



House of Commons
Science and Technology
Committee

**Government Response
to the Committee's
Fifth Report, Session
2003–04, *Too little too
late?* Government
Investment in
Nanotechnology**

Sixth Special Report of Session 2003–04

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The Science and Technology Committee

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Sixth Special Report

On 2 April 2004 the Science and Technology Committee published its Fifth Report of Session 2003-04, *Too Little too Late? Government Investment in Nanotechnology*. On 9 June 2004 the Committee received a memorandum from the Government which contains a response to the Report. The memorandum is published without comment as an appendix to this report.

Appendix

Introduction

The Government thanks the Committee for its contribution to developing an effective national strategy for this key area of technology.

The UK's industrial strengths need the support of a dynamic and vibrant MNT infrastructure within the UK. It is important to get the strategy right to satisfy the needs of UK industry, and a good deal of time and effort has been spent crafting the strategy in the last few months. This is an organic process, and the strategy will develop with time.

In the short term it is important to provide support to the existing operational centres in the UK with world class facilities, to strengthen their industrial focus, and enable them to become product orientated. We expect to invest further funding in these centres through DTI's Micro and Nanotechnology Manufacturing Initiative.

The ideal model for the MNT Network of facilities is world class distributed manufacturing centres with focus on strategic areas for the UK e.g. nano-particles, nano-bio, micro-/nanometrology, packaging etc.; with one or two strategically placed major centres having open access catering for a wide range of techniques and technologies to provide incubators for companies, access to expertise, and training facilities. These will be particularly important for SMEs. Government does not believe this is a significant departure from the Taylor report.

However, it is vital to get the structure of these major centres right, with good skill levels, appropriate equipment to meet the needs of industry, a strong industry / product focus, an identified business plan, and strong management. There are examples in the world where such centres have been built in haste without these attributes, and have become white-elephants.

List of recommendations and Government responses.

1. We have not been given a satisfactory explanation for the absence of a successor programme to the LINK Nanotechnology Programme. (Paragraph 14)

The DTI acted with commendable foresight in engaging industry and universities in a nanotechnology programme in the 1980s when few other countries had taken such steps. But the department's failure to build upon the LNP programme with something

similar represents a very damaging failure, which has contributed significantly to the UK falling from a position of international strength in nanotechnology. This lack of foresight and ambition has left the UK in the position of having to catch up. (Paragraph 17)

Government reiterates its evidence to the Committee. The LINK Nanotechnology Programme failed to attract sufficient industry interest to justify follow-on activity. In a time of declining technology funding Government continued to support nanotechnology developments through the Research Councils, the Basic Technology Programme and SMART.

2. In our view, the Taylor Report provided a comprehensive, ambitious, affordable and achievable strategy for the development of UK nanotechnology capability: it provided a ready made blueprint which the DTI could have taken forward and implemented in full. (Paragraph 22)

We question the need for the industrial survey commissioned by the DTI three months after the Taylor Report had been published: it did not add significantly to the body of knowledge that was necessary to inform the framework of future funding. The DTI could have responded to the Taylor Report without this unnecessary delay. (Paragraph 24)

In our view, whilst the Taylor Report has not been completely rejected, there is no doubt that its central thrust has been lost: it is not being implemented in the manner recommended. Instead of the immediate focus being on the establishment of at least two nanofabrication facilities, the available money is being disseminated widely between supporting applied research and the further development of a number of existing small micro and nanotechnology facilities. (Paragraph 27)

We find the DTI's immediate response to the Taylor Report wholly inadequate. We suspect that the initial decision to commission the survey of the UK micro and nano industrial landscape was taken in order to allow the DTI to broaden the focus from nanotechnology to include microtechnology, with its greater commercial potential and ability to attract matching funds. The decision to lump together micro and nano technology for the purposes of the MNT Initiative and to focus on the micro first will have serious adverse consequences for the successful commercialisation of nanotechnology in the UK. (Paragraph 32)

The Taylor report was helpful in initiating further Government investment in nanotechnology. The knowledge gained by international comparisons and how other countries have established infrastructure and applied research programmes have built on Taylor's evidence – all of the major centres around the world have micro system capability. The emerging strategy widens the initial scope of Taylor without significantly departing from its core recommendations.

Government notes that the Committee acknowledges that micro systems technology has the greatest immediate commercial prospects and Government believes it is the most likely field in which to generate industrial interest. Once that is established it is more likely that successful exploitation of nanotechnology will follow. It is extremely difficult, in industrial

terms, to have defined boundaries between what are microtechnologies and what are nanotechnologies. They are invariably intertwined in most product, process and service combinations.

The areas of Applied Research and Infrastructure are not the same as basic science, and industry engagement is essential if these programmes are to succeed, hence the very real need for a comprehensive industrial survey.

3. We recommend that the Government Chief Scientific Adviser liaises with the MNT Network and relevant Government departments to encourage the commitment of resources from departments to potentially useful nanotechnology research, as appropriate. (Paragraph 36)

We agree with this recommendation.

4. We welcome the long-term view taken by the Government in its science and innovation framework consultation but question the need for yet another consultation on such well-trodden ground. (Paragraph 38)

The consultation document on the 10 Year Investment Strategy for Science and Innovation brings together a number of recent strands of work, and is an important part of the allocation of funds under SR2004. It was essential that the Science and Engineering Community was able to input into this process.

5. The sums of money currently committed by Government and other agencies, spent in line with current strategy, will ensure that the UK continues to fall behind our major competitors. We recommend that in its ten year investment framework for science and innovation the Government gives a clear commitment to funding nanotechnology research and development at least over the next ten years at levels significantly in excess of current spending plans. (Paragraph 39)

While the opportunity presented by nanotechnology is an important input to the ten-year investment framework we think that decisions about the allocation of funds to specific areas of research and development should be taken by the Research Councils and the new Technology Strategy Board.

6. The impact of a decision to develop world class centres in the UK on the number of top quality researchers remaining in or coming to the UK should not be underestimated. (Paragraph 42)

Government agrees with this observation.

7. We are convinced that, had it wished to, the DTI had the necessary resources to sponsor at least one nanofabrication facility for the short term. We believe that the UK's industrial and academic strength and its international competitiveness in nanotechnology would have been better served by the establishment of one, if not two, nanofabrication facilities to give nanotechnology in the UK a distinctive focus. The rejection of this option appears to have been based more on regional political than economic factors. A geographically diverse network of small scale facilities is far easier to sell than one or two major centres built upon existing strongholds of research and

development. The DTI displayed timidity and poor judgement in deciding against the immediate development of two nanofabrication facilities. (Paragraph 44)

The Committee has rightly acknowledged the diversity of opportunity offered by nanotechnology. We agree and therefore do not think it right that the bulk of the available resources should be sunk in one centre.

8. The process by which the DTI established the MNT Initiative lacked logical coherence. The means were put before the ends, the broad strategy set before the strategic advisory group formed. The DTI is now left to try to make its strategy work around the constraints imposed by its original decisions. (Paragraph 46)

Government does not accept this assertion. The strategy is being developed and was not decided prior to the formation of the advisory group.

9. We are concerned that the MNT Network Director does not have the remit to give the Network the sense of direction and drive that it needs. (Paragraph 48)

We recommend that the DTI strengthens the leadership of the Network by giving real powers to the Network Director and by engaging the necessary expertise on a more established basis to inform decisions relating to the direction of the Initiative. (Paragraph 50)

We note these points and will review the role and authorities of the Network Director.

10. We recommend that the Network Director and NSAG devise specific and measurable targets covering levels of investment from the UK and abroad, the division of spending on micro and nano technology, numbers of new companies, research outputs, collaborations, graduates and courses. (Paragraph 51)

Accepted. This work is underway.

11. To spend the MNT Initiative funding on the establishment of a series of relatively mature microtechnology facilities would be to throw the Taylor Report, with its emphasis on developing the UK's nanotechnology capability, out of the window. We accept that both the DTI and RDAs need to show a return for their investment, but an insistence on seeing a return in three years for technologies in their infancy is liable to be counterproductive, and inhibit the development of the very technologies that the MNT Initiative is trying to stimulate. We recommend that DTI develop performance measures that are realistic in terms of revenue generation and are based on a longer time scale than three years. (Paragraph 58)

Government accepts the recommendation and such performance measures are being developed.

12. We recommend that the proportion of funding available to SMEs is reviewed after the first round of funding, and amended if the take up is low. (Paragraph 59)

Accepted.

13. The areas identified by the Taylor Report could have formed the basis of six managed programmes for the applied research programme funding strand, complemented by the provision of relevant facilities. (Paragraph 61)

The Applied Research Programme first call for proposals covered a wide range of thematic areas in micro and nanotechnologies. The National Strategy Advisory Group (NSAG) agreed with this on the basis that UK industry should decide what areas have the best commercial prospects. Calls 2 and 3 will note the outcome of the first call and the NSAG will advise on what topic areas are covered in these future calls.

14. We recommend that future calls for proposals in the applied research and capital projects programmes are directed towards the meeting of strategic targets in specified areas that are devised by the Network Director and endorsed by the National Strategy Advisory Group. (Paragraph 62)

Accepted.

15. The patchy nature of scientific expertise in RDAs does not present a strong platform upon which to build participation in the MNT Network. (Paragraph 66)

There is a rapidly growing awareness of the importance of Science, Engineering and Technology (SET), as part of the knowledge base of Regions. Each Region will have a Science and Industry Council in place by December 2004 to oversee the SET strategy.

The Development Agencies are developing capacity to handle Micro and Nanotechnology and through the UK MNT Network Group the scientific expertise of regions can be supplemented, where necessary, to ensure that each region has appropriate scientific support. The closer working with the Research Councils, Universities and Industry, including representation on Science and Industry Councils and Regional Centres of Excellence, will help strengthen the scientific expertise available to all Development Agencies.

16. We have severe doubts about the ability of the RDAs to agree to support, on the basis of scientific and commercial merit, the establishment of a small number of world class micro and nanotechnology centres built on existing facilities. (Paragraph 69)

The work of the network group is premised on the need to have a national strategy which supports critical mass, world-class facilities.

17. We recommend that all RDAs accept the advice of the National Strategy Group and commit themselves, if necessary, to support the development of a small number of facilities which will benefit the whole MNT Network, even though some RDAs would not enjoy the direct economic benefits of such centres. (Paragraph 70)

The Agencies are working closely with the DTI, the Director of the MNT Network, the National Strategic Advisory Group (NSAG) and the Executive Panel (made up of strong representation from NSAG) which carries the authority for the key recommendations on capital projects investments. The chosen approach has been to invite the business and academic communities formally to submit applications to host open access facilities for the UK. To date there has been no decision to place conditions on this selection process

concerning the total number of centres to be funded. Funding one/two or a larger number of smaller centres remains open at this stage. These are important questions which will be answered when the quality of propositions small, and large, is reviewed by the Executive Panel.

18. In developing its MNT Network, the DTI is missing the opportunity to help create the conditions which might produce nanotechnology clusters with a sufficient critical mass to create an impact on the world stage. Indeed, the way the Network is to be run makes it very difficult for such clusters to be encouraged. (Paragraph 73)

Government agrees with the need to foster the conditions to allow clusters to develop and there is nothing in the Government's approach which prevents this.

19. Once the decision was taken not to establish a small number of dedicated nanofabrication facilities, the establishment of an applied research programme and a network of enhanced facilities was the next best option. This network should have been a Nanotechnology Network rather than the Micro and Nano Technology Network that has emerged. We hope that the MNT Network will serve to generate industrial interest and collaboration in both micro and nanotechnology but we believe that adjustments need to be made to the structure if it is to have maximum impact. (Paragraph 74)

We are left with a number of concerns. In principle, we question whether a network involving the exchange of ideas and information can operate effectively both at the near to market level that is envisaged and over the whole of the UK. We are still not convinced that the DTI has a clear idea of what the Initiative should achieve in which areas. There is still no road map and no clear strategy which sets out priorities and goals for forthcoming years. The DTI's decision to operate in responsive mode is not conducive to producing a coherent network of complementary facilities. We believe that a more directed approach is needed to build upon UK strengths. We accept that any strategy needs to be flexible enough to adjust to industry's response and any major breakthroughs in particular areas, but such flexibility needs to be built upon an initial strategy rather than forming the strategy itself. At present, the emphasis is on short term rewards at the expense of the long term strength. This is wrong. The strategy should give some indication of the emphasis to be given to both micro and nano, along with some guiding principles on the geographical distribution of funds and facilities. Above all, there needs to be strong leadership from the top if the efforts of those involved are not to be expended on the internal political wrangling involved in maintaining the network rather than the actual delivery of a coherent micro and nanotechnology infrastructure for the UK. We do not believe that the present structure lends itself to the exercise of such leadership and we have recommended improvements. (Paragraph 75)

The Committee has highlighted the need for good management of the network. That is why we have put in place a strong network director and a high quality advisory group which will evolve the UK strategy. It is why the RDAs and devolved administration have established a strong management group. Government does not agree with the assertion that short-term gains are being pursued. We are developing a balanced strategy which permits companies to realise commercial benefits as they materialise (such as in

Microsystems technology and nano-particulates) whilst encouraging joint working with academe on longer-term nanotechnology developments.

20. We welcome the initiative and commitment shown by the Research Councils in establishing the two Interdisciplinary Research Collaborations specifically relating to nanotechnology and we hope that they will form a prominent part of the MNT Network. We recommend that, provided they perform satisfactorily, the Research Councils should guarantee the future long term funding necessary for them to be able to continue to attract the best researchers. (Paragraph 78)

The Research Councils are committed to supporting world leading research and postgraduate training in both nanoscience and nanotechnology. Both IRCs have ring-fenced funding for a period of six years and will be assessed at regular intervals to ensure that research is of the highest quality and a balanced portfolio is maintained. The evaluations, taken together with input from the respective IRC Steering Committees, will allow the need for future funding from the RCs to be determined and whether further strategic intervention is appropriate. It is anticipated that following the completion of ring-fenced funding, the IRCs will be able to attract substantial support through competitive funding routes.

21. The Taylor Report stressed that in any more focussed strategy, the balance between funding on the basis of quality and encouraging focus was a key issue to be faced by the Research Councils. We do not believe that this issue has been adequately addressed. (Paragraph 83)

The Research Councils welcome this recommendation. Each Council, by appropriate means, conducts a regular review of the balance across their own portfolio, taking account of issues including critical mass, capacity, research quality and degree of focus.

BBSRC recently examined its support for bionanotechnology and as a result updated the remit and launched a refreshed priority in the area. This priority area complements the Applied Research Programme's activity (second call). Whilst BBSRC's responsive mode funding is allocated primarily on the basis of science quality, strategic relevance, such as fit to priority, is also considered.

EPSRC uses seven technology descriptors first articulated by the Materials Foresight Panel to regularly review the overall landscape of its portfolio in nanotechnology. This is coupled with a forward vision for research which has been elucidated in the EPSRC 2003 'Research Priorities and Opportunities' consultative document – a "road-map" of future research priorities.

EPSRC has sought to introduce focus into its responsive mode landscape through the establishment of EPSRC Platform Grants and Portfolio Partnerships for its internationally leading teams. The number of Platform Grants and Portfolio Partnerships will continue to be expanded in the area of nanotechnology.

22. We recommend that the Research Councils balance their responsive mode funding equally with managed mode funding in nanotechnology areas which complement priority areas established under the MNT Network applied research programme as they emerge. (Paragraph 84)

We consider that Research Council funding to the IRCs together with that secured through the responsive mode provides a significant investment in nanotechnology.

EPSRC and BBSRC have chosen to deliver most research relevant to nanotechnology through the responsive mode, since this affords researchers the greatest flexibility to develop their own innovative ideas and to address adventurous research challenges. It also enables the Councils to respond in a timely manner to emerging needs and opportunities.

BBSRC responsive mode has a 'managed mode' element in the form of priority areas. Priority area status is used to bolster weak or emerging areas of science that are of strategic importance or where the user community expresses a need for underpinning science. The identification of BBSRC's bionanotechnology priority was underpinned by findings in the Taylor Report. There is already good alignment between the priorities of the Applied Research Programme and those of BBSRC and the Council will work through the National Strategy Advisory Group (NSAG) to ensure this is maintained.

The overall balance of EPSRC support for nanotechnology is delivered in the ratio, two-thirds responsive to one-third (including the IRCs) managed mode. This balance is regularly reviewed in consultation with the stakeholder community. EPSRC also has a number of managed initiatives which are not banded as Nanotechnology, but actively provide support for nanoscience and nanotechnology, these include, Engineering Functional Materials, Materials Modelling and High Throughput Technologies.

DTI and EPSRC have agreed to jointly support collaborative research projects submitted through the MNT initiative where they meet the priorities of both organisations.

23. We recommend that relevant Research Councils liaise with the MNT Network Director on a cross-Council initiative to improve industrial awareness of Research Council activities and facilities relating to nanotechnology. (Paragraph 86)

The Research Councils look forward to working with the MNT Network Director and each other to enhance the cross-Council interface with industry.

EPSRC's Strategic Plan 2003-2007, sets a target of 50% of grants which should involve genuine industrial collaboration. For the nanotechnology portfolio this level is currently 35%. EPSRC believes further scope for expansion is possible.

EPSRC has developed a sector-based approach to its activities specifically aimed at interfacing directly with industry to disseminate information and develop an awareness of user needs and requirements.

EPSRC has published a number of specific briefing materials on nanoscience and nanotechnology which have been disseminated to both academic and industrial communities including a partnership publication "NanoToday".

24. It is up to the Research Councils to provide a measure of coherence in the provision of research and training opportunities in nanotechnology related fields and to promote interdisciplinarity. We commend the lead that EPSRC has taken. We recommend the Research Councils work closely with the MNT Initiative, RDAs and Sector Skills Councils to identify and address any skills shortages in this area. (Paragraph 92)

The Research Councils welcome the recommendation and plan a joint approach to having an active dialogue with the groups identified. The Research Councils have already worked together in the provision of research and training in the two nanotechnology IRCs and the one in tissue engineering. In addition EPSRC has an active dialogue through their sector teams, DTI and RDAs to establish clear strategic needs from the user base. If a strong strategic case were to be made, MRC would consider ring-fencing studentships and fellowships.

25. We recommend that the Higher Education Statistics Agency collects and publishes information on the subsequent employment of students in sufficient detail to record in a meaningful way the career paths of those engaged in nanotechnology research and development. (Paragraph 93)

Specific Nanotechnology courses are offered by only three HE institutions in the UK. Information on the first destination of these students will be collected by the institutions themselves.

26. Both universities and academics, with a few notable exceptions, have been slow to react to the development of nanotechnologies. That is now changing, with the provision of some nanotechnology related courses, although there has been no strategic attempt to meet the needs of UK research community and industry. It is our view that undergraduate courses in nanotechnology are more of a desperate scheme to attract people into science courses than an attempt to provide the right skills for subsequent employment. Universities should be providing these skills at postgraduate level in an interdisciplinary environment. In future, nanotechnology elements should increasingly form a part of standard physics, chemistry, biology, medicine and engineering undergraduate courses. We recommend that any dedicated nanotechnology courses should be given a kite mark by an appropriate body of nanotechnology experts approved by the Institute of Nanotechnology. (Paragraph 94)

We agree with this recommendation but believe that the standard should be approved by existing professional institutions, such as the IOM³, RSC or IoP, that already accredit courses.

27. We recommend that the Network Director reports back to the DTI, the Research Councils and DfES on the types of skills being demanded by industry and that universities are encouraged to reflect these in the courses they provide. (Paragraph 95)

Accepted. Government agrees that a detailed picture of requirements in terms of the skills and training needs will emerge as the MNT initiative develops and industrial requirements are more clearly articulated. The Research Councils are keen to receive the report from the Network Director on this subject.

EPSRC will work actively with the Network Director, DTI and DfES. To date through EPSRC's own sector work, requirements are only still emerging to the type and nature of trained personnel. EPSRC's approach has been to develop a balanced portfolio of activities in anticipation of these needs from both academia and industry.

28. We recommend that the Network Director takes a proactive role in promoting bids from academics and industry to the nanotechnology and materials programme of the

EU Sixth Framework Programme. We further recommend that the MNT Initiative provides clear links to other European nanotechnology networks. (Paragraph 100)

Accepted.

29. We recommend that the Research Councils examine the need for further research on the health and environmental impacts of nanotechnology in the light of the RS/RAE study and, if necessary, develop an appropriate cross council managed programme, with appropriate funding. Any such programme should be co coordinated with similar research being undertaken internationally. (Paragraph 105)

Accepted.

BBSRC expects that the fundamental research it funds will inform, where appropriate, regulatory issues relevant to the health and environmental impact of nanotechnology. The direct issues concerning the potential health and environmental impacts are of particular relevance to MRC and NERC but all councils will examine the RS/RAE study when published and work together to address this important area in a holistic manner.

Ahead of the recent concerns voiced about the safety to human health of nanoparticulates (and associated nanotechnologies), EPSRC had initiated the assembly of “thematic networks” in the area of nanosafety aimed at surveying the available literature and identifying potential research challenges. These networks will pull together interdisciplinary communities engaging biologists, clinicians as well as physical scientists.

ESRC looks forward to the RS/RAE study's findings in order to further inform the potential of the social sciences to contribute to the field of nanotechnology and to build upon the issues previously highlighted in its report on The Social and Economic Challenges of Nanotechnology.

30. We welcome the establishment of the RS/RAE study into the need for regulation in the field of nanotechnology. (Paragraph 107)

Agreed.

31. We recommend that the Research Councils take the lead in co-ordinating a proactive strategy to promote the dissemination to the public of accurate information about the potential benefits and risks of nanotechnology. (Paragraph 107)

The Research Councils recognise the pivotal role that the IRC's are able to make in communicating advances in science and technology to the wider public audience. Both have developed significant public engagement programmes. BBSRC, EPSRC and MRC will work together to expand their promotion of nanotechnology in light of the RS/RAE study.

BBSRC has already begun to identify public attitudes and issues about nanotechnology that will guide its programme on public awareness.

EPSRC promotes public awareness of science, through the ‘Partnerships for Public Awareness Awards’ (PPA) to enable leading researchers in partnership with specialist communicators to engage in effective promotion of their research. Specific Public Awareness Awards will be developed and encouraged in the area of nanotechnology.

EPSRC will continue to offer nanotechnology researchers public communications training, concentrating on such difficult (and sometimes confrontational) environments as radio interviews, and direct public dialogue.

32. We welcome the recent, if belated, attempts of DTI to raise awareness and encourage nanotechnology R&D. It is big business more than SMEs where most impact can be made and this is where DTI's efforts should be concentrated. A judgment on the success of such efforts will be made when we see the rates of participation in the MNT Initiative and evidence of a step change in investment in nanotechnology by major companies. (Paragraph 113)

Noted.

33. We do not see any realistic prospect of UK venture capitalists changing their relatively cautious approach to high tech companies in the near future. Ministers rightly promote the UK as a good place to base manufacturing industry but they need to be supported by a more favourable climate for obtaining venture capital. If that is not immediately achievable in the UK, the DTI and RDAs should examine the practicalities of providing more structured routes into venture capital sources abroad. (Paragraph 118)

Agreed, though the structure of Venture Capital investment and the need for fund managers to closely monitor their investments usually requires that they be made within a limited geographical area.

The UK Development Agencies agree with the Select Committees analysis on the prospects of UK Venture Capitalists changing their relatively cautious approach. For that reason Development Agencies have in certain cases already taken steps to address this funding gap. Proof of Concept and co-investment funding, in Scotland and in the North East of England (complementing the Regional Venture Capital Fund) have been established. These funds, together with Loan Funds provide a continuum of finance for early stage investment.

In the South East, Oxonica Limited is a major player in the area of applied nanomaterials and has successfully raised £4 m in its latest round of investment. The venture capital firms investing in this round were VCF Partners, BASF Venture Capital GmbH, Generics Asset Management Ltd of the Generics Group and Quester.

NanoMagnetics Limited in the South West uses proteins as a template for the manufacture of nanoscale particles that can be used dramatically to increase the capacity of current data storage systems. Prelude Trust plc, the investment trust that specialises in investing in high growth technology based businesses, has recently invested a further £360,000 in NanoMagnetics Limited as part of a new £1.1 million financing round.

The Proof of Concept Fund in the North East, which was launched as a pilot in 2003 has taken six of the 33 applications to date from the general area of nanotechnology and associated areas of material science. Five of the six have arisen from the region's universities, and all have had input from the appropriate Regional Centre of Excellence for Nanotechnology, Microsystems and Photonics (CENAMPS).

A summary of the technologies are:

- Novel laser wavelength locking technology – semiconductor applications
- Nanoparticles for finger print detection
- Novel mirror coating technology – astronomy and imaging applications
- New bifunctional catalysts – green chemistry applications
- Gold nitride coatings for semiconductor applications
- Novel composite terminations for Zylon fibres – wide range of end uses in engineering

NB some of above are subject to patent applications and any detailed disclosures are inappropriate for this reason.

34. We welcome the fact that RDAs are beginning to address the issue of the funding gap, but we are not convinced that they all currently have the funding or political will to provide the investment required by small start-ups, including those in the high tech and nanotechnology sectors. We recommend that the Government remove current maximum restrictions on the operation of Regional Venture Capital Grant Funds to enable them to be used more flexibly. We further recommend that RDAs earmark a significant proportion of their venture capital funds for investment in small high tech companies. (Paragraph 121)

Rejected. The Regional Venture Capital Funds have been established to address a specific market failure in the provision of small amounts of equity (not grant) funding. Introducing flexibility to the terms of that investment now could allow them to make fewer, larger investments, which would prevent them meeting the original objective. It would also send the wrong signals about Government's commitment to its policies. The proposed Enterprise Capital Funds will operate, subject to state aid clearance, with larger potential investment sizes.

The UK Development Agencies welcome the comments in relation to the provision of venture capital and early stage funding generally for technology based business proposals.

Already, where appropriate, Agencies are putting in place Proof of Concept Funds and Co-investment Funds based on venture capital principles. This complements the funds already in place from Regional Venture Capital Funds. In the evidence given to the Committee, the Development Agencies pointed to the potential gap of up to £2m, which is often not covered by existing structures. The Development Agencies welcome the emphasis the Committee has placed on addressing that gap by encouraging the scope of Regional Venture Capital Funds to be increased above the existing limits of two transactions of £250,000 up to £500,000 in aggregate.

There is evidence that business proposals linked to nanotechnology are now being supported through Regional Funds. An example in the North East is Orla Protein Technologies a bio-nanotechnology business. Its technology platform is based on immobilising the outer surfaces of proteins in a very ordered way – biotechnology at nano scale. Orla received £150,000 for the Regional Venture Capital Fund in 2003.

Regarding the earmarking of a significant proportion of Regional Venture Capital Funds for investment in small high technology companies, there is some evidence that a significant proportion of such proposals are already being supported over a range of technologies.

In the North East for example out of 14 cases since the Fund was established, 6 have been directed to small technology based companies. The East of England regional venture capital fund has reviewed more than 200 proposals in 9 months from early stage business start-ups, of which ca. 80% are high technology. 2 investment proposals are being funded, with 8 more in progress.

35. We recommend that the DTI establish a substantial dedicated proof of concept fund to be allocated in loans of up to £1m to high tech companies seeking to move to the next stage of innovation. (Paragraph 122)

Not accepted. There is no evidence at present to justify such an intervention.

36. We welcome the improvements that are being made to the provision of commercial advice and liaison with business in many universities and the attention the Government is giving to finding ways to improve the knowledge transfer process. We recommend that RDAs liaise closely with university enterprise centres in their regions to ensure that opportunities to tap into RDA and DTI funding via the MNT Initiative and other sources are maximised. (Paragraph 124)

Accepted.

37. We welcome the publication of the simplified guidelines on R&D tax credits. We recommend that the MNT Network Director takes the necessary steps to publicise them as part of his awareness raising activities. (Paragraph 125)

We fully support the introduction and further extension of R&D credits since 2000. It is too early for a meaningful evaluation of the impact that tax credits have had on levels of R&D. We recommend that the DTI wastes no opportunity to publicise the reforms and conducts periodic surveys of awareness to supplement the collection of statistic on take up. (Paragraph 128)

Accepted.

38. The rationalisation of an incredible 180 different support programmes into five, providing around £200m, is very welcome. (Paragraph 131)

39. We welcome the fact that nanotechnology has been identified as a priority industry and has benefited from the majority of the £150m made available by the DTI to support the new innovation strategy. Whilst we are sceptical of the need for new decision making structures in this area, we believe the DTI is right to focus a medium term technology strategy on technologies which may give UK industries a competitive advantage. (Paragraph 134)

Noted.

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