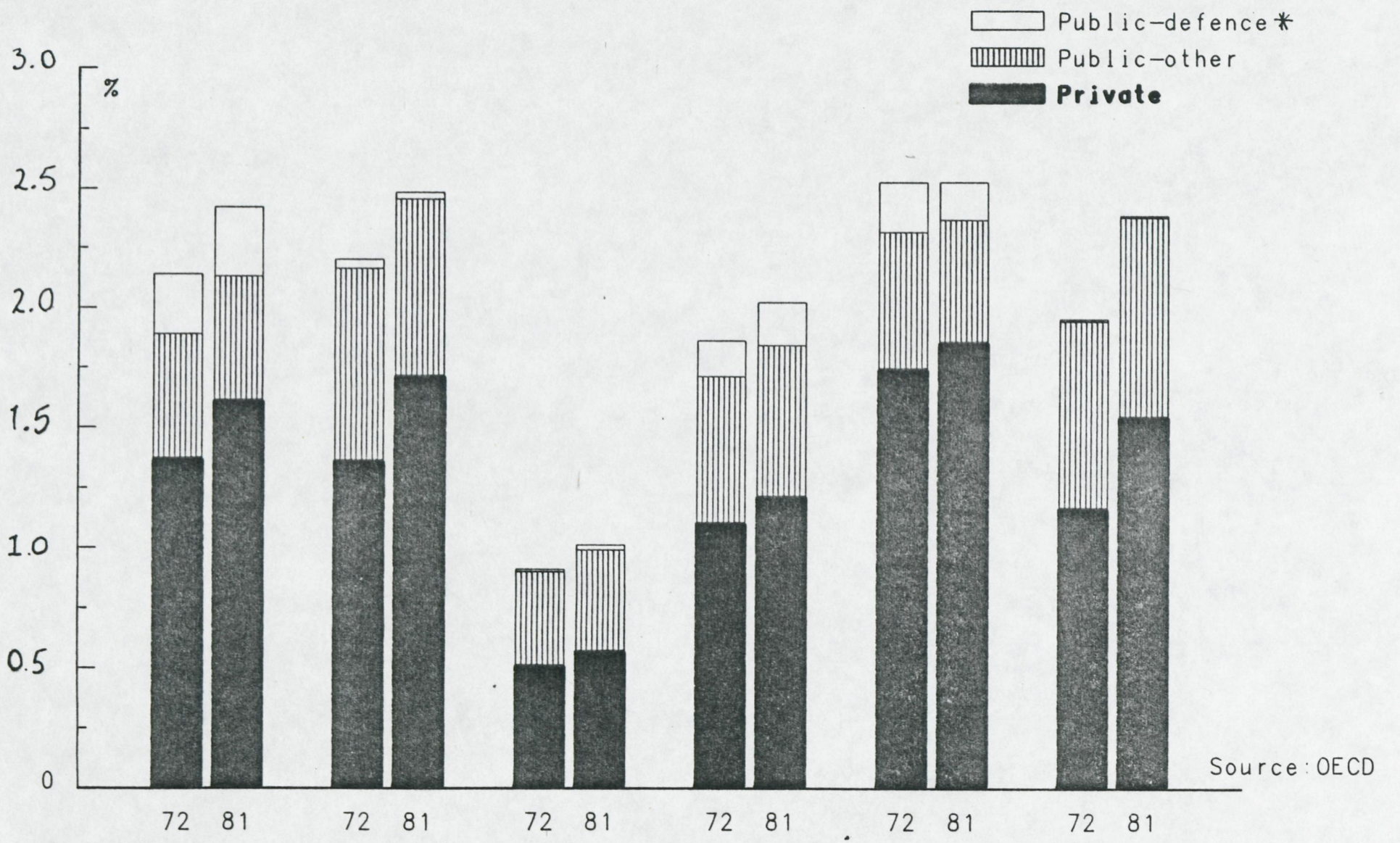
FIGURE D4

R & D share: R & D expenditure as a percentage of GDP



* Assumes split between 'defence' and 'other' in 1972 was the same as in 1974

Spending on research is often related not only to price competitiveness but also to non-price competitiveness, involving such factors as product design and quality as discussed in the previous section. The usual measure, expenditure on research and development (R&D), can be thought of in the same way as expenditure on fixed capital, that is, as an investment which will contribute to output in the future. Similarly the stock of R&D capital can be thought of as giving services, present and future, to the production process, and R&D spending is necessary to increase and/or maintain this stock. Current R&D expenditure flows may be a poor indicator of the stock, or of services from the stock. Because of estimation problems however, similar but more complex than those noted on the figures for fixed capital, the use of such current flows, rather than stock estimates, is unavoidable. Furthermore, again, the usefuleness of such spending depends not only on its size but also on its effectiveness. Figure D4 presents data on R&D investment, privately and publicly funded, as a percentage of GDP. The UK ratios compare favourably with the other countries. The increase in UK share over the period is about the same as Italy, West Germany and France. The increases in share which took place in these countries were largely due to rises in privately funded spending. The USA also increased privately funded spending but this was approximately offset by the reduction in publicly funded expenditure. The share of UK publicly funded R&D rose slightly over the period and in 1981 was third highest after France and Japan. The similarity of the total R&D shares disguises considerable variation in the distribution of the expenditure over the range of industries. The UK has the highest share of publicly funded spending on defence.[3]

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[3]Comparative R&D figures take longer than average to be published so that figure D4 gives a less up-to-date picture than most others. Furthermore, 1981 was a year of relatively low economic activity and may not be representative of any trend.

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MARK ADDISON - No. 10

27 June 1985

ACARD'S ADVICE ON THE 1985 ANNUAL REVIEW

Sir Henry Chilver has sent the Council's comments attached on Government's R & D expenditure to the Prime Minister direct (26 June).

ACARD's comments include some substantial recommendations - for example, that all Departmental R & D proposals should be considered against a central objective which emphasises national wealth creation.

It would be appropriate for the comments to be circulated to Cabinet Ministers, and to other Ministers who will be attending the E(A) discussion of R & D priorities across Government on 10 July as a background paper.

I therefore enclose a draft minute not attached for you to send to the Private Secretary to the Chancellor of the Exchequer and to Private Secretaries of other Ministers; copies of the ACARD comments, with the Chairman's covering letter, are being sent separately.

I recommend that we postpone decisions on how to handle ACARD's 1985 comments until the E(A) discussion has taken place, since Ministers may initiate reviews which could incorporate consideration of matters raised by ACARD.

I strongly support the thrust of ACARD's points. I will include detailed briefing on them for the Prime Minister with my briefing for E(A).

I am copying this minute to Richard Hatfield with a copy of ACARD's comments.

RBN.

SIR ROBIN NICHOLSON
Chief Scientific Adviser

DRAFT MINUTE FOR PS/PRIME MINISTER TO SEND TO PS/CHANCELLOR OF THE EXCHEQUER

Rachel Lomax

cc Cabinet Ministers

and other Ministers ~~attending~~ E(A) discussion of R & D Priorities

ACARD'S ADVICE ON THE 1985 ANNUAL REVIEW OF GOVERNMENT FUNDED R & D

When the Annual Review process was set up (Cmnd 8591), Government invited the Advisory Council for Applied Research and Development (ACARD) to provide independent advice.

A copy of ACARD's comments on the 1985 Review is also attached, together with a letter from Sir Henry Chilver (the Chairman) to the Prime Minister which summarises the Council's principal concerns and recommendations.

The Prime Minister has suggested that ACARD's comments on the Annual Review, together with ACARD's comments, be considered as background to the forthcoming discussion of R & D priorities across Government in E(A). Decisions on handling ~~the 1985~~ ACARD's comments will be postponed until after th E(A) discussion, since Ministers may agree to actions which cover some of ACARD's points.

I am copying this letter to PS (Cabinet).